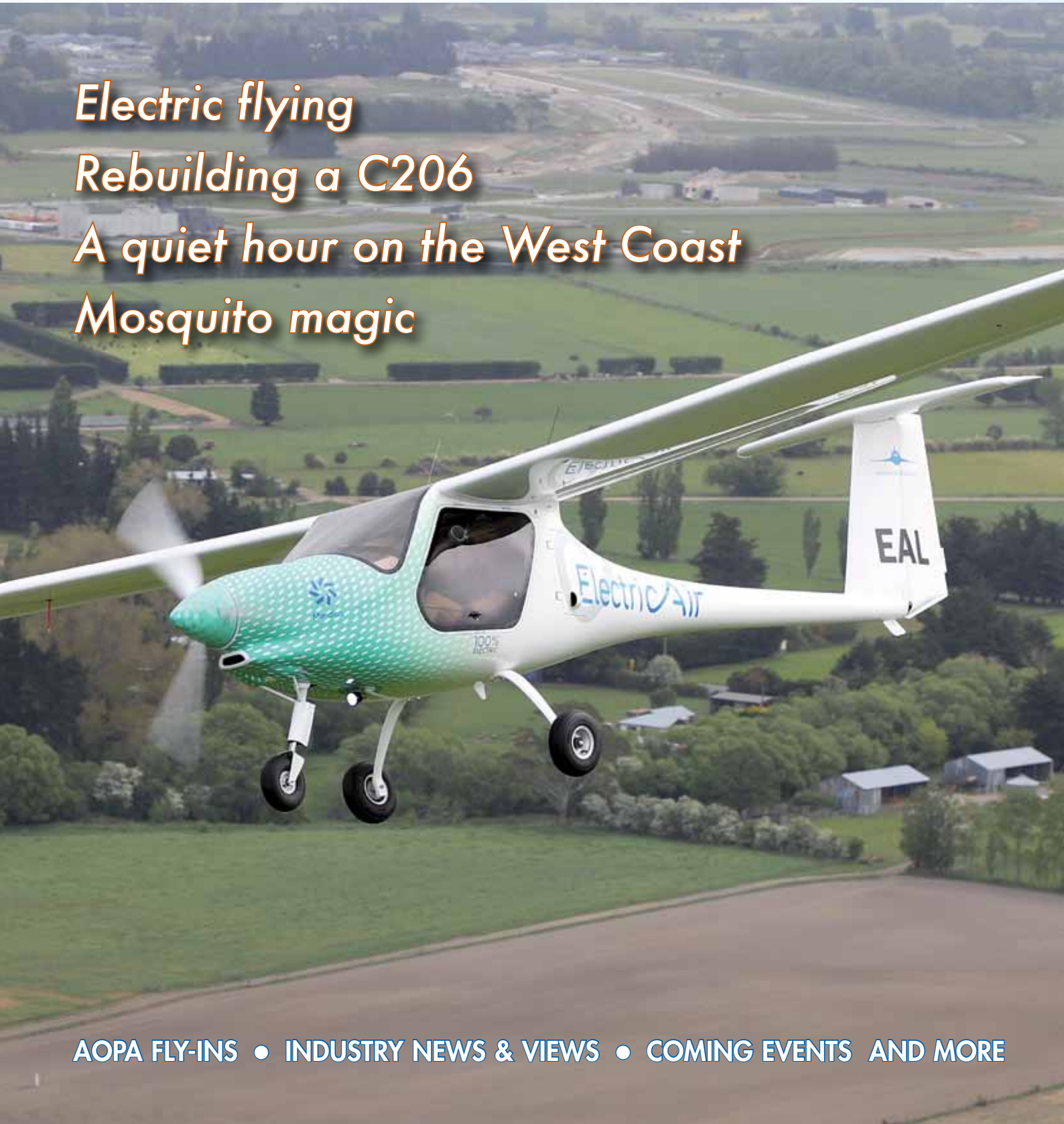
AOPA NEW ZEALAND

Approach

THE NEW ZEALAND AIRCRAFT OWNERS AND PILOTS MAGAZINE
SUMMER 2021



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Approach

***ISSUE**: SUMMER 2021*

ISSN 2422-8230 / 2538-1083 *(Online)*

Coming up

- *AOPA AGM weekend 2022 Tauranga, 25–27 February*
- *AOPA Summer Safari, 27 Feb–6 March 2022*
- *Watch your inbox for notifications of One-Day Fly-ins*
- *For more information visit www.aopa.co.nz*
- *Fly safely this summer!*

Cover photo: New Zealand's first electric passenger plane is put through its paces

Photo credit: Brian Greenwood

Contents

Regular Columns

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Deadline for ads, articles and photos for the next (Summer) issue: **20 January 2022**.

President's Comment

Technology is great, isn't it. The phones in our pockets have massive powers; powers undreamt of twenty years ago. Yet the motor I follow though the skies is based on a 1930's design with an updraft carburetor which, to my mind, looks like a vintage tractor carby…

However, technology is making inroads; I now have a 'magic' electronic ignition system replacing one of my magnetos, and the engine monitoring device gives me comprehensive information about what my engine is doing. I even went for a fly in an 'electrically powered' aircraft last week – see page 5 for more on that.

However, the subject I am keen to share with you is regarding maintenance. I enjoyed facilitating a Zoom meeting of members interested in mechanical matters last month. We were a diverse group of flyers; owners of an eclectic range of planes including a couple of C182s, an immaculate C206 on floats, a C421, and a vintage Stinson. The topic was 'How to streamline maintenance'. We did not solve the problem. However, we certainly identified some of the issues and had a good meeting.

I was quite amazed by the range of experiences aircraft owners have with their maintenance providers. It appears that I am lucky that my LAME is happy for me to tag along for a day or so and do some of the menial tasks which make his job easier. Contrast that with some of the bigger providers, who will basically not allow owners into the workshop; 'do not pass the orange line'. They are no doubt conforming with our authoritarian, cradle to the grave, 'elimination of accidents' legislation; great though this might be, we do pay a price. I really enjoy my day or two in a workshop environment; plus, I am right there able to make decisions as issues crop up. I realise that some owners just want the aircraft sorted and don't want to take part.

Getting back to technology, I was also disappointed to hear about the lack of consistency across maintenance providers' use of modern technology, eg borescopes. It does appear that the main engine manufacturers consider borescope examination of cylinders a critical part of a regular engine service. The compressions are a blunt assessment and once they are low your options are limited. The borescope vision of the cylinder and valves gives a visual picture of health. Even I can see how a 'pizza' pattern on a valve is indicative of even heat and a valve rotating properly. Yet all too often it seems that cylinders are pulled off and expensive repairs undertaken unnecessarily. Whereas other workshops use the tools to effectively monitor engine condition.

When you book in for a service, do you take a recent download of your engine monitor data? I have not done in the past, but will do in future.

On a personal note, I have a valve which looks like a pizza with a segment missing. Ahh. We have checked the part which makes the valve rotate, photographed the valve and are going to borescope again in 10 hours. All seems a logical and systematic process.

Hope I have not bored you with mechanical matters, I was determined not to talk about Covid or medical matters this time.

On a different maintenance front and regarding elderly aircraft, I have been amazed at the skills available in New Zealand. When it came to refurbishing the interior of our well-worn aircraft, I left the detail to my co-pilot, Sue. She did a comprehensive job: comfy repadded and recovered seats, restored panel frame, the smokey plastic lining of the cabin treated in such a way as to make it look like new or, indeed, better than new, fresh modern carpet – all in all JPN is set up for the next forty years.

The airframe seems to be unaffected by age and is actually little different to a new C182. Carbon fibre has not penetrated our New Zealand GA certified fleet to a great extent. By comparison the electric Pipistrel I mentioned earlier is a Light Sport Aircraft and has very modern carbon fibre wings and fuselage, light, strong and streamlined. However, the wings and control surfaces are totally conventional, the laws of aerodynamics have not changed.

I trust you are all having a summer with plenty of freedom and the Christmas celebrations you planned. Your Executive is looking forward to AOPA NZ getting some 'normality' back so we can continue our work to enhance our 'Freedom to fly'.

Best wishes,

Steve Brown, President

Keep on snapping!

A big thanks to everyone who contributed photos for the 2022 calendar.

As usual we've had a great response, receiving 110 images from members – we could have created three good quality calendars! Thanks to everyone who contributed. It's obvious that your dual passions of aviation and photography intersect to our advantage.

There were about 25 photos that were ruled out because their resolution was too low for a printed publication. I think most of them were taken from social media reduced images or device thumbnails, which are a bit grainy once enlarged. We could have contacted some of those contributors to seek higher resolution versions but with the volume of entrants we received we chose not to do that. The photos that made the cut were larger than 1mb and generally over 3mb (the biggest file was 18mb).

