



MANY MODERN MICROLIGHTS OUTPERFORM TRADITIONAL TWO-SEAT SEPS IN JUST ABOUT EVERY WAY. DAVE UNWIN TESTS A FINE EXAMPLE OF THIS EXCITING NEW BREED.

YLAC WT9

DYNAMIC

I've written before that, compared to the type of two-seat aircraft most of us learnt to fly on, a modern 450kg microlight is superior in just about every way. (The main exception to this rule is - of course - useful load. More on this later). Indeed, many of these machines are really 'blurring the line' between the two classes, and a fine example of this is the YLAC WT9 Dynamic. I have admired the sleek lines of this speedy

looking machine for some time, and when the opportunity arose to test it, I accepted with alacrity.

I met up with YLAC boss Nick Marley and demo pilot Bill Sherlock at Sibson on a very cool, crisp November morning. The aircraft they'd just flown in was the first 100hp Dynamic in the country, and it really did look very inviting. Unfortunately, although I usually prefer to fly the target ship (it's more fun, not as cold and I know

what the photographer wants) we were a bit short-handed, so I ended up flying the camera ship.

However, as soon as photographer Duncan had the pictures in the can we hurried back to Sibson, as I really was eager to get my hands on it.

I always like to start my evaluation by observing the machine from a distance, and my initial impression as I looked at the Dynamic was that it was a very good-looking aircraft. ▶



From the sleek spinner through the broad cockpit to the elegantly tapered empennage, I thought it looked extremely attractive. This is important for two reasons. Quite apart from the (albeit occasionally incorrect) adage "if it looks right it'll fly right" - who wants to fly an ugly aircraft? Although

some of the aeroplanes that I've flown recently (and particularly since the start of the US LSA boom) were great performers, they just weren't that attractive aesthetically. The Dynamic certainly is. I then moved in close to inspect it in more detail. As you'd expect of a

Above: The Dynamic is a fine looking aircraft. (All KEY - Duncan Cubitt)

high-performance 21st century ULM, a considerable amount of attention has been paid to reducing total drag. Indeed, I would say the quality of the overall finish is excellent, and on a par with that of a modern competition sailplane.

As mentioned earlier, this is the first 'hundred horse' Dynamic in the UK, and those horses are supplied by the familiar Rotax 912S. I like the Rotax liquid-cooled engine much more efficient than its air-cooled American rivals, but as it produces its max power at the relatively high engine speed of 5,800rpm, power is conveyed to the prop via a 2.43:1 reduction gearbox. This keeps the prop speed down to a much more neighbourly 2,400rpm. The combination of liquid-cooling, low prop speeds and an efficacious exhaust combine to produce a quiet, efficient aircraft, which is essential if GA is to survive into the 21st century. I've said it before and I'll say it again - noisy, inefficient aeroplanes will not have much of a future in the general aviation environment of the next decade.

Access to the engine is good. The top cowling is secured by 'Dzus' fasteners and can be removed quite quickly, making it very easy to check not only the levels of oil and coolant, but also to inspect the entire engine installation.

In my opinion, far too many modern aircraft don't provide adequate access to the engine bay, and this can lead to poor pre-flight inspections. Being liquid-cooled, the hoses of a Rotax certainly warrant regular inspection, and with such easy access there really is no excuse for not performing a full inspection regularly, and, of, course, it also makes routine maintenance easier. For the pre-flight inspection, there is a good-sized access hatch on the right side of the cowling for checking the oil.

"THE DYNAMIC PRACTICALLY LEAPT OFF THE GROUND."

The propeller is of particular interest, as it is one of the new three-blade French 'DUC' props. What makes it interesting is that although only ground adjustable, the blades twist under aerodynamic loads. This essentially changes the pitch, providing some of the advantages of a CS prop with none of the complexity or weight.

