How the EcoFlyer adds muscle

Photos: Flyer magazine

We had been thinking hard about aircraft purchase since Steve started his PPL in February 2008. We needed a simple, single engined four-seater, IFR capable, which could carry our family of two boys and some luggage, whilst serving as transport for business for the two of us.

A very short short-list rapidly came down to one aircraft; the Robin EcoFlyer. Relatively inexpensive to buy and maintain, with an efficient engine burning fuel with a future, excellent handling characteristics thanks to that famous cranked wing and outstanding visibility through a canopy that dips to elbow level.

On the drive back from a skiing holiday in March we met Guy Pellissier, the Apex President, at Darois and took a test flight. That sealed it for us. We were on to John Kistner of Mistral Aviation, the UK Robin distributor, immediately we were back home.

The only problem was that Thielert's Centurion 2·0 engine's 135 hp gave a MTOW of only 980 kg; meaning a useful load of 310 kg for an aircraft with our intended fit. This was going to be fine for a couple of years, but with our two boys growing rapidly we were definitely going to run out of load capacity. We knew that we really needed the 2·0S 155 hp variant. 15% more power and 21% more torque for the same empty weight translated into a MTOW of 1,100 kg and a useful load of a class-leading 430 kg; enough to carry four adults, full fuel and 40 kg of luggage and putting several larger aircraft to shame. No more worries about weight, just the balance to watch.

The snag was that the 2·0S was not even ready for production, let alone certified in the DR400 airframe. "Well," said John, "it may just be a 'chipping' exercise, but in case it gets more complicated, I'll negotiate with the manufacturers." The result of his negotiation was a guarantee to have the engine exchanged later for the difference in price between the two engines. Very well done.

***Steven and Jennie Bailey** describe how they took the risks and reaped the rewards of upgrading to an avtur-fuelled Robin EcoFlyer*

Above: do not allow an unaccompanied refueller to approach this aircraft
Below: cowling redesign differentiates the EcoFlyer from the standard DR400

The aircraft duly arrived in the UK and was registered G-SJMH in August 2008, but the promised upgrade was thwarted by the engine manufacturer's insolvency that dragged the aircraft manufacturer down with it. The Apex factory closed for the French holidays in August and did not reopen in September.

Over the following months, Thielert spun Centurion off outside receivership and engine production got under way again, but Apex/CEAPR was still in the mire. Centurion were not going to 'chip' the engine. Reading between the lines, they were determined to make the

Top left: Guy Pellissier sees Jennie and Steve off from Darois for the flight home
Top: Massive cooling ducts have ensured exemplary reliability of the Robin installation
Above: NACA duct to right of nosewheel feeds air to cabin heat radiator
Above left: newly re-engined, MH taxis away from Robin/Apex/Finch at Darois

2·0S bulletproof and that meant some modifications to handle the extra power. We talked to Guy about CEAPR using our airframe to certificate the new engine, but it looked like the project would take too long, cost too much and, in any case, the time was not right.

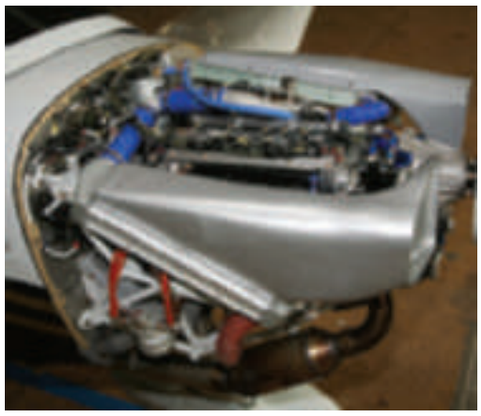
Meanwhile, we built hours on increasingly adventurous trips with the guidance and encouragement of Vicky Farmer at Cabair's London School of Flying. Steve got cracking on the IMC rating and night qualification, Jennie did the excellent AOPA 'Flying Companion's' co-pilot's course and got her R/T licence.