You will have received your calendar with this summer issue of Approach. We hope you enjoy it. We've printed enough to get them out to many GA organisations and businesses. Keep your eye out and send some images of people enjoying our calendars to editor@aopa.nz

Time to start thinking about the calendar for 2023! New photos taken from 1 November 2021 onwards can be sent to: calendar.photos@aopa.nz for the 2023 AOPA NZ calendar.

Double benefit with Z

There's always a double benefit for AOPA members when using their Z Aviation avgas fuel card.

First, you'll save 10cents/litre on the posted airfield price of any avgas that you put into your aircraft, and second, you'll be earning either FlyBuys points or Airpoints at the standard rate.

Savings accrued on the average GA aircraft's annual fuel consumption will more than pay for your AOPA annual subscription, not to mention the accumulating FlyBuys points and the extensive variety of redemptions they offer.

You can apply for your Z Aviation avgas fuel card by referring to the Member Benefits page on our website, www.aopa.co.nz.

World record flight across Cook Strait

On 1 November, the electric plane featured on the cover of this issue of *Approach* made its first ever crossing of Cook Strait – the world's longest electric plane flight over water.

Timed to coincide with the UN COP26 international Climate Change Conference, ElectricAir founder Gary Freedman described the forty-minute record-breaking flight as paving the way for electrification of short-haul routes that will help New Zealand meet its emmission reduction targets.

See what Steve Brown has to say about taking a flight in the electric plane on page 5.

A warm welcome to new members:

Tony Bird, Hamilton; Guy Blundell, Arrowtown, Piper Cherokee CUG; Patrick Bulfin, Waikanae, Falconer F11 KEA; James Cherry, Victoria Australia, Beechcraft B58 VH-ITL; Jack Collier, Wanganui; Stephen & Sian Collier, Whanganui, Piper Archer FNA; Paul Copland, Dunedin, Rans S7S ZKC; Michael & Sam Coupland, Wanaka, Piper PA28-161 EQE, Cessna 180 TSM; Graeme Crosby, Auckland; Kelvin Dolton, Geraldine; James Douglas-Clifford, Papamoa, Cessna 180A KDC; Jayson English, Napier; Jamie Gibson, Whangaparaoa; Jason & Amanda Gunn, Waipu, Cessna 172M DRN; Alistair & Jackie Hamilton, Cromwell, Cessna 172 CXP; Lynn Holland, Auckland, Cessna 172P VCT; Leon Hunter, Fairlie; Gary Julian, Whataroa, Schweizer S269C HMX; Bret Lucas, Kerikeri, Beechcraft Bonanza MEC; Hayden McIntyre, Gore, Maule M235C DWR; Don McMillian, Kaikohe, Cessna 172A WPO; Peter Mole, Tauranga; Matt Murphy, Lake Tekapo; Kevin & Pauline Neal; Simon Nicholson, Rotorua, Bearhawk Bravo MGO; Clement Powell, Waipukurau, Aero Commander 100 CTU; Flemming Ravn, Whanganui, Alpi Pioneer 200 WHC; Michael Redgrave, Auckland, Cessna 182T WYT; Damian & Jane Roach-Gray, Wellington; Toby Selman, Christchurch, Cessna 172SP TBN; Gilson Silverio, Queenstown, Zodiac 601 XL FLD; John Sturgess, Auckland; John & Avril Templeton, Wanaka, Alpi Pioneer 300 LAT; Andrew Vialoux, Rolleston, Andrew Ward, Christchurch, Piper Lance PA32-R EIB; Natalia Zuleta, Lake Tekapo

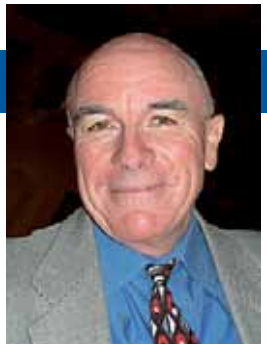
Summer AGM & Safari

Summer 2022: sun-drenched coastlines, aviation bonhomie and flying adventures. What more could anyone ask for?

The AOPA AGM weekend will feature Friday burger night with Tauranga Aero Club, and Saturday Airport-based activities, afternoon AGM and annual conference dinner at Trinity Wharf.

The Summer Safari follows, launching from Tauranga on Sunday 27 February and stopping over at Whitianga, Mercer and Te Kuiti with plenty of fun flying and other activities along the way.

Details are on the website – but be aware that bookings are already solid, so if you're interested in attending some or all of the AGM weekend and subsequent Safari week, don't delay!



Vice-President's view

Ground Hog Day continues. I have managed the grand total of two flights and 69 minutes of flying over the last two months. Covid lockdowns here in Auckland are continuing to take a toll on multiple fronts. At least I can have a picnic though. The priority, when some semblance of normalcy returns, will be some time with my instructor. It's very easy to get complacent and behind the aircraft with such a small amount of currency time.

There are a number of airports and airfields currently under threat in New Zealand, and at various stages of consultation or engagement with the wider community as to their future.

The pressure on the owners of these airports is varied. As is the case with one well known lower North Island airport, it's easy to say financial gain is the driver. But for some airports and airfields, the threat is reverse sensitivity.

Reverse sensitivity, a known driver of change in New Zealand, is defined as the legal vulnerability of an established activity to complaint from a new land use. It arises when an established use is causing adverse environmental impact to nearby land, and a new, benign activity is proposed for the land. That the airport was there first and housing surrounding the airport came well after doesn't stop pressure being placed on the airport to mitigate the complaint, which is generally noise.

What can we do as a group of aviators? Firstly, wherever possible 'fly quiet' over sensitive areas around airports.

Secondly engage with the community in a positive manner around the value that airports bring to the wider area. Understand that we are generally participating recreationally and have a right to do that, but not to force our opinion on others.

AOPA NZ is actively engaging with these issues and with airports on your behalf. Succcess is not guaranteed, but efforts are reaching the highest levels around protecting what, in some cases, are privately owned airports.

What is positive for airports is the rapidly developing electric and hybrid aircraft area. I expect that within five years we will see some quality electric GA aircraft become available and short-haul commercial aircraft start to appear. This will allow a lot more 'point to point' commercial flights, which will benefit numerous smaller airports and bring significant noise reduction.

Sounds Air are leading the way in New Zealand. For more information, visit soundsair.com.

For those of you on the 'mainland' enjoying freedom to fly as I write this, keep flying the flag. I look forward to seeing some of you at the AGM in Tauranga early next year.

Steve Horne, Vice-President

From the Editor

A few weeks ago at a family gathering, one of my nieces confessed that she'd always been interested in doing some flying. Now, there's an easy fix!

The following morning dawned sunny and still. Hamish had a few students booked in at the Aero Club so we arranged to meet at the clubhouse mid-afternoon once his lessons were complete.

BHP was ready and waiting when Harriet arrived with her nine-year old daughter Eleni, who'd decided she wanted to come along, but who began to experience nerves as the moment approached. It's not quite like walking onto a commercial aircraft – her only previous experience of flying – after all.

For expediency Harriet opted to sit with her in the back and we busied ourselves with seatbelts and headsets, Hamish talking calmly about the flight. Eleni was still looking a little nervous as BHP trundled out to the runway.

Five minutes out from the aerodrome Hamish overflew Harriet's childhood home, dipped the wing around our place (looking a little dry, even in October) and headed for Te Mata Peak. Eleni's nerves turned to enthusiasm as the scenic tour continued, complete with tour guide commentary, and went up a notch further as the coast came in sight at Waimarama.

Hamish pointed out the predator-proof fence at the northern end of Ocean Beach – a couple of weekends previously I'd spent a day enjoying this impressive reforestation project at ground level, and seeing it from above added a welcome sense of scale.

Observing the restrictions around the Cape Kidnapper's gannet colony, we noted the guano-painted cliffs and looped back over the up-market Kidnapper's

golf course. The trip back to Bridge Pa offered fresh views of Havelock North and Hastings. When Hamish turned to check on his backseat passengers he recieved beaming smiles and a thumbs up from Eleni.

It's so easy to forget what a first flight in a small plane is like. Given a good day and a spare hour, you can generate so much wonder and delight.

If you're going up anyway, why not invite a newbie along? Even if you don't make an immediate convert, you may well make your passenger's day. And in addition to enjoying your flying, you get to enjoy those delighted smiles and the occasional thumbs up.

Anna Mackenzie, Editor

New Zealand's first electric passenger aircraft

By Steve Brown

I was expecting to be underwhelmed by my first experience in an electric aircraft. Not so.