I liked the look of the rugged nosewheel strut, as well as the elegant, trailing-link units fitted to the main undercarriage legs. These looked familiar, and Nick confirmed that they are similar to those fitted to the retractable version that I flew in the US last year. I also noted that,

Above Right: The trailing edge of the wings is dominated by large, manually operated slotted flaps which have four positions - 'up', 15°, 24° and 38°.

in the constant quest to save weight, even the discs were drilled. While studying these I noticed that the wing was taped just outboard of the main undercarriage legs between the stall strips, and Nick explained that the wings are designed to be de-rigged reasonably easily. This seemed fairly straightforward, as the fuel tanks are inboard of the wing break, and the aircraft would stand on its wheels. This ticked another important box, as along with the price of fuel, hangarage is also getting increasingly expensive. The wing uses an MS (1) -0313 aerofoil and features a gentle taper to the tip, with the leading edge slightly swept back and the trailing edge swept forward. There is only a small amount

of dihedral. The trailing edge of the wings is dominated by large, manually operated slotted flaps which have four positions - 'up', 15°, 24° and 38°. The tailplane, fin and rudder are entirely conventional. The fin is gracefully sweptback and the rudder horn balanced, while the tailplane is fixed with separate horn-balanced elevators. The main spar and all other load-bearing structures are made with carbon-fibre reinforced composites, while the wings and tailplane use a mixture of glass and carbon, with a foam core sandwich construction. The fuselage is mainly carbon fibre sandwich construction with Aramid skin around the cockpit to provide impact protection for the crew.



Left: The propeller is a ground adjustable three-blade DUC 'Swirl'. Interestingly, the blades twist under aerodynamic loads. This essentially changes the pitch, providing some of the advantages of a CS prop without the complexity.

Right: Tie down rigs can be fitted to the underside of the wings.

Far Right: The wings are designed to be de-rigged reasonably easily - the tape covers the join. Note the stall strips and stall warning vane.





Overall, I thought it very well made. Access to the cockpit is via the trailing edge of the wing, which features sensibly sized non-slip wing root walkways. The enormous canopy hinges forward and opens wide, allowing excellent access to the surprisingly spacious cockpit and big baggage bay behind the seats. The canopy is well supported by gas struts. The semi-reclined seats are extremely comfortable, although as both the seats and rudder pedals are fixed (adjustable pedals are an option), adjustment is purely by specially tailored foam cushions. Although this is fine for the private owner, schools are likely to opt for the adjustable pedals, as they may be training pupils of greatly differing shapes and sizes. However, having the seats fixed not only makes them very strong and crashworthy, it also

helps to keep weight down. Once strapped in, I familiarised myself with the layout of the instruments and controls. Although the panel is quite wide and offers plenty of space for just about every instrument a ULM could conceivably require, it is actually an object lesson in minimalism. In fact, there wasn't a VSI or even a slip ball (see box). The primary flight instruments (an ASI and altimeter) are situated directly in front of the pilot, along with the tachometer, while the compass is mounted on top of the coaming. The rest of the engine gauges and fuses are located on the right side of the panel, with the master, starter and mag switches centrally located above the throttle, choke, carb heat, cabin heat and fuel

"VISIBILITY WAS EXCELLENT."



Far Left: The nosewheel strut is rugged, while elegant trailing-link units carry the mainwheels. Note that the discs are drilled.

Right: There are separate fresh air nozzles for each pilot built into the canopy frame.



valve. A large centre console extends aft between the seats and this carries the trim knob, flap lever and combined wheel/park brake. Overall, I thought the cockpit was quite nicely laid out, although as always there was room for improvement. Firstly, the ASI should have better scale expansion on the slow side of the speed scale, and also be colour-coded. Why? Well, the Vfe is quite low, and as the Dynamic is so quick you could also exceed Vne quite easily. The airspeed limitations are placarded on the panel, but I'd rather they were on the actual ASI. I would also have arranged the engine instrumentation differently, as I felt that the two fuel, CHT and oil pressure and temperature gauges are unnecessarily big and heavy. I'd also delete the three warning lights above the altimeter, and the two low fuel lights, and incorporate everything into a neat lightweight electronic engine monitoring system, plus a 'Master Caution' and 'Master Warning' light above the ASI. Now, I get to fly a lot of different



Above: Access to the engine is good, as the top cowling is secured by 'Dzus' fasteners and can be quickly removed.

Above Right: NACA ducts in the top cowling feed air to the engine bay. Note the good-sized access hatch on the right side of the cowling for checking the oil.

Right: The canopy is well supported by gas struts.

