Microlight Flying

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INSIDE

Also...

Swiss role a tasty trainer

The Light Wing AC4 could give flying schools a welcome alternative to the usual suspects, says **Dave Unwin**. Photos by **Keith Wilson**

FLYING over the Fens on a glorious winter morning, with the motor humming and the heater heating, I must admit it's really not a bad way to go to work.

It was a little chilly to fly to Fenland airfield in my open-cockpit Jodel, so The Light Aircraft Company's Stuart Hudson had very kindly picked me up at Saltby in the AC4, giving me the chance to get a feel for the Swiss-made machine.

Thirty minutes earlier I'd been waiting for Stuart to arrive, and as Alpha Golf floated over the threshold, my initial thoughts were that it looked like an evolved iteration of the Ikarus C42.

This makes sense, as it was designed by Hans Gygax, the talented Swiss engineer responsible for the C42 and several other designs, including the S-34 SkyStar.

A quick walk around soon confirmed that it looks exactly like a stretched, cleaned up and much-improved C42.

The fixed-pitch Neuform propeller has three composite blades and is turned by a closely cowled 100hp Rotax 912iS fed by a single 94-litre (90 usable) carbon fibre fuel tank immediately behind the seats, with the filler at waist height on the starboard side.

The tricycle undercarriage looks pretty robust, and features a rubber nose strut with Cellasto discs for shock absorption, and the mainwheels carried by faired steel leaf springs.

The nosewheel steers through the rudder pedals, and the mainwheels are fitted with Beringer hydraulic disc brakes. All three wheels (also made by Beringer) feature snug-fitting spats. An aerodynamic anomaly is the big fin on the nosewheel spat, which seems somewhat over-sized. ▷

> “”
> It's a worthy successor to the C42

Graceful lines

▷ I liked the good prop clearance, and the powerful LED landing light attached to the nosewheel strut.

The airframe is constructed primarily of aircraft grade aluminium and non-structural moulded composite sections in carbon fibre, with all the strength in the large central aluminium tube.

This is the main load-bearing structure, as the wing is attached to the centre beam through a cross beam which carries the aluminium and steel tube frame for wing attachment.

The fuselage cross beam also acts as a structural connection for the main undercarriage and its bracing struts, the wing struts and the seats.

Loads of luggage

The fit and finish of the composite panels is excellent. Interestingly, Alpha Golf isn't fitted with a ballistic recovery system, and this has opened up the baggage bay, which can carry up to 25kg.

The strut-braced wings use tubular spars both front and rear, and features a modified NACA 2412 aerofoil, but what really caught my eye were the flaps. These only extend to 24°, and I wondered if it might be a little under-flapped, as the C42 has a full 40°. Only the flight test would tell.

I was also intrigued by the pitot, which – unusually – isn't aligned with the wing's chord line, but points down slightly. In another interesting design feature, there isn't an external static port. Instead, static pressure is taken from inside the fuselage.

The strut-braced tailplane carries separate elevators, with a servo tab on the starboard elevator and a trim tab on the port.

A slightly swept-back fin carries a broad-chord rudder, and there's a small ventral fin and tail bumper which carries the tow hook on the tug plane version.

All the control surfaces and the fin have aerofoil-shaped formers, increasing control surface effectiveness, and there's a bobweight on the elevator horn to improve ▷

Opposite, top
The stick's similar to the C42's, but the throttle ain't

Opposite, bottom
Dave thought the seats were too high, so the factory's now lowered them by 6cms

This page, top
Well-appointed panel, with EFIS, EMS and analogue ASI and altimeter

Middle
Dave thought getting in would be easy – then had to get a stepladder

Bottom, left
The flaps only go down to 24 degrees, compared to the 40 of the C42

Bottom, right
That fuel gauge isn't particularly accurate, and has some annoying warning features

> That wing just keeps flying


Keith risks it all for a great photo

▷ longitudinal stability. I was surprised to see that the end of the trim tab was open to the elements.

The rudder also features a fixed ground-adjustable trim tab, as does the starboard aileron. The wings, tail, flaps and control surfaces are all covered in Xlam, a modern polyester fabric, sewn together with Tanara Teflon thread. Both these modern materials have minimum lives of at least 10 years.

All the controls are actuated by push-rods except the rudder, which uses cables.

Find me a Sherpa

Big gullwing doors held up by powerful gas struts and reasonably low sills should make ingress easy, but I initially struggled, as the carbon fibre bucket seat seems to be mounted unnecessarily high.