Maybe it's just that I like flying, maybe it was a nice day, maybe good company… However, I was really very impressed and felt comfortable in and around the Pipistrel Alpha Electro.

The Pipistrel is not the sort of aircraft I would buy; I like long cross-country flights and backcountry strips too much. But as an ideal aircraft for local flight and as a basic trainer, the Electro does tick all these boxes. The range is basically an hour with a thirty percent reserve.

The aircraft looks very sleek and smooth, there are no prominent rivets in its carbon fibre wings and fuselage. Its motive power is provided by an AC synchronous 80hp motor, which of course does not need gearing. This unit provides maximum torque from initial power-up. It weighs 15kg and has a 6000hr service free life. It is reconditioned at the factory and this is mainly checking plus replacing the bearings.

The batteries are Lithium Polymer (21Kw/hour) with the individual battery cells kept separate, which allows monitoring and replacement of individual units if deterioration is identified. The cells are built into metal capsules which reduce the risk of heat buildup and fire. There are two banks of batteries, one forward and one aft of the cockpit.

The standard charger needs 32 amps of 3 phase power and recharges in an hour. The electricity costs $3 per hour of flying – about what a litre of avgas is going to cost soon. The aircraft, including the charger, costs about $240,000 plus freight and GST. This is not much more than a fully refurbished Piper Tomahawk.

Gary Freedman is the owner of the Pipistrel and it is run under a 'Social Enterprise startup company' which has its main goal of promoting environmentally sustainable aviation in New Zealand. Gary is the NZ agent for the Electro.

So, to the flying. Firstly, we had just over half a charge in the battery (plus reserve), which I found a bit disconcerting but it did not phase Gary. Then the motor did not really start… It only goes round when you are ready to move. Preflight was pretty standard, without the engine run up. The battery, motor and inverter temperature gauges were duly noted. The battery range gauge is quite prominent. The seats are very well designed and look light but were very comfy.

So, time to line up and go – the propellor starts to turn once power is applied. And go we did, short take-off run and good climbing performance. My eyes were pretty glued to the battery range gauge, which of course shrank pretty dramatically during climb out but then extended 'magically' once we leveled off. All something any pilot would get used to. We had a 20-minute fly around, controls were light and sensitive. Very pleasant flight. Then we landed, still with 20 minutes plus reserve.

One of the good stories Gary tells is about getting the 'first of type' certification from CAA. Where is your engine log book? But it does not need one. Oh yes it does… So ZK-EAL now has a blank engine log book.

Many thanks to Gary Freedman for educating me regarding the only certified electric aircraft in the world and taking me for a most enjoyable fly. There is a lot of hype and a lot of investment around electric aircraft, so I am sure we will be seeing more of these silent planes in our airspace in the future.

Solitude on the Winter Fly-In

...until the Piper Cubs arrived!

By Ross Millichamp

The annual winter fly-in is – justifiably – one of the busiest events on the AOPA calendar.

For many years it was held in Omarama which is centrally located, generally has favourable weather and is certainly cold enough to justify the 'winter' moniker! However the airfield hotel became yet another victim of COVID and a new destination had to be found. The organising committee settled on Haast, which is an area steeped in back-country aviation history but also known for inclement weather, which can make it a difficult place to get to.

The weather for the 2021 winter fly-in was forecast to be a dying southerly front. Jinny and I departed Charing Cross, near Darfield, in calm and clear conditions but encountered strong winds as we climbed. I figured that if we climbed high and tracked on the upwind side of the major landmasses we should encounter smooth conditions at the expense of a little ground speed.

However the weather in the Alps has a mind of its own and we encountered strong updrafts and downdrafts as we approached the main divide. In response I tracked away from the moutains until back in smooth air and then tentatively resumed a track for Haast. This process was repeated a number of times until we were past the 'big stuff' around Aoraki and were able to descend down the Landsborough Valley and into Haast.

I am always conflicted about the format of fly-ins where we aim to land at as many different strips as possible while they are open to us. While it is great to tick new strips off the list and to spend a full day working on my back-country flying skills, I also know that my wife gets a little bored with the constant cycle of 'find the strip, land, talk with other pilots about planes, brief the next strip and take off'. This year we decided to do things differently.

One of the strips available was the Lodge Strip at Martins Bay. During the summer it is used to ferry clients back to civilisation once they have completed the Hollyford Track Guided Walk, but it had been opened up to AOPA for the winter fly-in. I have been into the Hollyford Valley many times on jet boating trips, but the combination of fishing, hunting, whitebaiting and eating fried food has never appealed to Jinny. The winter fly-in offered me the chance to show her this special part of New Zealand, and a quick stop was not going to do it justice.

At the Saturday morning briefing I learned that John Evans was leading a group around a bunch of South Westland and Fiordland strips. I advised John that we intended to go to Martins Bay on our own and asked him to check in on us when he was in the area, and to ensure that we got back safely at the end of the day. As a back-up we swapped Garmin Inreach contact details, which is a great option for getting help without pushing the big red switch on the ELT. The weather forecast indicated lingering strong southerly winds on the coast but almost zero wind inland. I had seen these forecasts for the West Coast before and never really believed that the wind gradient could be that steep, and so planned to track south along the coast to the Hollyford. Going inland through unfamiliar country was not appealing – those twenty five knot winds would be lurking in there somewhere, I thought.

The Haast airstrip was extremely busy by the time we were ready to leave. We waited our turn and departed south via the well-thought-out winter fly-in departure proceedure. For the first few minutes the radio was alive with calls from groups heading to various destinations to the north, south and east. However,

as we turned the corner at Jackson Bay, our headsets went silent and it felt like we had the whole of South Westland and Fiordland to ourselves.

We tracked southwest along the coast in fairly rough conditions. I flew low and close to the hills to stay in the wind shadow, which worked well up to a point but every time we came around a headland we got a pounding. Jinny sat there stoically but I could see that she was not happy. As we approached Martins Bay I said that we would overfly the strip and, if it was rough, head back to Haast.

We turned the corner into the Hollyford and it was as if we had entered another world. The weather was fine and sunny and the wind had dropped to nothing. Turns out that weird weather forecast was correct!

I circled the strip to get my bearings and to make sure all was tickety-boo below. Who knows how long it had been since anyone landed there? An inspection run used to be merely good practice – these days my insurance policy requires it. The strip was clear of obstacles but did look a little wet and greasy, which can be an issue on shaded strips in this part of the world during the winter when the sun is low in the sky. I came in over the Hollyford River and landed to the north, staying off the brakes in light of the slippery surface. We shut down and experienced something rare on a winter fly-in: complete silence!

Jinny set up a camp seat and made a cup of tea while I grabbed my camera and went for a stroll. Fantails appeared from nowhere and followed me down the track scooping up the insects I stirred up as I walked. As I came out to the river upstream of the lodge I spied a couple of deer standing peacefully on the far riverbank. They would have to wait until I was back in the spring with the rifle. We enjoyed an hour of glorious peace and quiet before the rumble of aero engines announced the arrival of the main fleet.

We had lunch with Gavin Wills and his gaggle of light tail-draggers before heading back north. This time we tracked inland, heading up the Hollyford, into the Pyke, across the head of Big Bay into Durwoods Creek and over a saddle into a tributary of the Cascade. We landed at the Martyr Strip in the Cascade and then headed for the whitebaiter's strip at the river mouth. It was a beautiful flight in perfectly calm conditions and made a mockery of my decision earlier to track via the coast. I was just setting up for an inspection run of the whitebaiter's strip when we ran into the twenty-five knot southerly that was still howling on the coast. I looked over at Jinny and said "We might just head back to Haast." We chose the inland route and enjoyed calm conditions back up the Cascade, over the Martyr Saddle, into the Jackson River and straight into the recommended Haast arrival inland of Okuru.

The 2021 Winter Fly-in was once again a great success. We chose a different approach to most in light of passenger well-being, but still benefitted from the work the organisers had done to make strips available and from the safety aspects of having people nearby to offer assistance if needed. My thanks go in particular to the Hollyford Track Guided Walk Company for opening up their strip and giving Jinny the chance to experience this special part of New Zealand.

Wrong way to New Zealand: part 7

Grounded in the Altai Mountains

By David Berger

The city of Omsk sits just off the north-east corner of Kazakhstan, in the deepest interior of the Eurasian continent, and now we really started to feel the immensity of Siberia.

Scenic moments in the Altai Republic; inset: David coming to terms with fresh pine nuts. Below left: Ob flood plain near Barnaul.

