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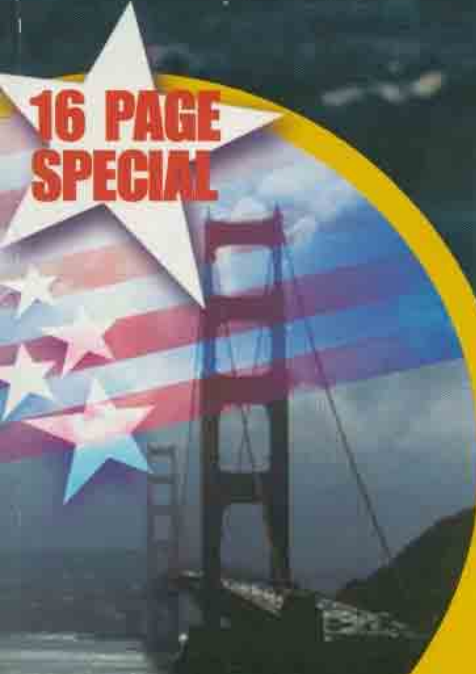
IMPOSSIBLE

Dyn Aero MCR4S: Four seats and short-field performance from 100hp. Amazing!

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DYN AERO MCR4S

Four seats, 500nm range, 125kt cruise, short field performance and all on just 100bhp... the latest from French kit aircraft manufacturer Dyn Aero is nothing short of amazing. **Dave Calderwood** reports



Low cloud swirled around the airfield, shielding the mountains we knew to be there. Every now and again, an occasional break in the grey revealed a steep hillside or, worse, a jagged peak. This was the French Alps after all, and the airfield at Gap, despite having the best light aviation facilities I've seen anywhere outside the US, couldn't do anything about the weather. Light drizzle didn't help either. Put simply, it just didn't look flyable.

But Paul Prudant, local ace, friend of Dyn Aero boss Christophe Robin and test pilot for the MCR45, insisted there was a decent cloudbase and that it would clear up further south. To prove it, he said, he'd go up solo for a circuit. So off Paul went, firing up the Rotax

engine of the little white four seater, letting the temperature come up before cycling the hydraulic constant-speed MT prop, and lining up on Gap's soaking wet tarmac runway 21.

Full power – though you could hardly tell, the engine and prop are so quiet – and the Dyn Aero accelerated quickly and was in the air in less than 200 metres, climbing steeply. Sure enough Paul was up to at least 1200ft agl and still clear of cloud. Down again quickly, using the same runway but in the opposite direction, 03 – one of those big hills lies a half-mile from the north boundary of the airfield – and I was in the left seat, ready to go.

We'd already been through the various controls, some of which are peculiar to this first prototype version of the MCR45, such as the flap lever, so after a quick reminder of where

to set the prop pitch for takeoff (full revs, 6000rpm indicated) and cruise (5800rpm) we were rolling down Gap's still sodden tarmac with one stage of flap deployed.

With just a little back pressure on the stick, it seemed to take no distance at all to accelerate to 110km/h (59kt) on the metric airspeed indicator where the aircraft lifted off cleanly, needing hardly any prompt to unstick. Any thought of dipping the nose to pick up more speed was dispelled by Paul who gestured 'up' with his thumb – no need, the ASI was up to 140km/h (76kt) by now and we were climbing at an indicated 800 feet per minute. A left turn at 500ft, flap up, prop back to cruise rpm, and less than two minutes after takeoff we were levelling off at 1500ft agl, heading south towards Sisteron following the



Tech Spec

Performance

Takeoff distance 665ft
Landing distance 660ft
Cruise (75% power at FL80) 150kt
Fuel consumption at cruise 4.0 to 4.4 Imp gallons per hour
Max range at cruise 821nm
Never exceed speed 173kt
Stall speed (clean) 54kt
Stall speed (2 stages flap) 44kt
G limits +3.8/ -1.5

Specification

Engine Rotax 912S
Max power 100bhp @ 6000rpm
Propeller Constant-speed 3-blade MT
Seats 4

Dimensions

Wingspan 28ft 7in
Wing loading 15.94lb/sq ft
Length 22ft
Height 6ft 3in
Empty weight 771lb
Max takeoff weight 1652lb
Useful load 881lb
Fuel capacity 25.4 Imp gallons

Price

From £28,519.42 to £38,558.25 (inc VAT) depending stage of kit
Options fitted to test aircraft include MT prop at £6240.05 extra

Manufacturer

Dyn Aero SA
 19 rue de l'Aviation
 21121 Darois, France

UK Distributor

Lyndhurst Touchdown Services
 64 Wellands Road
 Lyndhurst, Hants SO43 7AD
 tel: 023 8028 2619
www.avnet.co.uk/touchdown

Flying the Dyn Aero MCR4S is straightforward with plenty of speed and no major vices. Great visibility though it can get hot

wide valley carved out by the River Durance.