By August 2009 we had flown around 140 hours in our Robin. Cruising at an indicated 105 to 108 knots, we loved the handling, the short-field performance and the frugal fuel burn of 20 litres of Jet A1 per hour. The responsiveness and the visibility were a revelation after the cramped and claustrophobic aircraft that we had flown before. The ride was remarkably smooth for an aircraft of its weight: the outer section of the cranked wing has high washout and contributes little to lift, or to drag, in the cruise. The lift in cruise is mostly created by the inner wing section, giving quite a high loading. The outer section comes into play in earnest during climb and descent, contributing to the aircraft's very safe handling characteristics at lower speeds. But sometimes we were operating right up to and, dare we say it, occasionally a little over, our MTOW. Very careful calculations had to be made! The only thing to do was consider leaving fuel behind; never our preferred strategy but cutting the buttons off our shirts was no longer enough.

Then another call from John at Mistral: Centurion were ready to deliver the 2·0Ss, CEAPR were manufacturing spares and had Part M approval for maintenance and Guy wanted to certificate the new engine in the DR400. A few days later we picked up John from Goodwood, flew to Darois to meet Guy and Daniel Triques, the CEAPR chief engineer, and agreed a deal. The subsequent rapid-fire four-way email exchange between Mistral, CEAPR, Centurion and ourselves quickly resulted in contracts signed and exchanged and the project was under way.

It took a few months for CEAPR to get the engine, install it in a factory mock-up and work out how everything was going to fit together. Not quite a matter of lifting the 2·0 out and dropping the 2·0S in! True, the engine mountings were the same, but the cooling arrangements had to be beefed up, which left no space under the cowling for vacuum piping so electric instruments had to be fitted. That meant sourcing an electrically driven DI that was compatible with the invaluable S-Tec autopilot… and so on.

When at last CEAPR were ready, we flew MH from Elstree to Darois on a very frosty January morning only days before heavy snow



Above: not much room for manoeuvre in the well-packed engine bay
Left: silencer allows the aircraft to be used as a glider tug in Germany

closed Elstree for several weeks. We didn't land at Darois: that was 500 feet below a 2000 foot thick overcast so we cruised on for a few more miles – knowing that we had enough fuel to fly all the way back to Elstree if necessary – to where the very helpful controller at Longvic let us in. Guy flew the aircraft up the hill to Darois in a weather window two days later and CEAPR set to work.

Now we were aircraft-less, but John conjured up a Robin R 3000/180 to fill the gap. Interestingly, this gave us something of a taste of what was to come, the 180 hp Lycoming engine in the R 3000 giving much the same performance as the Centurion 2·0S. One difference being that the fuel costs of the Centurion engine would turn out to be not much more than a quarter of the Lycoming's!

In early spring, Philippe Le Corre, nicknamed 'Finch', arrived on the scene. A successful IT consultant, he had a solid background in aviation and had worked for several years at Dassault. He had gathered a group of like-minded people from the aviation industry, including Jean Camus, his marketing manager and previously Dassault's chief test pilot. Philippe's company, Finch Aircraft, was positioning to restart manufacture of the Robin designs at Darois, leasing facilities from CEAPR.

Engine	135 hp 2·0	155 hp 2·0S
Wing span	8·72 m	8·72 m
MTOW	980 Kg	1,100 Kg
Empty Weight (with typical avionics)	650 Kg	650 Kg
Useful load (without fuel)	330 Kg	450 Kg
Fuel capacity	160 L	160 L
110 L main tank + 50 L optional long-range tank		
Cruise at FL 50 (75% power)	115 kts TAS; 20 L/hr	126 kts TAS; 24 L/hr
85% power		137 kts TAS; 28 L/hr
Stall (clean at MTOW)	54 kts	57 kts
Stall (full flap at MTOW)	47 kts	52 kts
Take off run (at MTOW)	240 m	240 m
Clear 50 ft (at MTOW)	440 m	440 m

The Centurion 2·0S/DR400 project remained with CEAPR but became busier. After flight testing in Germany, MH was shown at Friedrichshafen and Euravia and we flew her back in time for AeroExpo. Another week of work in France and she really was finally complete.