Vast swathes of almost empty land stretched thousands of kilometres in every direction before reaching the coast. North, to the Kara Sea on Russia's Arctic shore, it was 1500km across trackless wilderness to reach an ocean which lies frozen for most of the year. To the west, it was nearly 2500km to the Baltic Sea at St Petersburg. South-west, 3000km back the way we had come, lay Russia's access to the strategically constrained Black Sea. To the south, nearly 3500km away, Karachi sat on the Indian Ocean. And finally, to the east, it was still nearly 4500km to the Pacific.

Meanwhile, our next destination, Gorno-Altaisk in the Altai Republic, sat a bare 800km from the Eurasian Pole of Inaccessibility, that point on the Eurasian continent farthest from any ocean and which lies in the deliciously named, but fiercely desolate, Dzoosotoyn Elisen Desert, on the Xinjiang-Kazakhstan border. It is only when you find yourself plonked in the middle of Russia, metaphorically scanning the horizon for an ocean and finding them all impossibly distant, that you comprehend Russia's geography problem – lack of access to unobstructed ice-free anchorages – and how this has influenced the country's foreign policy over the last two hundred years.

We would come even closer to the Pole of Inaccessibility on the ground, but for now we were focused on reaching Gorno-Altaisk airport, 500nm to the south-east, not too early, so as to encounter a non-English speaking controller, and not too late, so as to encounter darkness. Our route took us east, skirting the north-east corner of Kazakhstan as far as the shallow Chany Lake, a salt lake popular with fishermen, then south-east to Gorno-Altaisk, past the large cities of Barnaul and Biysk.

After the obligatory fly-by for our new friends at Maryanovka, we set course for Chany Lake, which gave us an excellent view of Omsk as we climbed to altitude, then it was once more large tracts of wilderness dotted with occasional tiny settlements. Only in Australia does one also see such enormous cities juxtaposed with such empty distances.

We were handed off from Omsk Tower to Barnaul Control about 40nm west of the city, but were unable to raise them on VHF or HF, a fact which bothered us not one whit, and we cruised on dreamily through the smooth air and unlimited visibility under a high overcast. All of a sudden, however, as we approached our turning point at Chany Lake, the satellite phone

rang. It was Evgeny. Barnaul Control was annoyed with us, apparently, and wanted to know where we were, so they had phoned Evgeny, whose number was on the flight plan. Could we please call them back on the satphone?

One short phone call later and a bout of wounded amour propre soothed, we continued merrily on our way, shortly after coming to Chany Lake, where a small electrical storm was flickering off the lake's north-east edge. The Stormscope dutifully displayed the strikes, which was a relief, because we'd encountered so little lightning on the trip we'd begun to wonder if it worked. Barnaul Control was soon reachable on the VHF. We later found out that they'd scheduled an English-speaking controller especially for us; an extraordinary service showing just how far the country is going to accommodate foreign light aircraft.

As we crossed the Ob River south of Barnaul, the Altai Mountains came into view on the horizon, and it was not long before we were starting our descent into Gorno-Altaisk, remaining with Barnaul Control, because the tower was now closed. There was hardly any wind and we circled to the north for another of Tom's immaculate landings and parked on the apron, where we were met by the airport director, Sergei Kruglov. Sergei had been seconded from Omsk airport for the past four years and flies a nosewheel RV, which he built himself. He was as welcoming as everyone else had been in Russia and after we had tied down he drove us to our hotel in town.

Gorno-Altaisk, the capital of the tiny Altai Republic, is a rather down at heel town of about 65,000 people and sprawls across several valleys in the foothills of the Altai Mountains. The weather forecast for the next week or so was poor and we had a few things to sort out, so we had no imminent plans to move on.

First on the agenda was firming up plans to meet up with renowned long distance flyers, Barry and Sandra Payne (the Bazflyers) from Taupo, in their spotless Comanche. They were on pretty much the same trip as us, only 30kt faster, and were due in direct from Ekaterinburg in a few days. Next, we were hoping to get permission to head across the mountains to the capital of the remote and mysterious Tuva Republic, Kyzyl, hopping east from there into Mongolian airspace, north up Khovsgol Lake and then, via a night stop at a dirt strip at Kyren in the Tunkinskiy National Park, cutting across Lake Baikal to the dirt strip at Ust'-Barguzin on its eastern side. This was always going to be weather-dependent, especially in late September, and was a big ask of Evgeny, notwithstanding his arch fixer status, but we wanted to see if we could pull it off. I mean, why not?

Finally, we had an appointment with the Chuysky Tract, the scenic road that winds 600km south across the mountains from Gorno-Altaisk up onto the flat, windswept plateau on which sits the Mongolian border. There is an airstrip close to the border at Kosh-Agach, but no chance of devilish foreign espionage agents like us getting permission to land in such a sensitive location, so four wheels it would have to be.

It took some considerable endeavour with Google Maps and my rudimentary Russian to find the rental car office in Gorno-Altaisk, which was tucked away in a muddy, potholed yard behind the supermarket. By the time we found it, we weren't feeling very optimistic, but Anatoly, the owner of the business, turned out to be a fine fellow, enthused by our trip and keen to ensure that we experienced the best of what the Altai had to offer. He compulsively picked fresh pine nuts – a specialty of the region – out of pine cones and posted them into his mouth, pressing so many cones into our hands we couldn't hold them all. He was, by any standards, a bit manic; the looks exchanged by his long-suffering employees telling their own story. After showing us pictures of various beasts in states of undress as a result of his many hunting trips, he took us out to a quite presentable Dacia (a Romanian Renault), taking special care to show us how to use the radar detector and reassuring us there was now no way we would ever get caught in a speed trap. He then took a small bottle of pills out of his pocket, a local herbal concoction, he said, which would keep us awake and alert so we could drive for 24 hours at a stretch (or even more!). And then, with a cheery wave, he was gone and we were left to pick our way between the potholes out onto the main road.

From top: one of many remote villages in the Altai Republic; Tom and the Rampie at Gorno-Altaisk; Anatoly and his pills; taking in the sights via the slowest chairlift in the world; and the tourist attraction steamer at Teletskoye Lake.

Rendezvous with 'The Bazflyers' in their spotless Comanche; right: Tom and Valentin in the Altai. Below: Mongolian Border.

There followed a blissful four days' driving down the 600km Chuysky Tract to the Mongolian border and back. We considered a diversion down to the base of Mount Belukha, the highest peak in the Altai, but luckily decided against it at the last moment. It turned out that as foreigners we needed a special permit to even be within 30km of the border and a long diversion to Mount Belukha would probably have got us picked up by the police, an occurrence which even Evgeny's fixing skills may not have been able to prevent signifying the end of our trip.

Like all remote places 'on the edge', the Altai attracts its share of characters who are themselves 'on the edge'. Valentin, a former soldier, has set up a camp on the edge of the wilderness about 30km up a tributary valley, far down near the border. Here, he has a small museum of Soviet military memorabilia, but mostly just seems to enjoy sharing his open fire, his vodka, his kasha (porridge), his homemade (lethal) mechanical sawmill and his good nature with any visitors who happen to pass by. On this day, we sat and shivered and drank and laughed for over three hours with Valentin, some local Russian visitors from Barnaul who seemed to know him well, and a pair of intrepid Swiss overlanders. You can't buy an experience like that, or plan it. You are just privileged to be part of it and you go on your way feeling as if you have tapped into something precious and real, something never to be repeated. It's a rare enough find these days.

By the time we got back to Gorno-Altaisk, Evgeny had the news that the Mongolians weren't going to let us through and, as the weather was looking pretty sketchy for the mountains anyway, we shelved our plans to go to Kyzyl with a heavy heart and replanned for a fuel stop 600nm to the north-east at Bratsk, then on to the dirt strip at Ust'-Barguzin, on the eastern side of Lake Baikal.

On the day Barry and Sandra were due in town we drove out to the local ski resort and took the world's slowest chairlift up the mountain before going to meet them at the airport as they arrived. Barry has spent a life in aviation and the pair of them in their matching 'Bazflyer' jumpsuits were the darlings of the media all the way across Russia, who could not believe that such elderly people were undertaking such an adventurous trip: "But what do your grandchildren think?!"

Sandra became the intrepid 'Flying Babushka' for gushing local TV reporters right across Russia.

We spent a great day with Barry and Sandra, swapping flying gossip and hearing about some of their incredible adventures over the years in Antarctica and New Guinea. The next day, we thought we saw a weather window to get to Bratsk. Freezing levels meant we had to stay VMC over a long stretch of very remote country and we set off with some trepidation, as the first hundred miles or so looked pretty dodgy. Unfortunately, we found ourselves forced lower and lower and within ten miles of departure were scud running at 500 feet, or perhaps even a tad lower. Admittedly we were in reasonable visibility, but when you are a long way from home and safe haven airfields are hundreds of miles apart, discretion soon becomes the better part of valour and we turned back smartly with our tails between our legs.