Those hills and mountains were either side but easy to keep an eye on, thanks to the superb visibility from the front seats of the MCR4S. The front part of the hinged canopy is all clear so you can see all round and above but the really neat trick is that the low wing is situated so the front seat pilots are ahead of the wing, and can see below it. Later, on a subsequent flight, my passenger confirmed the rear seats are placed behind the wing so the view is similarly unobstructed. The panel and cockpit sides are also low, giving a panoramic view.

While taking all this in, I was trying to get the Dyn Aero into a steady cruise. We were showing 25 inches of manifold pressure, 5800rpm and an airspeed of 250km/h (135kt) with the huge centre-panel Becker moving map and GPS reading 128kt groundspeed. Four buttons on top of the stick control the trim, both pitch and side to side. Getting the pitch trim right takes some practice – it's very sensitive and just a tap too far will have you climbing or descending. Eventually I set it about right. Equally sensitive is the rudder which needs a very light foot to keep the ball centred, and slightly at odds with the stick which seemed perfectly weighted in all directions.

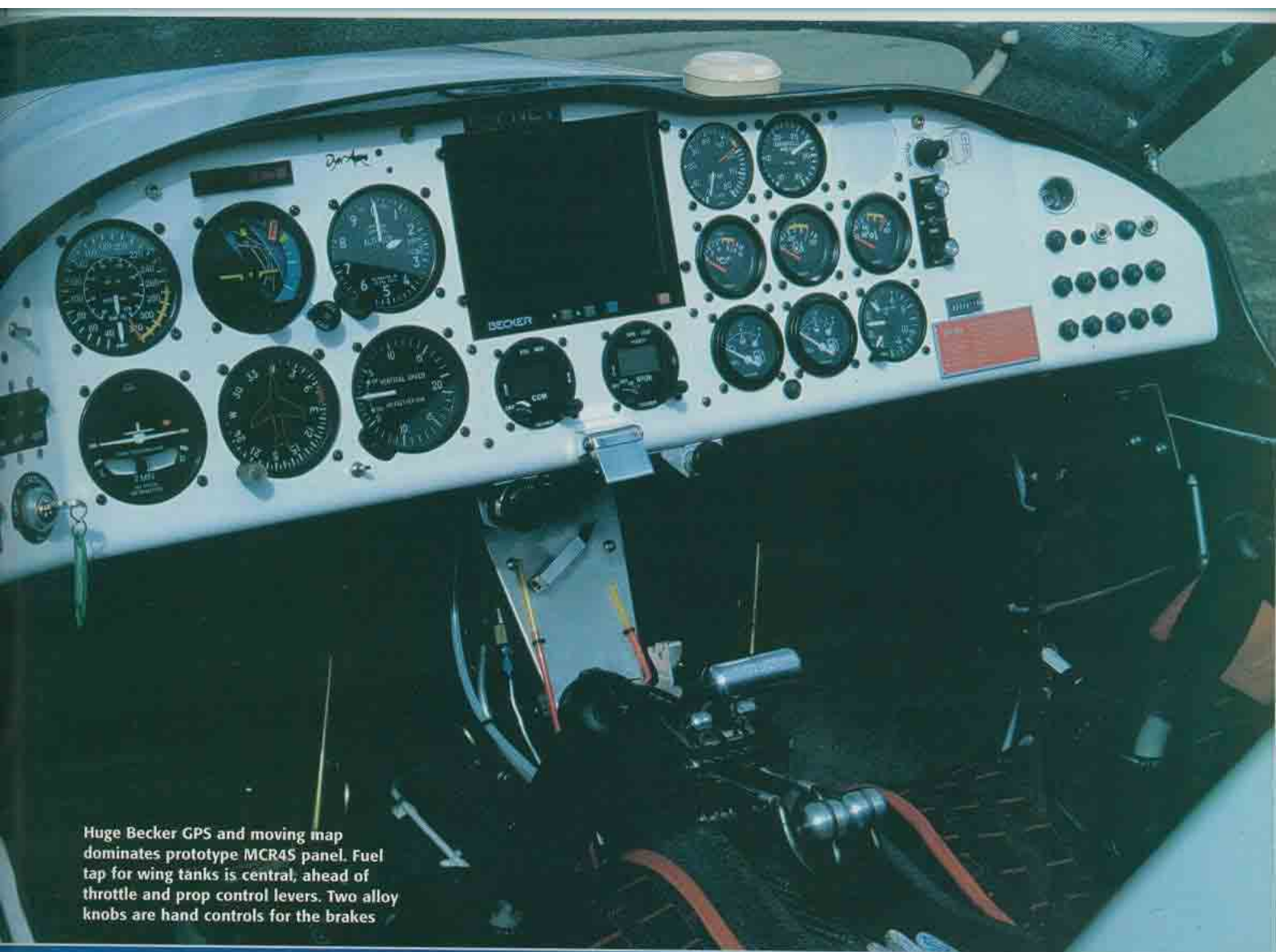
By now feeling more at home with the MCR4S, it was time to try some basic manoeuvres. First, a bit more altitude and thankfully the cloud was indeed lifting a little and the drizzle easing. Then a HASELL check – no fixed wing aircraft out but during the day we'd seen constant helicopter activity – and some