This impression was reinforced once strapped in with the four-point harness. The seats can be adjusted fore-and-aft, but only before getting in. The rudder pedals are fixed.

So far, my initial impressions of it being essentially a cleaned-up C42 had been accurate, but the centre tube seems thicker, the panel's much more sophisticated, and the cockpit is subtly different to the C42C I tested a few years back, although the basic architecture remains the same.

Unlike the C42 and its unusual folding throttle levers between your legs, the AC4 has plunger-type throttles that sprout from both sides of the panel, and there is the familiar single centre stick, although it seems to be mounted at a different angle from what I remember.

In front of the P1 is a Dynon Electronic Flight Instrument System, with a standby metric ASI and imperial altimeter.

Directly below the P1's throttle is the flap switch, and then across the base of the panel is a rocker switch for the Master (labelled, incorrectly in my opinion, BAT), then three toggle switches for the strobe, landing light and position lights.

There's a neat rotary switch for the ignition and starter systems, and then something that could be confusing.

Confused Dave

There's a guard that covers the main fuel pump switch, which is permanently left on with the guard down, then a toggle switch for the auxiliary fuel pump, and another guarded switch which has been turned through 180° so it's permanently off, with the guard down. This selects the backup battery. Next to that is the avionics master, and then a row of circuit breakers.

In front of the P2 is a very handy-looking glove box, then a Stock Engine Monitoring System (EMS), commonly referred to as a 'Stock Box', along with a Becker transceiver and transponder.

This is complemented by a combined volts/amps gauge and a surprisingly sophisticated fuel gauge that appeared to have the ability to display fuel by either volume or mass.

Stuart wasn't overly impressed by its veracity, and pointed out that it's possible to see the fuel tank's illuminated sight gauge (which is much more reliable) from the P1's seat in flight.

Another odd facet is that the vertical

strip of LEDs which display pitch trim position appears to have the mark for the takeoff setting almost at the very top of the strip. I think takeoff position should be generally more or less neutral.

I like the location of the fuel selector, on the side base of the central column by the P1's right leg, where it's easy to see and reach, the large sun visors and the map pockets built into the doors.

The centre stick carries a PTT, buttons for the electric elevator trim and a bicycle-type brake lever with integral parking brake.

Another area which is greatly improved is starting the engine. I've got several hundred hours being either pushed or pulled by a 912iS, and the starting sequence can variably considerably.

Indeed, the starting sequence for the Saltby EuroFox tug was remarkably complex for such a small machine, with a sizeable number of buttons, switches and a key to be pressed, pulled and turned to start the engine. The test aircraft has a much better arrangement.

And we're off

Having selected the battery on, the engine key is turned through Lane A and Lane B to the 'Start Power' setting, where it is held until the warning lamps for the two lanes extinguish and the 'Lane' captions in the EMS turn green.

Fuel pressure is also checked (minimum 3.0 bar), and if the engine is cold, the EMS indicates where the throttle should be set in percentage terms. Then rotate the key to 'Start' and the engine starts instantly.

It's all very simple, with the sole caveat that you must increase rpm to at least 2,500 to get the generator online, otherwise the demands of the electrical system soon drain the battery.

The brief taxi out reveals it to be an easy machine to handle on the ground. The suspension seems well damped and the turning circle acceptable, bearing in mind that there's no differential braking.

As ever, I check the vital speeds, and note that at 88kts the Vfe is considerably higher than a C42's: an impressive 26kts, in fact! ▷

Emergency release

Fuel cap

▷ Regular readers will know that unrealistically low flap limiting speeds are one of my regular gripes when testing LSA and LSM types, as in the event of a missed approach, care must be taken not to exceed the limiting speed.

With 150kg of Dave and Stuart on board, no baggage and 50litres/35kg of fuel, the weight is around 24kg below the 600kg MTOW.

The acceleration and rate of climb are both excellent, and cruising down to Fenland at 80% throttle (4,700rpm), the TAS soon settles on a comfortable 80kts at 12lit/hr. One noteworthy point on this cold morning is that it has a very efficient heater, which we make full use of!

Joining on a right base for Runway 18 at Fenland, I wait until the speed sinks past 70kts, then set the flaps – a process which is quite different from that on the C42, on which a roof-mounted lever gives you either 0°, 20° or 40° of flap, combined with significant changes in pitch trim, although these are easily trimmed out.