We went over our options with Barry and Sandra. They were heading to Krasnoyarsk, just a short 340nm hop to the north-north-east, and the weather looked possible for them for the next day. Lake Baikal, however, was now closed for us for four or five days at least, so we bade Barry and Sandra farewell, hoping we would meet up further down the line (we did), and trekked once more through the mud back to Anatoly's office. The next day, our pockets brimming over with pine cones, the radar detector twinkling at us from the dashboard, we were on the road again, this time to the remarkable Teletskoye Lake.

Teletskoye Lake is a couple of hours easy drive from Gorno-Altaisk and from Czarist times on has been one of the major tourist attractions of the Altai. Artybash, the muddy village at the head of the lake, is no Queenstown, but the lake itself, at 65km long and snaking elegantly through the mountains, is rather reminiscent of Lake Wakatipu. It also has its own lake steamer, in this case the Pionier Altaya, a Soviet-era pleasure cruiser which has been plying the lake for over sixty years. We duly boarded and trundled off down the lake to the ubiquitous sound of Russian techno-pop played over tinny loudspeakers. I ventured what I thought was a gentle joke to the charming, if rather intense, young woman who was sitting opposite us. Olga was from Moscow, red-headed as only Russians can be, and had been in the region for the last month,

working for a small independent political party contesting the local elections on a platform of industrial rejuvenation. This was the works outing after the election was over.

"This is such a wonderful ship," I said, smiling, "But of course for the full effect we should have Soviet patriotic songs playing instead of the techno-pop!"

Her face crumpled and she had to bite her lip to stop herself crying. She looked away. "Oh no, that would be terrible. That was a very sad era for my country."

And so the conversation died awkwardly to nothing, Olga excusing herself a short while later.

Notwithstanding this failure of diplomatic relations, the lake trip was as uplifting and relaxing as trips on lake steamers always are. We paid our respects to the two sets of waterfalls at the corner of the lake which formed the ostensible excuse for the outing, ogled at the billionaire's retreat halfway back on the eastern shore, and nosed back into the shore in Artybash thoroughly satisfied and in time for tea. That evening we had dinner at an excellent pizza restaurant overlooking the lake, offered up our customary prayer to windy.com and were obliged by the offer of a weather window the next day but one. It is safe to say that we went to bed, two stuffed aviators thoroughly satisfied with our supplementary Altai excursion.

We drove back to Gorno-Altaisk the next day and arranged to depart early the following morning. The weather was looking quite good, so we asked Evgeny to file VFR for us and I badgered Tom into letting me fly, which he did with all the good grace a nineteen year old can muster when he believes his father is not only incompetent at a task, but frankly dangerous.

This time things went more smoothly and before long we were cruising over the rounded tops of the Western Sayan Mountains, far to the west of the city of Abakan. Siberia has districts and mountain ranges of extraordinary remoteness dotted here and there in a seemingly random topography reminiscent of Middle Earth, and feeling just as mysterious. In the depths of the Western Sayans there still lives the last descendant of a family of Old Believers who fled the Stalinist purges in the thirties and who were only discovered by a group of field geologists in the eighties. As is the way of such things, the discoverers introduced their germs along with the news from outside and most of the family members soon died, leaving just one woman who ekes out an existence there yet.

We were battling a headwind and were relieved to finally reach the enormous airport at Bratsk after nearly six hours. The local light aircraft flyers had been briefed about our arrival and once more we were bowled over by the kindness and camaraderie shown to us. They swung N185MW into their hangar and – Hallelujah! – filled it up via an electric fuel pump. As we rolled it out again, the local air ambulance landed, an AN2 turbine conversion biplane, which we were soon all over. So warm was the welcome at Bratsk, in fact, that we were tempted to stay a while, but our weather window was short, the day was getting on and so we said goodbye to our new friends, promising to stop in for longer next time, started up, took off and set course to the south-east and Lake Baikal!

Rebuild project: C206

By Chris Hoffman

I learned a lot about aircraft ownership and refurbishment from Brian Souter. That was back in 2008, when Brian owned ZK-EIF, a Piper Arrow 3 that was online at the Wellington Aero Club, and it needed some attention.

It was a plane I used regularly to fly across to Takaka where my in-laws lived, but the engine was reaching TBO and its IFR avionics panel needed upgrading. Brian offered me a fifty percent share to enable funds so we could set about re-building it – a new prop and remanufactured engine, repaint with a new interior (leather seats), and avionics re-equipped with a modern GPS and PFD (Primary Flight Display glass panel replacing the six pack of gauges).

Cast ahead ten years, and I had completed a CPL and IFR rating, the plane was PBN-certified (Performance Based Navigation standard for IFR) and, with Brian retiring from active flying, I had taken over full ownership.

With aircraft ownership, the pundits talk about identifying your mission. Mine was to fly my family to Takaka to visit the in-laws – with four kids, a dog and sometimes extras like bikes or Christmas presents, I often made multiple trips to get everything over from Wellington to Takaka. With Brian's retirement from flying I relocated the plane to Paraparaumu. The option of an IFR return on Sunday night to NZPP kept me interested in keeping my instrument rating current. But as the kids grew up, the problem with the four-seat Arrow became more apparent. Like a lot of four-seaters, especially IFR equipped planes, it is really a two- to three-seater, allowing for a decent safe fuel load with options for alternates and more than just a handbag as luggage. A weekend to Takaka with another couple was not an easy trip to plan.

The other thing I began to realise was the limitation of a retractable undercarriage: visiting off-aerodrome grass strips in the Arrow was a potential lottery, given the very limited prop clearance and take-off performance.

So about three years ago I began looking for alternates. The Cessna 182 and 185 looked interesting. I joined Pat Lyford in a share of Piper Cub BQX to get some tail-dragger time, but soon came to the realisation that I was not going to be pushing the limits in the back country. Lots of the 185s had been ground looped while the 182 load-carrying capacity was only slightly better than the Arrow, so a 206 looked like a great compromise. With 300Hp and six seats it was really a four-seater with full fuel and lots of bags, and with some upgrades to the undercarriage and a STOL kit on the wing, a really great answer – especially with IFR avionics!

So began a quest for knowledge. The Cessna 206F and G models seemed the best option, manufactured during the 1970s until Cessna stopped making them in 1985. They had great load-carrying

capacity and various options from an avionics perspective. The Cessna 206H model (turbo and non-turbo) was produced after 1998 when Cessna began manufacturing again, and had options for G1000 glass panels, but these were out of my budget. So began a worldwide search for a 1979–1985 C206G with an engine at TBO. I have to thank Mike Scotter, a pilot and LAME who knows everything there is to know about 206s, for his help and guidance.

After several near-purchases from the USA and Europe fell over, I began to look more closely at options available in New Zealand. The older 206F model was included in the search. And my understanding of the effects of corrosion and SIDs (Cessna's Supplemental Inspection Documents listing an ever increasing set of inspections for an aging GA fleet) took a giant leap.

It seemed that most of the imported 206s came in second-hand from USA. If they operated on floats there, they were factory corrosion proofed – but most did not. After some searching, I found ZK-DWX, a 1975 U206F model that had been imported new and was factory corrosion proofed as an international export model. From new it operated from several high country stations in the South Island then spent a large part of its life flying commercially from Queenstown on the Milford run. It was sold when a problem with the engine was identified, and then found its way to Whangarei where it was used to ferry forestry crews. Another 200 hours on the engine put it close to TBO, but it was still running sweetly so worth a look.

After lots of emails, photos and phone-calls, I made an offer then Mike and I paid a visit. It all checked out and we flew it back to PP. It appeared a very honest machine – it flew straight and true, with no significant damage history and, although long on hours, the SIDS were all up to date and the engine was about to go on to condition. This kept the price down, as commercial interests would need to re-engine immediately, whereas I, as a private Part 91 operator, could continue operating it with the engine 'on condition' as long as an engineer was happy to sign off on it.

The interior had a basic six pack VFR panel, no autopilot, basic radios and engine monitoring, the original upholstery and worn seat rails. The windscreen glass and exterior paint were okay but there was some pitting on the oleo and main undercarriage. These would need a look sooner rather than later. The transponder installed was a Trig TT31, the same as I'd used in the Arrow, and able to be retained as, once linked to a GPS source, it would be ADS-B out capable.

After six months flying it, I was happy with the purchase. The engine was now on-condition and seemed to be holding together okay, and so began stage one of the refurb – everything except paint, prop and engine, which are stage 2.

There was plenty to plan and coordinate – complete panel and interior strip, refurb carpets, seats and rails and undercarriage legs, re-chrome the front oleo, add a heavy-duty nose fork for the new larger tyres, then add a Sportsman STOL kit, micro-vortex generators on the flying surfaces and add in some high-intensity wing-tip lights. Apart from the STOL kit this was a similar level of upgrade to that we had undertaken on the Arrow – all under control… Yeah, right!