clearing turns before easing it into steep turns, first 45 degrees, then 60. The sharp-pointed nose of the Dyn Aero proved easy to keep firmly on the horizon as we pulled the turns, using a bit more power and gentle back pressure. Then easing the stick over further and full power applied, it went to about an 80 degree turn with no problem. With a bit more altitude I'd have gone for a true 90-degree 'knife edge' but not today. Rolling out to align with my pre-determined land feature was precise.

Next some stalls. Power off and flaps up, the Dyn Aero came back to about 100km/h (54kt) indicated before there was just a gentle nod, with no tendency to drop the wing, and recovery lost almost no height. With one stage of flap, the speed was down to 80km/h (43kt) before a sharper nod and a bit of wing drop. Recovery, as before, was instant.

This had all been far too easy so Paul, a flying instructor in his spare time, took control for a couple of minutes and demonstrated his 'bad pilot' routine: two stages of flap, airspeed back to 80km/h, and we wallowed around the sky as though on base leg looking for a slow turn onto final. Even with some gentle turns the MCR4S did nothing untoward. Made me as nervous as hell, though.

Then on to Sisteron – actually, a narrow tarmac strip north of Sisteron near the village of Theze. Used mostly by gliders wanting to soar the western edge of the Alps, it looked very small from where I was sitting. Pre-landing checks were the usual, carb heat on, leave the prop alone, power back a bit, slow the aircraft down, get in one stage of flap on



Huge Becker GPS and moving map dominates prototype MCR4S panel. Fuel tap for wing tanks is central, ahead of throttle and prop control levers. Two alloy knobs are hand controls for the brakes

downwind, second on final. The approach was at 110km/h ("long finals at 120," said Paul) and the Dyn Aero was a model of perfect behaviour as we descended, flared, landed and took off again in one smooth movement. Throttle was very easy to adjust, the aircraft reacted very predictably to the stick and all responses were immediate.

Back to Gap, where the weather was near minimums again so with no other airfield activity we had a straight-in approach to 03 for another very straightforward and very flattering landing. Taxying back to the hangar needed a couple of squeezes on the individual hand controls for the brakes to supplement the nosewheel steering, and then I shut down the engine by simply turning the mags off, with a characteristic juddering final clank from the Rotax unit.

We parked the MCR4S in the hangar alongside Paul's other aircraft, an MCR01 'Banbi', the two-seater that is the mainstay of Dyn Aero's production and from which the four-seater was developed. Both are designs by Michel Columban, a former engineer and aerodynamicist with Morane-Saulnier and Aerospatiale, whose target for the Banbi ('Ban' from Columban and 'bi' meaning two-place) was a speed of 300km/h (162kt) from an aircraft weighing no more than 200kg using an 80hp engine, without sacrificing safety or ease of use.

The first Banbi was all-aluminium but this changed when Columban met up with Christophe Robin, son of the famous Pierre Robin who founded Avions Robin, Christophe's company, Dyn Aero,

already produced an aircraft designed by him, the CR100, built mostly from wood but with carbon fibre main spars. The pair decided to develop a composite version of the Banbi and in 1995 the MCR01 was launched at RSA Rally, French equivalent of our PFA Rally. It had carbon fibre spars, aluminium skin wings, composite fuselage enlarged from the original Banbi and was an immediate hit with French kit-builders. Now over 180 kits have been sold with more than 100 aircraft flying.

