Eurofly Minifox

By Dave Unwin

Photos by Keith Wilson

“How did those look Keith?” I ask. “Did you get enough take-off and landing pics” “Absolutely” he grins “got some crackers!” “Oh, OK” I reply “well, I’ll just do a couple more circuits, just to be on the safe side.” I knew we had all the pictures, and also knew that Keith knew that I knew. Bottom line, I was having a blast and just wanted to keep flying. The Minifox is a lot of pure flying fun, and in an era when we’re surrounded by ‘fun sponges’ (as my young sons call them) that just want to soak up all the joy, it was just joyful to spend an agreeable autumn afternoon on a well-tended grass strip shooting a succession of touch ‘n’ goes in an open-cockpit single-seater.

I first saw the Eurofly Minifox at last year’s UK LAA Rally, and being an impecunious aviator who was already convinced there was nothing new there in my price range, I was instantly intrigued when Dave Broom of Airplay (the UK agent for Eurofly ULM) told me that it could be “completed for less than £19 grand”. That’s not a lot of money for a brand-new flying machine, and it occurred to both Dan Johnson and I that – just like the Spacek SD-1 the new SSDR category might reverse the current trend of making aviation ever-more expensive. For more expensive it surely is. In 1967, a new Cessna 172 cost around $12,750, and a Dodge Charger about $3,100. These days a top-of-the-range Charger is $52,000, but a Skyhawk SP is $307,000! Anyway, a flight test was rapidly arranged and photographer Keith and I met Dave on a very pleasant autumn day at Airplay’s Sutton Meadows base.

The basic design is based on Eurofly’s Firefox two seater and is almost a ‘pod and boom’, but without the pod! The traditional tubular structure is made from 6082T2 alloy, with the chromoly steel spaceframe powder coated grey. All the fixtures and fittings (even down to the nuts and bolts) appeared to be ‘aviation spec’ and this isn’t always the case! The high wing is strut-braced and covered with semi-translucent Polyant PX5 trilaminate sailcloth. This modern synthetic material is very robust and UV-resistant. To brighten the wing and tail unit up (the primary colour is a rather anonymous opaque grey) the sailcloth can be ordered with highlights in blue, green, orange, red, and yellow. Dave had already rigged the Minifox before we arrived, but he assured me that it’s an easy

one-man rig as its very light and straightforward. Eurofly also now offers the New Closing Wing System (NCWS). This arrangement incorporates brackets that simplify alignment of the wing with the wing attach points, and replaces the stock wing attachment bolts with quick-release pip-pins. The NCWS allows the wings to fold aft and rest on the tailplane in the wing supports provided. With wings folded the aircraft is only 2.3m wide, allowing it to fit into a shipping container or easily tuck into the corner of a shed.

Unsurprisingly there are several engine options – the test aircraft is powered by the engine that Airplay recommends, a Cisco Motors 250 BullMax. This 230cc single cylinder two-stroke engine produces 33hp at 7,400rpm, yet only weighs a very impressive 16.5kg with electric start. It turns a two-blade composite Helix prop in a pusher configuration, via a Poly Vee-belt with a reduction drive ratio of 2.62:1 and is fed from a single 15-litre fuel tank behind the seat, while the engine's finely-tuned exhaust has such sinuous curves it is practically a sculpture. The main undercarriage legs may look a little flimsy, but Dave explained that they're a lot more robust than they look as they're made from 7075T6 Ergal, which is an extremely strong alloy. The undercarriage consists of three plastic wheels of the same size and fitted with solid tyres, plus a small fourth wheel underneath the fin. There are small cable-actuated drum brakes on the mainwheels. The fin, rudder, strut-braced tailplane and elevators are made using the same techniques and materials as the wing. There is a large trim tab in the starboard elevator, which is actuated by a combination of a cable and a large spring. It all appeared very nicely made, and I particularly liked the size of the control surfaces. It looked like there'd be no lack of control authority. Pushrods drive the ailerons and elevator, with cables for the rudder.

By now I was eager to get airborne, and the Minifox looked like it felt the same way! This is because when there's no-one in the cockpit it rests on the small fourth wheel beneath the fin, so it seems to be looking impatiently up at the sky. After a quick but comprehensive briefing from Dave I don silk scarf and leather helmet, then carefully sit down and the Minifox nods onto its nosewheel. The cockpit is as simple and unfussy as the rest of the aircraft. There is no adjustment for either the pedals or seat (except cushions), but luckily it fits me fine. The test aircraft has the optional fibreglass nosecone, which is fitted with a small Lexan windscreen. The nosecone is available in either black, blue or red to match the seat material. Another option (not realised on the test aircraft) is the Comelli pneumatic BRS.

Once I've strapped it on (well, that's what it feels like – it is literally not that much heavier than me) Dave reminds me that there aren't yet control stops on the stick, and confirms that I have enough fuel for about two hours of playtime.