As anyone who has done this before will tell you, expect a budget overrun and be prepared to be flexible and adaptable to cope with the unexpected and then compromise as needed.

The goal was to replace the panel with a Garmin G3X 10" PFD with a 7" second panel for the engine information system (EIS) – a full engine computer and

From top: original panel and upholstery; panel stripped for new yokes and avionics; new panel good to go; new upholstery and proud owner!

replacement for all the engine monitoring gauges and fuel and oil gauges. With a Gamin G5 back-up PFD, the Garmin GFC500 autopilot now had its STCed (a Supplemental Type Certificate is needed to add things to certified aircraft) for this 206 model, and comes with a flight director and yaw damper, and when linked to an IFR GPS, like the Garmin GTN650Xi, the package integrates well and would be able to be PBN certified without too much drama. The Trig TT31 transponder is only ADS-B out, so I used the G3X option of a remote receiver that linked in to display traffic on either of the screens.

I like flying IFR routes and enjoyed the back-up VOR/DME equipment we had on the Piper Arrow, so I bought a second hand DME from USA and added in the second radio, a Garmin GNC255A linked to it to provide a full back-up in case of GPS failure and the need to fly the ground-based NAV aide approaches as an extraction.

The next step was planning the interior refit. I had visited Brent Hill and the team at Generation Global in Nelson and we selected a leather seat option with matching carpet and trim, including the nice touch of wooden arm rests. When the interior was gutted I loaded my SUV and drove all the interior panels and six seats over to Nelson and Brent and his team set to work. They did a great job.

Back at PP, Neil Morris of Aviation Limited and Nick Wisnewski and the team from Aviation Radio Ltd had set to work rebuilding the interior – fitting the autopilot was a chore, as was replacing the seat rails. Then they started to rebuild the panel. This included me sending the LED backlit part of the panel to Florida for a ten day turn around to provide the backlighting to the lower part of the panel. The undercarriage was stripped and repaired then the plane was made airworthy enough to be flown over to Nelson to have the interior refitted. I had to get the two front seats shipped back to allow that to happen. It all went well and then the final push was made to fit the Sportsman STOL and new wing tips, and the Avionics were signed off for PBN IFR. This included calibrating new CiES fuel sensors in the wing tanks, which are accurate and a great back-up to the fuel

New upholstery including wooden armrests.

tabulator when working out fuel remaining. With the new engine computer, the fuel burn is now 50l/hr lean of peak with a TAS of 135knt.

Another 50 hours later, and Sally and I have enjoyed the benefits of a true four-seater – my mother Molly and sister Helen joined Sally and I at the Ruatoria 60th anniversary weekend celebrations (see Helen's story in the Autumn 2021 APPROACH).

What's next? Well, saving the pennies for an engine and prop upgrade (to the IO-550N with 310Hp), and perhaps a re-paint. In the meantime, we're planning to join lots of fly-aways and to make more trips to Takaka.

Maniototo Fly-in

By Murray Paterson

September 24th dawned crystal clear across the South Island, which always encourages aviators to venture out to enjoy the day. And what a great day the One-Day Maniototo Fly-in proved to be!

We were very fortunate to have permission to use Kyeburn Station airstrip, located on the Naseby to Dansey's Pass road, for our first gathering point. This strip runs very slightly uphill to the northwest and is 700m long.

A great turn out of 29 aircraft flew in from just north of Invercargill all the way up to Rangiora, and included several who were attending a fly-in for the first time and were excited to be part of the fun. The group included two R22 helicopters – we can cater for all makes, models or types, so long as they can land and take off on the available strip!

After lots of chat, home baking and a cuppa, we set off to Idaburn, located between Wedderburn and Oturehua.

Idaburn strip is a huge triangular paddock with 900m available on the longest side. Aircraft can use any part of the paddock. Once on the ground we pulled out the rugs, coats and deckchairs and made the most of the day. The chatter almost drowned out the passing traffic.

The one-day format continues to prove its worth, partly because these events tend to be held on good weather days and on strips that are very accessible. And a shout out here for the strip owners – without them, the fly-ins wouldn't get off the ground!

On this occasion the Mackenzie family at Kyeburn Station and the Becker family at Oturehua, both of whom have been very generous to AOPA over the years, kindly welcomed us, and we thank them both for their superb generosity.

Safety key as new wave of UAVs take off

With the latest wave of commercial-application UAVs (unmanned aerial vehicles) ensuring UAVs are ever more common in our airspace, it is timely to remind ourselves of the importance of NOTAMS in our flight preparation, and as an essential component of our aviation kit.

Yes, we share the sky with UAVs. Over the last decade a recreational toy has become familiar to the city-dwelling certified Part 102 real estate agent pilot. A search of the internet will reveal articles on topics such as a passenger shuttle UAV at Dubai Airport, and land owners promoting the agricultural capabilities of UAVs.

The latest *Vector* magazine (Spring 2021) informs the aviation community of a BVLOS (beyond visual line of sight) operation. This BVLOS operation will be a certified Part 102 operator. The UAV technology operation will inform and comply with rules guiding where their craft can fly, in what airspace, how high, and how it engages with other airspace users. Hence the NOTAM and AIP Supplements.

An interesting read about air logistics company, SWOOP AERO, can be found at https://swoop.aero. The company focuses on responsiveness for pathology, pharmaceutical, cold chain, and urgent blood supply. Known as a 'Kite', this ship is sized to allow easy operation, and this little bus can travel at 200km/hr for up to 175km (94.5nm) carrying 3kg of medical supplies, or 130km (70nm) with 5kg of medical supplies.

The Swoop Aero Kite can fly in most wind conditions and is controlled by a Detect and Avoid System (DAA technology). Swoop Aero states that its Kites have advanced flight control algorithms that continuously monitor the airspace and maintain complete situational awareness to allow them to make avoidance manoeuvres automatically. Multiple autonomous Kites can be operated simultaneously anywhere in the world via one operator using an iPad!

This technology 'swooped' into New Zealand to address the problems created by the loss of 106 hospital beds when 200 DHB buildings were damaged by the Christchurch earthquakes, and to meet increasing demands for improvements in environmental sustainability.

The Kite is seen as a tool able to deliver medical supplies to those in need when there is a lack of accessibility to health services – during a pandemic perhaps? It is sustainable, environmentally sound and offers contactless medical drone deliveries.

As this and similar technology is embraced, NOTAMS and AIP supplements will become even more important documents for safe flight navigation.

Swoop Aero has this technology ready to fly from January 2022, and it is recommended to subscribe to UAV updates via the CAA notifications in the CAA website: https://www.aviation.govt.nz/about-us/email-notification-service/

The crux of the Vector safety article is that if reliance on NOTAMS is the expected safety mechanism for GA and UAVs to share airspace, pilots need to step up and make this part of their pre-flight. There was talk of Met and IFIS combining to make one report… which makes sense, and it would be great to get everyone on a single platform of pre-flight knowledge. It also provides even more reason to stick above the legal minimum heights of 500ft, as many UAVs operate below this.

Hot heads

What to do about uncomfortably high CHT

By Mike Busch

For decades, I've been preaching that the two keys to piston aircraft engine longevity are avoiding extended periods of disuse and managing cylinder head temperatures.

If you allow your engine to sit unflown for weeks at a time, you risk internal corrosion – and corrosion is the number one reason that engines fail to make time between overhauls (TBO). If you allow your CHTs to get too hot, you increase the stress on the engine's reciprocating components (especially connecting rod bearings and bushings, piston pins, and valves), and increase the risk of catastrophic failure from destructive detonation, pre-ignition, and head-to-barrel separation.

In a perfect world, we would have sensors in each of our cylinders measuring peak combustion chamber pressure, and instrumentation that would let us see this in the cockpit. This is exactly the way engines are instrumented when they run on General Aviation Modifications Inc's (GAMI's) engine test stand in Ada, Oklahoma – one of the most sophisticated piston aircraft engine test facilities in the world. But it's not practical to install this sort of instrumentation in our aircraft, so CHT is our best proxy for internal cylinder pressure (ICP).

If we want to protect our engines against excessive ICP, we need to limit CHT to a reasonable value.

What is reasonable CHT?

Just this week, I received an inquiry from the owner of a Van's RV complaining that he simply couldn't keep the CHTs on his Lycoming IO-360 engine below 370°Fahrenheit no matter how hard he tried. I explained that 370°F was not a realistic CHT limit for his engine, and in fact was a bit cooler than optimal. I'm not sure where he got the idea that he should limit his CHTs to that extreme.

