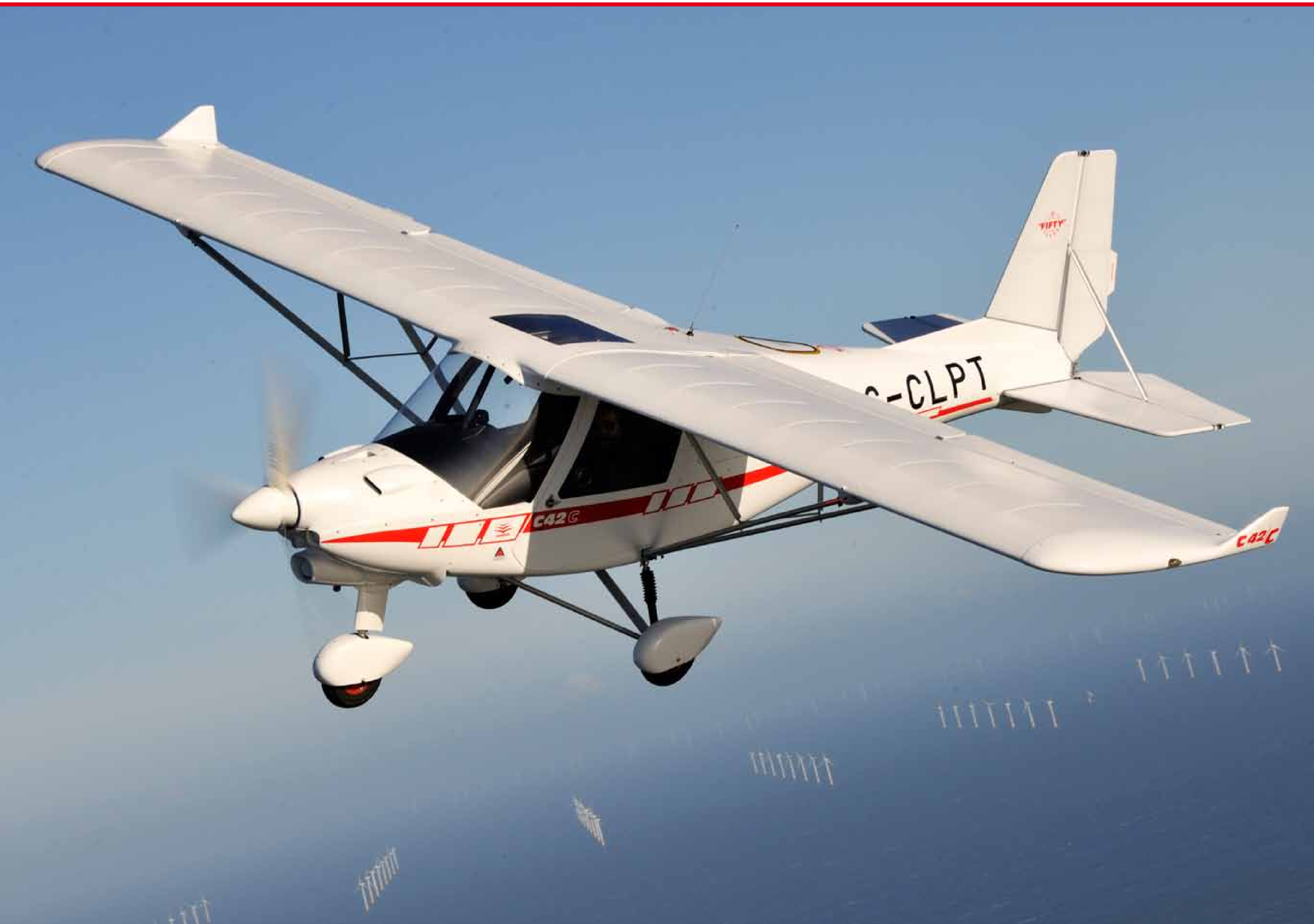
IT'S A 'C' CHANGE



Subtle development makes the latest version of this popular microlight faster and nicer to fly. Pending rule changes will give it an impressive useful load