This aircraft has electric flaps, with the switch just below the P1 throttle: great for the P1, not so splendid for the instructor. I'd move it to where the avionics switch is.

The flap position indicator is somewhat unsatisfactorily located in the roof. Settings are 0°, 10° or 24° of flap, and my first landing on type left me feeling that it was maybe slightly under-flapped, as it did float, even though the wind was right down the centreline.

Stuart recommended 60kts over the fence, but on a nil wind day I think 55 would be fine.

And so to work

After a quick brief with Fenland CFI Steve Brown and Keith, we take off to get the pics in the can.

As Fenland's elevation is almost 500ft lower than Saltby's, essentially at sea level, the acceleration is excellent, and the initial rate of climb exceptional at around 1,400fpm.

With the air-to-air photographs done, I can look at the general handling. While flying in close formation, I'd noted that the field of view is sub-optimum.

To be fair, every high wing aircraft has field of view issues, and while the AC4 is certainly not the worst by a long shot, I do think the roof should be transparent, or at least have a large skylight, as it is a bit blind in the turn.

The controls all seem quite nicely harmonised and authoritative, and the stubby centre stick feels more like a sidestick, as it does not confer any significant mechanical advantage.

With the controls neutral, it also sits at a more comfortable angle than the C42's, and gives more than adequate control around both pitch and yaw axes.

Keeping the slip ball centred in the Dynon requires only small amounts of rudder. The electric pitch trimmer is effective and nicely geared, but again, it always seemed to be trimmed well forward of neutral according to the trim position indicator.

> "It shrugs off stall provocation"

An examination of the natural stability around all three axes reveals that the directional stability is not as much influenced by the big keel on the nosewheel spat as I expected. Basically, introduce a profound cross-controlled slip or skid, and wherever you point the nose, that's where it tends to stay.

Stick-free, the spiral stability is essentially neutral to the left and just slightly positive from the right, while longitudinally it's quite strong: a 10kt displacement from a trimmed speed of 70kts resulting in a long-wavelength low-amplitude phugoid that damped itself out after three lazy oscillations.

Most importantly, it's not divergent around any axes, and exploring the slow speed side of the flight envelope reveals more very benign characteristics.

Flaps up or down, power on or off, that wing just keeps flying, down to around 40kts. You have to really abuse it to get it to do anything untoward, and eventually I firewall the throttle, haul the nose way above the horizon and bank to port for a departure stall, determined to provoke it into doing something, but it just sort of shrugged indifferently and rolled wings level. To recover, simply release the back pressure.

Back to base

Back at Fenland, I shoot several circuits with different flap settings, which again reinforces the feeling that it's ever so slightly under-flapped, although it does sideslip nicely.

I also perform the 'go' part of the final touch and go with full flaps, and the AC4 climbs away easily.

The density altitude is actually below sea level, but even on a hot windless day, the most incredibly inept student could take off with full flaps without scaring themselves too much. However, I still feel it needs more flap.

On the way back to Saltby, we drop into Black Spring Farm to check out the AC4's suitability for farm strip flying, and it copes admirably.

In summary, Your Honour

Conclusions? Overall, the AC4 is a worthy successor to the best-selling C42. All the performance parameters are more than acceptable, with short takeoff ability, a reasonable cruise speed and good numbers for range and endurance.

The cockpit is comfortable, well-sealed and fitted with an efficient heater although – of course – there's still room for improvement.

The seats are too high, and I think that the Perspex roof fitted to the tug version should be standard.

The flap switch needs to be moved, preferably to where the avionics master is, the amount of flap travel increased and the flap position indicator changed to a strip of LEDs in the panel.

The pitch trim indicator should be set up so that the takeoff position is essentially neutral, the Dynon EFIS and Stock EMS should both start booting up when the 'BAT' switch (which should be relabelled 'Master') is turned on, and they should both have circuit breakers to isolate them.

In fact, I'd ditch the avionics master completely, and just use the transponder and transceiver's integral buttons.

However, these are all minor gripes that are easily rectified – in fact I understand that TLAC has already tweaked the trim position indicator on Alpha Golf, relocated the flap selector and relabelled the BAT switch as Master.

At the factory, seats on new aircraft have been lowered by 60mm and the ends of the trim tab are now covered.

I also found a couple of anomalies in the POH which – although I didn't observe either during the flight test, need addressing.

Apparently "acceleration during takeoff run may cause the low fuel warning light to illuminate with less than 12 litres of usable fuel".