YLAC WT9 DYNAMIC

▶ DIMENSIONS

LENGTH	6.4m	21ft 0in
HEIGHT	2m	6ft 7in
WING SPAN	9m	29ft 6in
WING AREA	10.3m ²	111sq ft

▶ WEIGHTS AND LOADINGS

EMPTY WEIGHT	260kg	573lb
MAX AUW	450kg	992lb
USEFUL LOAD	190kg	419lb
WING LOADING	43.7kg/m ²	9lb/sq ft
POWER LOADING	6.08kg/kW	9.92lb/hp
FUEL CAPACITY	74lit	16.3Imp gal
BAGGAGE CAPACITY	10kg	

▶ PERFORMANCE

VNE (IAS)	144kts	266km/h
CRUISE (TAS)	130kts	241km/h
STALL	35kts	65km/h
CLIMB RATE	1,200ft/min	6m/sec

▶ ENGINE

Rotax 912S liquid-cooled flat-four, producing 100hp (74kW) at 5,800rpm

▶ PROPELLER

DUC 'Swirl' composite three-blade ground-adjustable.

▶ MANUFACTURER

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aircraft, and there are few things more irritating than being confronted with a row of identically sized, shaped and coloured controls that all move the same way but do very different things. (I won't name specific companies, but some of the German manufacturers are particularly guilty of this). In my opinion, the controls should be as simple and foolproof as possible - this is far more important than looking neat. Consequently, I was very impressed by the Dynamic's ergonomics. Firstly, all the controls fell naturally to hand, and they all have different shapes and

colours. The trim is green, brake blue, throttle black and carb heat yellow. I would have liked the flap lever to be white and flap-shaped, but overall, this is how a well-designed cockpit looks. The canopy features a simple, single centre-mounted latch that is very positive. Another of my major issues with many modern aircraft is the lack of ventilation, as these big bubble canopies soon warm the cockpit up in the summer. Furthermore, I also think that, if you can't open a door or window in flight then you should at least have a DV panel. This particular



Dynamic has two DV panels (one is standard), separate fresh air nozzles for each pilot and air holes drilled at the base of the canopy frame to demist the screen. Full marks!

With Bill in the other seat, we set off towards the runway with the geared Rotax emitting its characteristic muted whine. Taxiing was delightfully simple, with a fine view over the nose except for immediately in front, as the nose is pitched slightly up.

The nosewheel steering worked well through the rudder pedals and the brake lever for the hydraulic disc brakes was smooth and progressive. Despite the myriad variations of

brake design currently available, I still prefer toe-brakes. This just might be because I have a lot of tailwheel time (and taildraggers are easier if you have good differential braking), although it is also irrefutable that most of us drive cars, and they invariably have foot brakes. I know why ULM manufacturers like hand brakes (they're lightweight, easy to make and simple to install) and in fairness, with such low landing speeds the brakes are only really used for taxiing and parking. The elegantly simple park brake locks on by clicking into a cutout at the back of the console.

I also liked the manual flaps and trim,

Above: The panel is quite wide and offers plenty of space. The ASI and altimeter are situated directly in front of the pilot, along with the tachometer, while the rest of the engine gauges and fuses are located on the right side of the panel. The master, starter and mag switches are centrally located above the throttle, choke, carb heat, cabin heat and fuel valve.

as they're not reliant on the electrical system. I've flown a lot of light aircraft lately in which both of these services were purely electric, with no manual reversion. Not always a good idea, and also unnecessarily complex. The trim is a spring bias system, which is operated by a small lever that clicks into notches in the centre console.

The flap lever travels a vast distance, but it seemed to work well. It is a spring-loaded T-handle that snaps into the detents for each flap setting. Using it reminded me of selecting reverse thrust on a turbo-prop.

Left: A large centre console extends aft between the seats and this carries the green trim knob, black flap lever and blue combined wheel/park brake.

Right: The fin is gracefully sweptback and the rudder horn balanced.

Right: The tailplane is fixed with separate horn-balanced elevators.