With some exceptions, I like to see CHTs no greater than about 400°F for Continental engines and 420°F for Lycomings to avoid stresses that may be detrimental to engine and cylinder longevity. Statistical studies from my company's database of engine monitor data show that Lycoming CHTs run about 20°F hotter than Continental CHTs, and for good engineering reasons – chiefly Lycoming's use of sodium-filled exhaust valves that transfer heat from the valve to the head more efficiently than the solid-stem valves Continental uses. Lycoming cylinders are built to take this additional heat, with a more robust head-to-barrel junction.

Continental head-to-barrel separation

This is reflected in Lycoming's higher redline CHT of 500°F, compared with Continental's redline of 460°F. It's important to understand that these CHT redlines should be treated as emergency values only. We never want to let our CHTs get anywhere near that hot. (I once reviewed engine monitor data from a Continental-powered Cirrus SR22 whose pilot allowed one cylinder's CHT to slowly rise to 466°F – just 6°F above redline – at which point the cylinder's head abruptly separated from the barrel and the pilot found himself flying behind a five-cylinder engine that was running rough as a cob.)

Personally, I like to leave myself a little cushion, so I'm inclined to set CHT targets of about 380°F for Continentals and 400°F for Lycomings. These aren't not-to-exceed values, they're just comfortable targets. A good way to think of them is to imagine a CHT gauge with a green arc that tops out at these targets, followed by a yellow arc that extends 20°F higher and terminates with a redline. This is different from the actual markings on your CHT gauge, which probably has a green arc extending all the way up to the manufacturer's redline of 460°F or 500°F, but it's good mental image to use to ensure maximum engine and cylinder longevity.

These numbers should be adjusted for some special situations. They should be adjusted downward by 20°F or so if you're flying in unusually cold outside air temperatures (below ISA), and also if your aeroplane has an extraordinarily efficient cooling system (eg, Cirrus, Columbia, Diamond). Also, the not-to-exceed values should be increased by about 20°F when breaking in new or newly honed cylinders, because CHTs naturally run hotter than usual for the first few hours until break-in is complete.

Also, while we don't want CHTs to be too hot, we don't want them to be too cool, either. If CHTs get cool enough, there may be lead scavenging issues that cause excessive deposit build-up in the combustion chamber and particularly on exhaust valve stems, resulting in valve sticking issues (especially in Lycomings). For this reason, I suggest your mental CHT green arc extend downward to about 350°F for Lycomings or 330°F for Continentals, with a yellow arc below. That'll keep you in the sweet spot.

Keep in mind that there's nothing magic about any of these numbers. Nothing terrible will happen if a CHT runs in the 'mental yellow arc' or if it briefly exceeds the 'mental redline'. I'm offering them only as suggestions, not commandments or operating limitations.

Cures for hot cylinders

You ought to be able to keep your CHTs in the sweet spot if you're paying attention. But what if you can't?

In that case, you need to diagnose why your cylinders are running too hot. There are three common reasons for high CHTs, and your mission (if you accept it) is to figure out which one is the culprit.

One common reason is that the too-hot cylinder is running too lean. If it's a fuel-injected engine, perhaps there's a partially clogged fuel nozzle; if the engine is carburetted, maybe there's an induction system leak. This issue is super easy to diagnose. Simply do a test flight in which you first cruise with a rich-of-peak (ROP) mixture, then switch to a lean-of-peak (LOP) mixture. If a cylinder is running too lean, it'll have higher-than-normal CHT during ROP operation and lower-then-normal CHT during LOP operation.

Frequently such a cylinder will 'switch rank' from being the hottest cylinder when ROP to being the coolest cylinder when LOP. If you see this, you can be sure the cylinder in question has a mixture issue.

A second common reason for a hot-running cylinder is that there isn't sufficient cooling air passing over the cylinder's cooling fins. That's generally due to some issue with the engine's rigid cooling baffles or flexible baffle seals. If there's a cooling air problem, the cylinder will run hot both ROP and LOP since the cooling airflow isn't affected by the mixture setting. If you

suspect this might be the issue, you may want to look at my column 'It's Baffling' in the December 2020 issue of AOPA Pilot for some tips.

A third common reason for too-high CHT – particularly when all cylinders are running hot – is advanced ignition timing.

Your magneto (or electronic ignition) is supposed to be set to a specific number of degrees before top dead centre (BTDC) that is marked on the engine data plate – typically between 20° and 28° BTDC. It is essential that the timing be set very accurately – the tolerance is +0° and -1° – and it should be set using a digital inclinometer accurate to 0.1°. If the timing of one or both mags is even slightly advanced (ie, too many degrees BTDC), it will have a profoundly adverse effect on CHT.

The Lycoming IO-360-series offers an interesting case study. When the IO-360 was originally certified, Lycoming specified that the magneto timing be set to 25° BTDC – a relatively aggressive value. But the engines had so many issues with excessive CHTs that Lycoming subsequently issued a service bulletin authorising the engine timing to be retarded to 20° BTDC. Making this timing change had an insignificant effect on horsepower but a dramatic improvement in CHT.

Since the timing change was authorized by non-compulsory service bulletin rather than compulsory airworthiness directive, we now have a mixture of IO-360s flying, some timed to 25° BTDC and some to 20° BTDC. When I generate a CHT histogram of the thousands of IO-360s in our database, I see two distinct peaks in the data.

Achieving accurate ignition timing with an old-fashioned 'flowerpot' timing indicator (at left) is almost impossible. Always use a modern digital inclinometer. Inaccurate ignition timing can lead to engine damage.

Curiously, the Lycoming service bulletin applied only to the IO-360 family, not the O-360s, O/IO-320s, or O/IO-540s, all of which remain specified at 25° BTDC.

I've counselled numerous operators of RVs and other experimental aircraft using these engines to try retarding their ignition timing by a couple of degrees, and they've been very pleased with the results. I can't really offer the same advice to operators of certified aircraft, but at least backing the timing off to 24° BTDC (the bottom of the tolerance band) will provide some improvement.

Mike Busch is a CFI, A & P, IA and regular contributor to *AOPA PILOT*.
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Mosquito magic

By Jay McIntyre

There probably aren't too many AOPA members who have not heard of the 'Mosquito in a shed up near Mapua'. A good number of those will have visited the property of John Smith some time over the last fifty years and, having played their cards right, obtained the obligatory photo of themselves perched in the pilot's seat.

I made the pilgrimage back in the early 1990s with good friend and RNZAF course mate, Alistair Marshall. I can't find said photo but I can remember the grainy image quite clearly. It was another one of those moments that set me on the course that led me to this point.

Who would have thought, but fast forward nearly thirty years and this aeroplane is now firmly part of both our histories, Alistair's to a significantly greater degree however. Things have a funny way of working out. When all the dealing was done and dusted, the Omaka Aviation Heritage Centre was left with the significant challenge of removing the aircraft from its home of fifty years, transporting it to Omaka and then rejuvenating, preserving and presenting it to the public.

A meeting of like minds quickly identified Alistair as a good man to carry out this task. He had previous history with bringing the Omaka-based Bristol Freighter to life and, more importantly (as we thought), had nothing better to do, having been made redundant by Virgin Australia when COVID hit. We had a conference call and it did not take much to twist his arm into taking on the task (as predicted!)

Alistair immediately launched into meticulous planning and by August 2020 was making weekly trips to prepare the aircraft for her big move. Props and engines off, nacelles and all sorts of other bits removed by a large team of willing volunteers from Omaka and beyond.

The big day came in late September when she was wheeled out of the hangar for the first time. A crew directed by Wal Denholm of AvSpecs promptly had the fuselage separated from the wing and loaded onto two trucks. We would have been home for afternoon tea except for having to fabricate a missing piece of the transport jigs generously loaned by AvSpecs.

The project was deposited into Bill Reid's hangar and from there a team of volunteers, led by Alistair, got to work. The aircraft was in remarkable condition, with only some minor areas of the structure needing attention. Dismantling the aircraft had been a largely straightforward exercise, with most fasteners coming undone easily, meaning reassembling things was commensurately easy.

Much of the work carried out was cleaning, as the aim of the job was to preserve the time capsule that this aeroplane is. Alistair thought through every task before ploughing in – what were the ramifications of this; what would be lost if this was done… Once cleaned up and preserved the aircraft was painted in the colours of a 487 (NZ) Sqn machine lost on operations in July 1944.

At the end of January 2021 everything was ready for the reassembly of the fuselage to the wing. As with the dismantling, the deft touch of the team from Muscles Lifting made this job easier than it might have been, although it must be admitted she did

fight a little going back together. It was very satisfying to see her sitting on her wheels at the end of that hot summer day.