The difference in performance over the 2·0 was immediately apparent. No more dipping the nose after rotation; the aircraft just lifts off straight into the climb. The climb rate is dramatically improved: with the 2·0 and four up with our 13 year old and 20 year old in the back we struggled to get much more than 500 fpm. In contrast, during a flight test at Darois with Guy and Steve in the front, Jennie and John in the back but light on fuel, the 2·0S pulled the aircraft up at 1,000 fpm all the way to 5000 feet. Only on the way to 10,000 feet did the compact engine display show the power starting to drop off, a clear benefit of turbocharging, and even at 13,000 feet the aircraft was still climbing at 500 fpm.

We hadn't expected much improvement in airspeed, but we were very pleasantly surprised. An IAS of around 118 knots at 75% power was now the norm; and all on 24 litres of Jet A1 (or automotive diesel) per hour.

The aircraft had always been very quiet; the all-aluminium engine being water-cooled and the three bladed prop having reduced tip speeds compared to the Lycoming version's two blade with longer sticks. Now it was even

Above: non-transparent baggage door makes EcoFlyer look solid
Above right: baggage door gives easy access to up to 40kg of luggage
This photo: Jennie and Steve with John Kisners (centre) of Mistral Aviation

quieter courtesy of a more efficient exhaust: the Germans wanted the aircraft simultaneously certified as a glider tug so very strict noise regulations had to be met.

Our first proper practical test of the new engine's capability came when we ferried Jennie's parents to Jersey to stay with friends for a few days. Taking off from Chiltern Park at close to the new MTOW, the aircraft felt vastly more responsive than it had with the old engine and 80 kg less load.

Flying down to Mallorca in August, three-up plus luggage, a two-day journey with the 135 hp engine was now an easy one-day trip, facilitated by increased airspeed and being able to carry a full 160 litres of fuel (110 litres in the main tank under the passenger seat and another 50 litres in the long-range tank under the baggage compartment). 160 litres gives a no-reserve range of 6·7 hours and about 800 nm at 75% power, or a practical range of more than 650 nm.

The virtue of simple engine operation cannot be over emphasised. The turbocharged Centurion engine has a single lever controlling power to the constant speed propellor. FADEC managed and fuel injected there are no worries about carburettor icing, no time spent on leaning. The crew are free to concentrate on looking out, manoeuvring the aircraft and navigating. Considering how many air accident reports in GA implicate carburettor icing this has got to be a big plus point alone. "Ha!" the cynics cry, "but what happens when your FADEC fails?" Well, there are two, so not a problem, and if the automatic switch over did not engage then there is a manual override. "Okay," the cynic continues, "what happens when your alternator packs up? No dual magnetos to get you out of that one!" Actually, nothing much would happen if the alternator, which is a singularly reliable device, did indeed give up. The engine is, of course, compression ignited and the aircraft would fly on quite happily for several hours with its management system powered by battery, during which time the pilot would, hopefully, have noted the bright red alternator warning light directly ahead and have considered his/her options. Failing that, when the capacious battery was finally exhausted and all the electrics had shut down, an event that even the least alert pilot should surely notice, the engine management system would still operate for another 30 minutes or so on the FADEC back up battery.

Left: single-lever engine control at centre sets the EcoFlyer apart

The factory at Darois is now in full swing with the new 2·0S EcoFlyers being first off the line. Glass cockpits are being evaluated by Finch for those who want one and a more powerful diesel engine is being considered for the larger DR500 President. The 135 hp DR400 remains in the range as a '2+2' and training aircraft. The Robin line is set to evolve under Finch's command and we should be seeing many more of these great little aircraft in the UK skies before long. As John said: "Not exactly another Concorde, but still a fine example of Anglo-French-German co-operation."

For information on the EcoFlyer contact Mistral Aviation; sales@mistralaviation.co.uk ■