SNAGS AND SOLUTIONS

Although I found very few snags with the Dynamic, I thought I'd raise them with Nick to get his opinions. Firstly, the panel. He explained that company policy was to offer a basic aircraft as light as possible, and then allow the customer to use the weight margin - the highest of any UK factory-built microlight - to complete the instruments and avionics suite as they wish. He also confirmed that all new aircraft will have a VSI and slip ball as standard, and that a new colour-coded ASI that is linear throughout the speed range has been selected. My next question was about the high flap retraction forces on the ground. Apparently, YLAC had to modify the flap actuation mechanism for UK certification, and this involved adding a gas strut to provide assistance in lowering the flaps. The adverse consequence is higher retraction forces, but to be fair you only notice this when the aircraft is static. He agreed with my assessment that self-centring springs for the rudder pedals would be a good idea, and in fact this is a scheduled modification, as all aircraft already have the lugs for these springs welded to the rudder pedals. As for the low engine temperatures, he validated my evaluation by explaining that the aircraft needs that level of cooling for the summer. He also confirmed that YLAC does offer a winterisation kit, it just wasn't fitted on the day in question.

However, without the airflow to assist, the retraction force is quite high, and needs a full-blooded push on the ground.

With all the pre-take off checks completed, (incidentally, I was surprised there wasn't an electric fuel pump as it's a low wing design) I taxied out on to the uphill, grass runway and smoothly opened the throttle.

With no baggage and the fuel tanks only half full, I would estimate we were within 5kg of the 450kg MAUW, which gave us a fine power-to-weight ratio of 4.45kg/hp.

The acceleration was astonishing! Indeed, 50 knots came up almost by the time I'd got the throttle to the stop, so I eased the stick back and the Dynamic practically leapt off the ground and climbed away very rapidly. I would guess that we used very little of the 700 metres available. I'd taken off with the first stage (15°) of flap

deployed, and as we climbed rapidly though 500ft I pushed the flap lever forward into the 'up' position. The flaps retracted instantly, with a strong 'pitch up' that was easily held and quickly trimmed out. The Vy is 60kts, but this gives a dizzyingly steep deck angle and commensurately poor forward visibility, so I trimmed for 80.

Passing rapidly through 1,000ft, I swept the Dynamic through a graceful curving turn and on to a southerly heading. Already I could see that it was a very well designed and capable aircraft, which I immediately began to feel at home in.

I was interested to find out if it was as fast as it looks, so as soon as we were clear of the circuit I levelled out at 2,000ft and set it up for high-speed cruise. This simply entailed setting the throttle to 5,500rpm, then trimming forward. It promptly settled into a 132kt IAS cruise, which is pretty quick for 100hp fixed gear, fixed pitch aeroplane. Of course, it is quite thirsty at this speed, but if you pull the power back a fair way you'll still get an easy 120kts IAS and greatly improved fuel consumption.

I briefly removed my headset, and can report that the ambient noise levels, ►



Breakout forces were very low and the roll-rate agreeably crisp, with a 45°-45° reversal taking less than two seconds.



Above: Note the surprisingly spacious cockpit, and big baggage bay behind the seats.

although not especially low, were acceptable. Visibility was excellent, as the large bubble canopy provided a full 270° view above the wing. The cabin heater worked very well, and there was also plenty of cool air provided by the nozzles built into the doors and the DV panels. Talking of cooling, I got the distinct impression that the engine was over-cooled, as it never really got up to the normal operating temperature.

I then began to assess the general handling characteristics. With the exception of the rudder, the controls are all actuated by push rods and these gave the aircraft a very taut feel. Several 360° turns and steep reversals revealed absolutely impeccable handling, and both control response and harmony were wholly satisfactory, with the ailerons being the lightest control and the rudder the heaviest. Breakout forces were very low and the roll-rate agreeably crisp, with a 45°-45° reversal taking less than two seconds. There was negligible adverse yaw.

An appraisal of the stick-free stability was the next item on the agenda. I found the longitudinal stability to be positive, in that from an IAS of 100kts it took three long wavelengths, low amplitude phugoids to recover from a ten-knot speed displacement. Lateral stability was just barely neutral. Directional stability was slightly soft, and it needed a positive rudder input to yaw the nose back. I also noted that when I sideslipped, it also required opposite rudder - merely releasing the pedals wasn't enough. This could have been down to friction in the controls, but I also wondered if perhaps rudder-centring springs would help.