Unsurprisingly, the controls and instruments are simplicity personified. The primary controls are operated by pedals for the rudder and a single centrally located stick for the ailerons and elevator. The stick carries a bicycle-type lever for the brakes, and as with this arrangement there is no differential braking the nosewheel steers through the rudder pedals. There's a throttle on the left, the elevator trimmer on the right and that's all you need! The panel continues the minimalist theme and consists of an ASI, a small altimeter, digital tachometer analogue CHT and EGT gauges and a slip ball. The ASI looks a little optimistic (almost half of the scale is essentially redundant) and the altimeter not easy to interpret. I suspect it is possibly a mountaineering one, as it only has a single pointer. As for the electrics, there's a switch for the single magneto (the red button under the seat is for the optional electric starter). Dave obligingly gives the recoil starter a hearty tug and the little engine buzzes busily into life. It is possible to do it when seated, although if you're by yourself it's probably easier to set the park brake and chocks, start it then jump in. As it's a pusher you're well clear of the prop the whole time. During the short taxi to runway 28 I discover that the nosewheel steering works well and that the brakes are only really needed for starting and the run-up (there is a neat sprung-loaded button for the park brake on the stick). I quickly complete my generic SEP 'flow check', and while waiting for the CHT to register feel vaguely uneasy that I've missed something. As the BullMax 250 is a two-stroke there aren't even oil temperature or oil pressure gauges to check, and the small 'Master Caution' light in my brain flickers once or twice, so I wait until the CHT does register than run through the pre-take off checks again. Having convinced myself I haven't forgotten anything it's time to fly. Ambient conditions are close to ISA, with the 8-10kt breeze more-or-less straight down the runway. Like most two-strokes the engine has quite a narrow power band, and as I type this sentence it occurs to me that there's probably an entire generation of readers that have never ridden a powerful Japanese two-stroke motorcycle such as Kawasaki's legendary H2 Mach IV 750cc triple (AKA 'The Widowmaker'), and consequently have no concept of power bands, tuned exhausts and expansion chambers! Unlike four-stroke aero engines, which typically have relatively linear HP/torque curves, two-strokes are much more 'peaky'. If you take a look at the picture of the BullMax's exhaust you'll see it really is quite carefully shaped. The wide part of the pipe is the expansion

chamber, and the length and varying diameter of the pipe ‘downstream’ of the expansion chamber has a profound effect on where the sweet spot is. Consequently, as you open the throttle on a two-stroke initially there’s more noise than thrust, then the rpm reaches the ‘power band’ and the engine’s urge becomes a lot more urgent. In fact, once the engine ‘comes on the pipe’ the acceleration is really quite good and with just a hint of backpressure the Minifox is airborne after a very short ground roll. However, although it will fly in ground effect at very slow speed it has almost no energy, either potential or kinetic, so I check forward on the stick and hold it down until the ASI shows 55kt, then initiate a shallow climb. Like all high drag/low inertia machines you don’t want to get on the wrong side of the drag curve, and although altitude may be money in the bank, speed is money in your pocket!
While Dave and Keith strap themselves onto a GT450 flexwing I shoot a series of touch and goes, and this is just as much fun as you’d imagine. I really like flying circuits at quiet, uncontrolled grass fields on a sunny day, and the Minifox is already starting to work its charm on me. In a world of GPS, ADS-B and 8.33 radios, the Minifox is a real throwback to almost the dawn of powered flight. And as Cecil Lewis explained in the foreword to his seminal memoir ‘Sagittarius Rising’, “..what captain of a transport aircraft, hedged in with corridors, courses and controls, does not long to send them all to the devil, vault into the cockpit, flip a switch and take off, bareheaded, into the wind?” I’d like to think, still more than a few!

The GT450 is soon airborne and I move into formation. During the pre-flight briefing Keith and I had already agreed that the shoot was probably going to be a bit tricky - and our concerns are well justified. The handheld transceiver tucked into my jacket neither transmits nor receives and there is quite a speed mismatch between the two aircraft. Furthermore, on a weight-shift microlight the pod acts a bit like a pendulum (which doesn’t make it a very stable camera platform) and I can see the visor on Keith’s helmet won’t stay up. I would feel sorry for the long-suffering lens man – but on this occasion I’m saving my sympathy for myself! I really don’t have a lot of speed to play with, and at times I’m not sure if Keith is using hand signals or trying to hold his visor up! It’s not easy, but we persevere and get the job done, although I’m grateful when he kisses me off and I can break out of formation. For the purposes of completeness, I return to my generic flight test card and examine the stick-free stability, climb and cruise performance, slow flight characteristics and stall traits. To be honest though, the limited instrumentation makes completing some aspects of the flight test card quite tricky and anyway, this really isn’t that sort of aircraft. It’s a fun