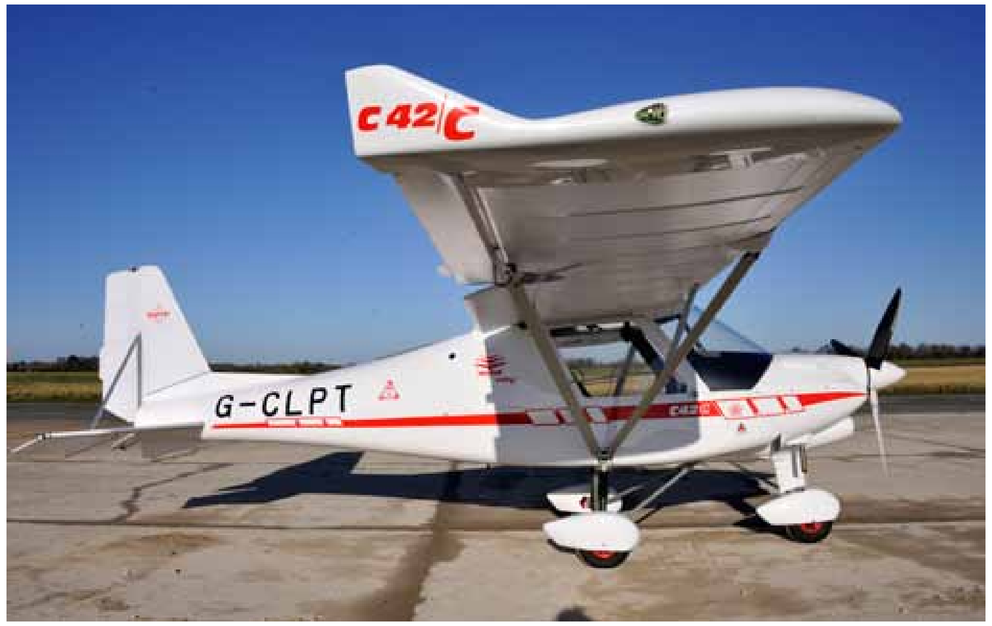
Words: Dave Unwin
Photos: Keith Wilson

The air is like glass as the C42 continues to accelerate across the winter sky. I'm evaluating the cruise performance, and the needle of the ASI is progressing steadily into the yellow arc when suddenly and completely unexpectedly, hard-edged turbulence batters the airframe. Startled, I swiftly and simultaneously pull throttle and stick back and the speed falls away. But what the hell was *that?*

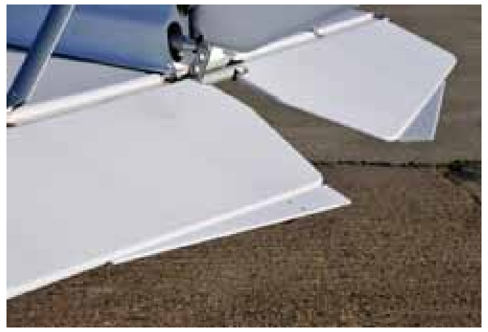
An hour previously I'd been preflighting the aircraft—which is the first C42C in the country—at The Light Aeroplane Company's Little Snoring base. It's a beautiful, albeit bitingly-cold day and the aircraft is positively gleaming in the bright winter sunlight.

I tested an early 'A' model some twenty years ago, and TLAC's boss Paul Hendry-Smith is keen to show off the myriad changes that are visible—and discuss all the changes that aren't.