For the four-seat MCR4S, the composite fuselage has been retained though lengthened and widened, plus the fuel tank moved from behind the instrument panel to the wings, allowing the panel to be moved forwards. All this shuffling around of the fuselage has created a remarkably spacious cabin, with plenty of elbow room for the front seat pilots and positive luxury in the rear. Access to the rear seats requires folding forward the one-piece front seat, and then it's simple step inside. There's a spacious luggage compartment behind the rear seats, and production versions will have a separate door for the luggage bay.

The front seats are adjustable via a peculiar hinge at their front edge. Basically, it rakes the whole seat back and you end up in a sports-car-like recline which felt very comfortable to me, being long-legged. When checking out the controls on the ground, I'd realised the foot space on the metal tube rudder pedals was confined for my size 11s so it was essential to wear slim-fitting trainers. Foot brakes are fitted to the rudders and are effective on

'TWO PEOPLE AT 85KG EACH PLUS TWO PASSENGERS OF 75KG EACH, WITH 40KG AND FULL FUEL, COULD FLY AT A CRUISE SPEED OF 125KT FOR 500NM'



> Slippery shape of the MCR4S and its light weight help it perform well, even in the thin air at altitude in the Alps



Do It Yourself



Dyn Aero is a developer and manufacturer of kit aircraft. The current range started in 1995 with the MCR01 two-place, now also available as an ultralight (French term for microlight), and the four-seat MCR4S was launched last year.

The MCR4S kit is available in three stages: **Standard Fast Build** which requires two to three weeks work in the factory using special factory jigs for the initial structure, **Extra Fast Build** where that initial structure is made for you, and **Super Fast Build** with more parts assembled. UK distributor Jerry Davis estimates 600 hours of work for the *Standard* kit.

> full deflection but I felt happier using the central hand controls for the brakes.

On this prototype almost none of the switches and controls were placarded – something the PFA is very keen on – so it took a while to work it all out, especially the electrical switches. But the panel had plenty of room for whatever instrument fit you want. Three cheers for fitting a proper throttle quadrant, adjacent to the prop control and just in front of the brakes.

Finish inside the cabin is pretty basic and hints at the weight conscious design – one reason for the extraordinary performance. The other reason is careful attention to detail on the aerodynamics and everywhere you look around the Dyn Aero areas of possible drag have been worked on to reduce

this to a minimum. Result is that the MCR4S has an empty weight under 350kg but a maximum all-up weight of 750kg, giving a payload of 400kg (about 880lb). The claim is that two people at 85kg each plus two passengers of 70kg, with 40kg luggage and two-thirds fuel, could fly at a cruise speed of around 125kt for 500nm. Even allowing for the factory performance figures being a tad optimistic, a view shared by UK Distributor Jerry Davis, that's extraordinary!

Helping to keep the weight down, carbon fibre composite is retained for the main wing spars and also used for the skin, with a similar construction used for the all-flying tailplane and rudder. Flaps and ailerons are aluminium skin with foam spars.

Other parts – seats, cowlings, spats and those



wacky looking winglets – are made from either carbon fibre, kevlar or glass fibre. Speaking of the winglets, they are brand new to the aeroplane, and fitted only recently. Theory is that, as on the Airbus from which the idea was borrowed, they reduce drag by reducing the vortex effect at the wingtips, but the guys from Dyn Aero just seemed to like the controversial look! I didn't notice any effect, good or bad, when flying the aircraft but it certainly created a crowd when we arrived back at Sisteron the following day in much-improved weather.

Before that sortie, however, the arrival of blue sky and much higher cloudbase meant a longer, more enjoyable flight over the nearby Alps, this time three-up. I was keen to see how the MCR4S would perform with a heavier load and Paul suggested a simulated short-field takeoff. So, brakes on – those awkward-at-first hand brakes had by now become second nature – full power, one stage of flap, rolling, gentle back pressure and we were airborne at 110km/h within roughly 200 metres. Very impressive but more was to follow.

This time, with the weather encouraging every possible aviation activity at Gap – gliders, parachuting, helicopters as well as the occasional light aircraft – we had to climb out and depart according to the circuit but it didn't take long to set a cruise climb looking for the blue bits. With 5800rpm set on the prop, 140km/h showing on the ASI and 800fpm rate of climb, soon we were at an indicated 10,500 feet with a fantastic, majestic, awe-inspiring vista of snow-covered Alpine peaks showing through a light covering of cloud. We felt very privileged right then to be enjoying such an experience, made possible by Paul's experience as a regular mountain flyer.

In the front, exposed to the sun through the clear canopy, we were hot despite the outside temperature being an estimated -10°C. But in the back my passenger was cold – the rear seats have excellent side windows but the roof is solid, cutting out the sunshine. We also experienced considerable misting up inside the canopy, one of the few problems also noticed on the first flight.