flying machine and assessing the qualitative and quantitative characteristics, stick force per G and roll-rate - while interesting - isn't necessarily fun. Anyway, if you *are* interested, the Minifox is positively stable around all three axes, and the generously proportioned primary flight controls provide excellent control authority, being both powerful and well-harmonised. The roll rate is acceptably brisk, especially if you help it along with judicious application of the powerful rudder while the field of view is – as you'd imagine – exceptional. It's a real magic carpet ride. Evaluating the climb rate is not so easy; -there's no VSI, the single pointer altimeter has very poor scale expansion and I have to use my trusty Timex's stopwatch facility which is half-hidden by my glove. My best guesstimation is that climbing from 1,000 to 2,000 feet was achieved at between 400 and 500ft/m. The stall characteristics are very benign and slow flight is - as you'd imagine - ridiculously slow, somewhere around 22kt. This really is a machine that can just barely kill you. At the other end of the speed scale the ASI eventually settled on 60kt (its actually in mph as it sounds faster, but I prefer knots) for a true airspeed of 64. However, the engine does sound a little frenetic at this speed as it's turning around 7,400 rpm and a more practical cruise speed is 50-55 at 6,500rpm. At this speed the motor is burning around five litres an hour, with gives a theoretical still-air range of about 125nm with 30 minutes reserve. However, it should be borne in mind that if you're into any sort of a headwind those 30 minutes won't get you very far, although on the other hand practically any open area with a reasonable surface could be viewed as a potential runway.

With the flight test card complete I return to Sutton Meadows for some fun. In a similar way to soaring, the physics and poetry of flight completely combine in the circuit, and even after 30-odd years of flying the simple satisfaction of concluding a well-judged circuit and finely flown approach with a satisfyingly smooth landing continues to exercise a fascination that is hard to explain and difficult to resist. And an open cockpit and grass runway just enhances the sensation, and sense of satisfaction when you get it right. Landing is easy, although always remember that lightweight/high-drag aircraft have very little inertia and tend to bleed energy very rapidly. Forget Vs x 1.3 or even 1.5 – Vs x 2.0 is entirely appropriate, even if its flat calm, so I come scorching in at a heady 55kt. One thing's for sure – in machines like the Minifox you're never going to overshoot. I can see Keith snapping away from the side of the runway, and on the grounds that you can never have enough pictures keep going round and round and round, until the urge for a coffee became too insistent.

Once back on the ground and thawing out we debrief the flight and then Dave explains the various options available. The Minifox is available as a complete quick-build kit requiring around 50hrs to complete, or as a RTF (ready-to-fly) aircraft. He claims that the kit requires no specialist skills and can be completed inside a week, and I have to say this seems perfectly reasonable.

Dave's next student then turns up, and he apologetically excuses himself with a "have another go if you want to." After a reviving drink, Keith shoots the detail pictures, and we sit outside in the sunshine. It is a *glorious* autumn day, and the Minifox is just sitting there, with its nose pointing expectantly at the perfect sky. It really does seem such a waste for it to be on the ground, and Dave did say that I could have another go if I wanted to…… "hey Keith, come and give the starter a pull would you!"

AFTERTHOUGHT About Minifox

I really was taken with the Minifox, and would love an electrically-powered one with a feathering prop. On a good thermal day it would be an absolute hoot, as the slow speed and tiny turn radius mean you could really centre in the core of a thermal; - imagine taking something a bit like a Slingsby Grasshopper cross-country, but without the very real possibility of landing out! Or alternatively trailering it to some hills or cliffs, bunging the local farmer a fiver to take off from one of his fields and then going ridge soaring! Excited by the prospect I did some digging around on the Interweb, and soon found a very advanced brushless electric motor that only weighs 7.3kg and is capable of producing 22kW for take-off, and 20kW continuously. However, sadly the energy density of the batteries is still lagging far behind fossil fuels, for where 11kg of petrol will fuel the BullMax for about three hours, even 150kg of the very latest Lithium-Polymer batteries provides barely an hour at 20kW. One day….

SPECIFICATIONS
Eurofly Minifox

Dimensions

Length	6.10m
Height	1.8m
Wingspan	8.65m

Wing Area 10.06m2

Weights and Loadings

Empty weight	115kg
Max AUW	230kg
Useful load	115kg
Wing loading	22.86kg/m2
Power loading	9.34kg/kW
Fuel capacity	15 lit

Performance

Vne 70kt
Cruise 55kt
Stall 22kt
Climb rate 500fpm
Best Glide 11:1 @ 30kt
Min Sink 400fpm @ 37kt
Take Off to 50ft 180m
Land Over 50ft 120m

Engine

Cisco 250 BullMax single cylinder air-cooled two-stroke, producing 33hp (24.60kW) at 7,800rpm and turning a Helix two-blade fixed pitch pusher propeller via a Poly V belt with a reduction drive ratio of 2.62:1

Price as tested (RTF) £20,964.00 including UK VAT and delivery.
Complete kit including engine from £18,799.20

Manufacturer
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