Slowing down to investigate the slow-speed side of the flight envelope

took some time, as the Dynamic is so slippery. With the flaps up and a suggestion of power, the stalls were a total non-event. If the speed was reduced very slowly, the aircraft never truly stalled. Instead, the altimeter merely began to unwind, but not dramatically. Recovery was simple - I

"THERE WAS NEGLIGIBLE ADVERSE YAW."

simply lowered the nose, and the wing began flying again almost instantly, with minimal height loss. Stall strips near the wing root ensure that the airflow separates from the laminar-flow wing at the root first, and the separating airflow buffets the tailplane quite convincingly.

80 OR 100?



While we'd been away, the 80hp demonstrator had turned up, so while Duncan finished photographing the 100hp aircraft I took the opportunity for a quick flip in this aircraft with Mike Oakley. Despite the fact that it had around 300 hours - mostly demonstration and instructional - on the airframe, it was still in good condition and went very well for only 80hp. Interestingly, the directional stability was better, and I noticed that when I sideslipped, the rudder didn't 'lock over' as much as it did on the 100hp machine. This reinforced my view that there might be a little bit of friction in the rudder cable circuit of the newer aircraft.

With the flaps down it did drop a wing very gently, but to be frank the deck angle is just ridiculously steep. You'd have to be asleep to stall inadvertently.

At such high angles of attack the ASI is almost useless, due to position error, so the indicated stall speed is almost irrelevant. Furthermore, the test aircraft's ASI exacerbated this particular problem as it had very poor scale expansion at the slow side of the speed scale. YLAC claims it stalls at 35kts, and this seemed perfectly reasonable.

Adjusting the power saw negligible changes in pitch trim; although the pitch trim changes are significant with adjustments to the flap setting. However, they are easily held on the stick, and can be instantly trimmed out. What was remarkable was the throttle response. Bill insisted that I flew along at about 65, and then opened the throttle quickly. Wow! This was exceptional - you could really feel the acceleration as a positive shove in the back, like driving a powerful car. You don't get that sensation in many light aeroplanes!

Back at Sibson, a couple of circuits revealed the landing characteristics to be as undemanding as the rest of the flight envelope. The stalling tests had revealed that the 'flaps down' stall had occurred at less than 40 IAS, and so application of the time-honoured 1.3VS rule indicated that a speed of around 50kts on short final would be about right. However, low weight equals low inertia so I decided that for the first approach I'd use 60 and 'flap 2'. A combination of turning in slightly too early left me high on final,

but a steep side-slip soon put me back on the glide slope, and a smooth flare saw me gently rolling the wheels on to the runway just past the numbers. Full power and we surged back up into the sky for another circuit. This time I deliberately extended the downwind leg slightly and dropped all the flaps that little bit earlier. Result - an easily controlled approach, leading to another very smooth touchdown. Bill had briefed me not to worry overly about raising the flaps during the 'touch and go', as he claimed it went around very nicely even with 'flap 3'. I decided to verify this, and can confirm that it does indeed go around most convincingly with full flap.

Another aspect of the aircraft's performance that impressed me was how speed-stable it is. Once trimmed, it holds that speed most satisfactorily, so for the last landing I brought it in with a bit more power at 50kts. This worked well, and firm application of the brakes brought us to a standstill in an extremely short distance. With a bit of practice and a decent headwind I'd need very little runway - probably less than 50m!

As I began to unstrap I became aware that Nick was hovering expectantly. A regular reader, Nick was aware that I'd flown a considerable number of ULMs, VLAs and LSAs over past few years, including just about all of the Dynamic's competitors, and was eager to learn what I

thought of his 'baby'.

So, what did I make of it? Well, it's fast, economical, roomy and comfortable, with superb visibility, excellent handling and exceptional numbers for take-off and landing. However, in common with all the other aircraft in this class, it is impossible to fill the seats, the tanks and the baggage bay while staying within the published MAUW. All in all though, I really was very impressed. For example, it does have an extraordinary wide speed range, and I can't think of many aircraft that can cruise with a TAS of around 140kts, yet come over the hedge at 50. But do you know what the most impressive thing is? The WT9 Dynamic is classed as a microlight!