The team then got on with the endless tasks of refitting and reconnecting everything. A sidebar to all of this was the Smith family's desire to see the engines running. Alistair spent a lot of time inspecting the engines – the internal condition was something he marvelled at – and once he was satisfied they were mounted on the trailer he had custom built for his ground runnable Bristol Centaurus engine. The engines were then hot oil primed and successfully run – hugely satisfying for all involved.

The engines were then fitted to the aircraft and all connections made. The family's further desire to see the engines run in the airframe saw Alistair build some cunningly disguised self-contained power packs which contain all the items necessary to run the engines from the cockpit but without utilising the actual aircraft systems. This will limit the time the engines can be run (from a fuel point of view) but also isolate the aircraft systems from any potential failure points. Airbus NZ have generously inspected and refurbished the propellers to ensure their integrity and safety.

By the time you have read this, the first 'secret' engine runs should have been carried out and, if all has gone well, a public engine run day will be held in the New Year… Should be an event well worth flying into Omaka for!

If you haven't seen it, check out the projects Facebook page for some fascinating insights into the last 14 month's work. https://www.facebook.com/groups/319631725815182

Southern instructing legend John Penno

By Ross Millichamp

A young John Penno had his hand up the private parts of a pregnant ewe on the family farm near Waikouaiti when he heard a noise overhead. Looking up he saw a Tiger Moth approach and land in the paddock he was working in.

"It looked like the most glamorous thing I had ever seen, and the job of being a pilot looked a lot more attractive than what I was doing at the time," John says.

It was the middle of the 1950s polio epidemic and everyone was meant to stay at home until they received their vaccinations. John was struck by the freedom enjoyed by the pilot in being able to go where he wanted in spite of the gloomy atmosphere that prevailed over the country.

A few months later the film 'Reach for the Sky' came out, profiling the life and war experiences of disabled pilot Douglas Bader, and the die was cast. John quit the farm and took up a job in a psychiatric ward at the Cherry Farm mental health hospital, which provided the funds for him to embark on flight training at the Otago Aero Club. He worked the night shift from 8:30pm to 8:30am, which left the rest of the day for learning to fly.

In just three years he earned enough money to complete his PPL, CPL and instructor's rating, and to build a house! "They were certainly different times in terms of the cost of flying and the cost of real estate," John says.

As soon as he completed his training. John was employed as an instructor by the Otago Aero Club, and has spent the rest of his career training student pilots in the Otago region. He found that farmers were generally the easiest to teach because of their practical experience with machinery. His advice to farmers was to treat the aircraft like a tractor. "If mishandled, it will hurt you."

Life Member Ruth Orbell told a story about John at the recent AOPA 50 Year Anniversary celebration in Cromwell. After training her late husband Andrew to his PPL, John thought it would be a good idea to teach the farmer pilots' wives to the point where they were able to land the plane in an emergency. For some, the flying bug took hold and they continued their training and completed their PPLs. Each time there was a good weather window, John would turn up and run them through the next lesson in the syllabus, generally operating from farm strips rather than certified airfields. "The problem was that he always turned up in a different type of aircraft!" says Ruth.

This type of training was very different to the training he did at the Otago Aero Club but John recognised that, once qualified, these pilots would be operating off farm strips, so they may as well train in that environment also. John is very proud of the safety record that 'his farmer pilots' have achieved after the completion of their training.

Although best known to AOPA members for his commitment to training farmers and backcountry pilots, John has also enjoyed training foreign students in the academy environment. He recalls one student who had a severe attitude problem at the start of his training, thinking he could complete multiple syllabus items in a single flight. Other instructors were struggling to deal with the student, so John took him up for a taste of aerobatics.

"I might have taken it a bit far because the student became airsick and with no sick bags on board, I told him to throw up in his jersey," John says.

Once back on the ground John hosed the student off, his attitude changed and he became an excellent student.

"I even got Christmas cards from him for years afterwards," John says.

Another memorable student was Akshit

Chopra, who was a model pupil from the start and has gone on to become a 737 captain in India. The two remain close friends, with John continuing to act in a mentoring role to Akshit eight years after his graduation. John proudly wears a fine watch that Akshit's father bought him at the culmination of his son's training.

In addition to flight training, John supplemented his income doing a bit of aircraft trading. It started after the share market crash when a number of aircraft owners had to quickly raise funds to stay solvent. Many had bought aircraft for the 'show off' factor but had never actually flown them. John specialised in buying disused aircraft and selling them to his farmer friends who did not have the time or knowledge to put into the process.

John also dabbled in charter work over the years, both for the Otago Aero Club and for private business owners. One job was for Terry Burling who operated multiple shearing gangs across the lower South Island. He chose to pay his shearers in cash at their remote work locations where cheques were useless. Terry soon tired of making the two to three day drives around his work sites and bought a Cessna 182 in which John and he could get the job done in a few hours. On one memorable flight the constant speed propeller started leaking oil onto the windshield, which was tolerable until they flew into rain which turned it a fuzzy white colour. At the same time smoke started coming into the cockpit – a glass valve in the old HF radio had burnt out and started smoking. Not knowing the source of the smoke, John headed for the nearest paddock, but the poor visibility led to a hard landing which knocked off the undercarriage. John reports the sight of Terry rushing from the smoking wreck clutching a bag containing $60,000 in cash as one of the funniest things he has ever seen.

John is well known for undertaking flight certification of newly completed homebuilt aircraft. This started in earnest in the early 1970s when the rules were not perhaps quite as tight as they are today. One aircraft was a 6/8 scale Hawker Hurricane replica which had been built on the cheap. To save money the builder had painted the fabric ailerons with Dulux house paint, which was too heavy and put the aileron's centre of gravity in front of the aileron hinge. Every time the plane was banked the out-of-balance ailerons tried to rip the control column out of John's hands. This was fixed but on the next flight he found he was showing 140 knots at take-off.

"That can't be right," John thought and

landed straight away. The builder called him "a gutless bastard" and stormed off. John refused to fly the aircraft again.

Asked about his favourite aircraft amongst all the types he's flown, without hesitation John answers "The Harvard." And proudly notes that he was New Zealand's first civilian instructor for this type.

For backcountry work John loves the big tricycle undercarriage of Cessnas such as the 182 and 206. "Even a Cessna 172 with two people and half tanks can get in and out of most topdressing strips," he says. Although acknowledging that

Two of John's former students, now 737 captains in India. Akshit Chopra (right) recently sent John a message marking India's Teachers' Day, in which he acknowledged John's role as mentor, motivator and inspiration.

"It has been an honour to get to learn so many things from you," the message read. "Your kind words inspire me every day."

the tailwheel Cessnas are very capable, he does not think they are a great choice for pilots who are not completely current.

Now 77, John continues to work part time at Otago Aero Club and Mainland Air as an A Cat Instructor and Flight Examiner, specialising in PPL flight tests and consolidation training with CPL students in the lead-up to their flight tests.

Asked how many hours of flying he has done, he answers "More than 20,000," the twinkle in his eye hinting back to the early days when not everything went into the logbook. His busiest year saw more than 900 hours flown, which is an enormous amount in the stop/start environment of flight training. Although not ready to retire, John is thinking of letting his Flight Examiner rating lapse at the next renewal so he can focus on the fun stuff.

John also shares the role of Safety Officer for the Taieri Airfield with Kevin Anderson. An incident recently led to them getting in early and banning a local aircraft owner from using Taieri for a few months, because they thought that would have more impact than a slow, drawn-out CAA investigation. John is always working to reduce any friction between the various operators at Taieri, "Because friction leads to safety being compromised," he says.

It is apparent that life has not always been easy for John. The working hours of a general aviation pilot can be tough on relationships and there have been a number of incidents, prangs and career setbacks along the way. He reflected that staying on the family farm might have been the wiser move, but he would then have missed out on a lifetime of fun and excitement that he would never have found on the farm. Most important have been the people he has met along the way, and the fondness they all show for him.

At the end of our interview in the busy reception area of the Otago Aero Club, John led me to a quiet room to show me something in private. It transpired that he had recently been invited to attend a function that he'd been led to believe was to farewell a pilot returning to India. When he arrived, the room was full of old pilots who had gathered to thank him for his contribution to Otago aviation over the past fifty years.

The group had presented him with a large greeting card, which he now showed me with some pride. On opening the card, he'd found it contained a large amount of cash, intended to pay for flights to Auckland, meals and accommodation and, most significantly, a ride in a genuine Spitfire at Ardmore.

"Bloody nice plane the Spitfire," he added.

John does not have contact details for many of the people who contributed to the Spitfire flight. Through this article he wants to sincerely thank everyone who was part of this great occasion and the upcoming flight.

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