That's at least 30 minutes of fuel in the tank, and you don't need a red warning lamp to indicate that endurance is 'only' 30 minutes during one of the most critical phases of flight.

Even worse, the POH says that "if the low fuel warning flickers, the remaining usable fuel is less than two litres. If the low fuel warning illuminates permanently, the remaining usable fuel in the fuel tank is less than one litre!"

The exclamation mark is in the POH, and I'm not surprised. I mean, how far do you think you'll get with one litre? That's barely enough to fly you to the crash! No wonder Stuart recommended using the sight gauge.

More importantly, although the AC4 may sound like any number of high-wing Rotax powered LSAs, it would make an eminently satisfactory replacement for all the venerable Cessna 152s still out there.

Even the youngest 152 is at least 40 years old, as production ceased in 1985, and compared to teaching in an old 152, I think most instructors would relish the AC4. It's comfortable and roomy with an efficient heater, and much less fatiguing to fly than something that is noisy, cold and draughty.

It's a much more civilised machine than the C42, let alone the 152, and if TLAC can market the machine at a reasonable price, it could be on to a winner. □

TECHNICAL DATA

Light Wing AC4

MANUFACTURER
Light Wing, Stanserstrasse 126a, CH-6373 Ennetbürgen-Stans, Switzerland

www.lightwing.ch.

IMPORTER
The Light Aircraft Company Ltd, Hangar 4, Little Snoring Airfield, Little Snoring, Norfolk NR21 0JL

SUMMARY
Two seat side-by-side (1.26m cabin width) high-wing cantilever monoplane with conventional three-axis control. Parallel chord wings with electric flaps and ailerons, covered in Xlam.

Gullwing doors, carbon fibre ergonomic seats (adjustable fore and aft). Schroth four-point harness with quick release buckles. Central control stick.

The tail is conventional. Pitch control by elevator on tail incorporating a servo tab and electric trim tab; yaw control by fin-mounted rudder; roll control by ailerons.

Undercarriage has three wheels in nosewheel formation; cantilevered steel suspension on mainwheels. Nosewheel suspension by Cellasto compression rings, steering connected to aerodynamic controls. Beringer wheels all round with hydraulic disc brakes on mainwheels.

Structural central main tube, Aluminium components all anodized for corrosion protection. Aerodynamic carbon fibre composite fuselage mouldings attached.

Engine mounted to the firewall and driving tractor propeller.

AVAILABLE AS FULLY-BUILT AIRCRAFT MINUS ENGINE, PAINT AND AVIONICS.
Microlight version 230,000 Swiss francs, including VAT (£214,680 at time of writing).

CS-LSA version 246,000 Swiss francs including VAT (£229,610).

EXTERNAL DIMENSIONS AND AREAS
Length overall 6.95m.
Height overall 2.67m.
Wingspan 9.57m.
Parallel chord. Dihedral 2°.
Fin area 0.38m².
Rudder area 0.18m².
Elevator area 0.61m².
Tailplane area* 0.62m².
Aspect ratio 8.5/1.
Wheel track 1.70m.
Wheelbase 1.20m.
Mainwheel tyre size 15x6.00-6".
Nosewheel tyre size 4.00 – 6".

INSTRUMENTATION
Dynon Skyview HDX with analogue or EFIS display, Traffic Information and synthetic vision.

Digital engine monitoring, with RPM, fuel consumption, oil temp and pressure, status Lane A and B, EGT and CHT on all cylinders, throttle position in percentage, recording ALL flight data on an SD card.

Trig radio and Trig Transponder. Standard ASI and ALT.

POWERPLANT
Rotax 912iS fuel-injected engine.
Max power 100hp at 5,800rpm.
Propeller three-blade Neuform.
Gear reduction, ratio 2.43/1.
Fuel capacity 90l.

WEIGHTS AND LOADINGS
Max takeoff weight 600kg.
Payload with an hour's fuel 186kg.
Load factors +4g, -2g recommended, +6g, -4g ultimate.

PERFORMANCE**
Max level speed 106kts.
Never exceed speed 113kts.
Economical cruising speed 90kts.
Power-off stall speed with flap 41kts.
Power-off stall speed without flap 44kts.
Max climb rate at sea level 750 ft/min.
Takeoff distance to clear 15m obstacle 336m on grass.
Landing distance to clear 15m obstacle 170m on grass.
Service ceiling >10,000ft.
Range at average cruising speed 578nm including 30min reserve.
Noise level <65.9dB