The aircraft handled perfectly even in this thin air, and I was amazed at the performance of the little Rotax upfront. It had hauled three of us, plus half-tanks, from a short-field takeoff to over 10,000ft with ease. All too soon, however, we were on our way back to Gap, descending carefully to avoid cloud and also to keep the engine warm.

Paul pointed towards a col between two snow-topped peaks and gestured with his hand to fly a descending turn around one of them. Naturally, feeling a tad nervous being 500ft from huge lumps of extruded granite, I was careful to fly the Dyn Aero very precisely, leaving plenty of margin. Fortunately, the air was extraordinarily smooth and

stable and the aircraft responded precisely.

As we entered the circuit back to Gap's O3, with Paul handling the radio calls since it was all in very fast French, he suggested a short-field landing, using the third and final stage of flap. "It behaves like a helicopter," he said, and sure enough, adding the third stage while still quite high on short final, brought us down right to the threshold, needing a fair bit of forward stick to keep up a 110km/h approach speed. Flaring from this extreme angle approach proved easier to judge than I'd thought it might be and soon the mains were rolling smoothly over the tarmac. Distance to land? Well, we made the first taxiway with plenty of room to spare so I'd estimate 200 metres...

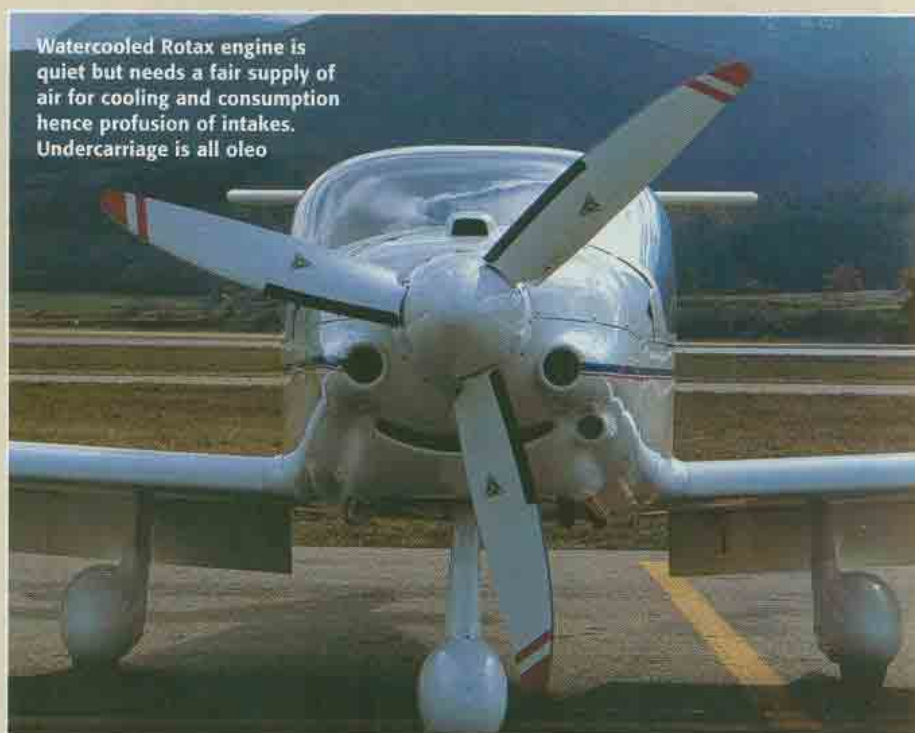
Later that day, we made two more flights – over to Sisteron and back again for the photo shoot – and every time, with a variety of wind directions, admittedly all light, the Dyn Aero was straightforward to fly. Part of the ease of landing is down to the wide-spaced undercarriage, which uses oleo struts rather than the sprung legs of the two-seat Banbi, but the preciseness and responsiveness of the controls is also a big factor, as well as the superb visibility.

The constant-speed prop helps maximise performance of course, but Dyn Aero's ability to design a slippery, light weight and easy handling aircraft shows what is possible these days with new materials and fresh ideas. Mission Impossible achieved, I think! ■

Above: Canopy hinged at front giving easy access to front and rear seats. Wing positioned so it doesn't obstruct the view totally

Above, centre: T-tail and sensitive rudder

Above, far left: Slotted Fowler flaps have three stages – final stage for (very) short-field landings!



Watercooled Rotax engine is quiet but needs a fair supply of air for cooling and consumption hence profusion of intakes. Undercarriage is all oleo