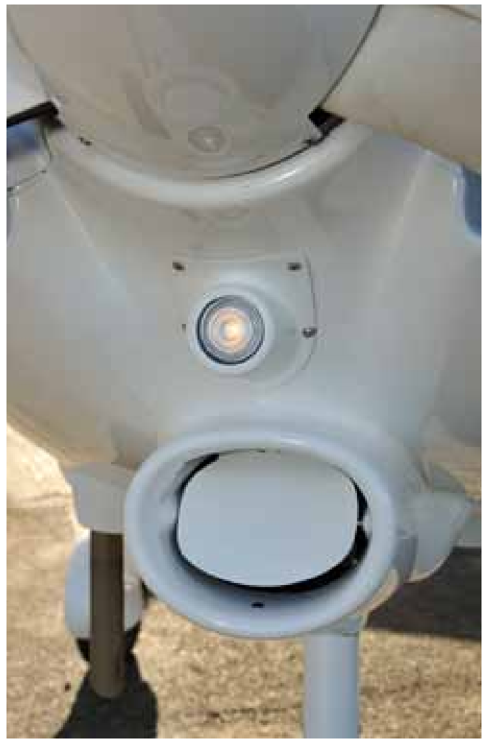
The prototype flew in 1996, and the first C42s began appearing in the UK in the early noughties. Since then the type has evolved and matured through 2003's B model to the C, which first began appearing →

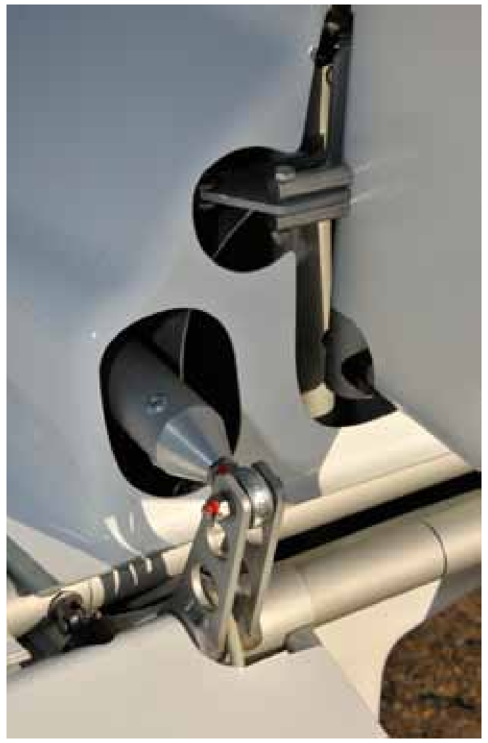


C model improvements include a low-drag aerofoil section and distinctive winglets


Port elevator tab is an adjustable trim – starboard one a servo tab that lightens control force


The Xlam fabric covering also serves neatly as an elevator gap seal. Note the plugged tube ends


The flight-adjustable cooling air intake flap facilitates rapid warm up on the ground and fine temperature control in the air


Nicely engineered elevator and rudder controls. Note the large diameter pushrod, designed to prevent buckling under extreme load

on the continent in 2015. More than 1,450 C42s have been delivered, and the type makes up a substantial part of the UK's microlight fleet, with some having logged over 8,000 hours.

Several subtle but significant differences between the A and the C soon become apparent. Power is still provided by – yes, you guessed – a 100hp Rotax 912S, which on the test aircraft turns a composite three-blade, fixed-pitch Helix prop. A notable difference is that the close cowl now features a controllable flap for the air inlet. The panels are secured by numerous Dzus fasteners, and although the oil dipstick can be accessed via a small hatch, removing the top half to check the coolant does take time – so I'd like to see another hatch for access to the coolant expansion tank.

Nine series engines are used in over 260 different types of aircraft, and the dry sump design means the location and size of the separate oil tank and system is down to the designer. Many installations feature separate oil coolers and radiators, but the C42C uses a single radiator in series with a heat exchanger, which is essentially an aluminium block through which the oil and coolant both flow. As the coolant tends to heat up first, this propensity is used to warm the oil. Then, when the oil is hot, the coolant helps carry the excess heat away, aided by judicious use of the cowl inlet flap.

Fuel is carried in a single 65-litre fuel tank made from roto-cast polyethylene, located immediately behind the P2's seat, with the filler cap on top of the fuselage. An auxiliary tank is an option, which takes total fuel capacity to 100 litres.

The airframe is constructed primarily of aircraft grade aluminium and is covered with non-structural moulded composite sections, the strength being in the large aluminium boom, hidden within the depths of the fuselage. The fit and finish of the composite panels is excellent. Comco has invested heavily in CNC-made moulds that produce skin panels to a very high standard.

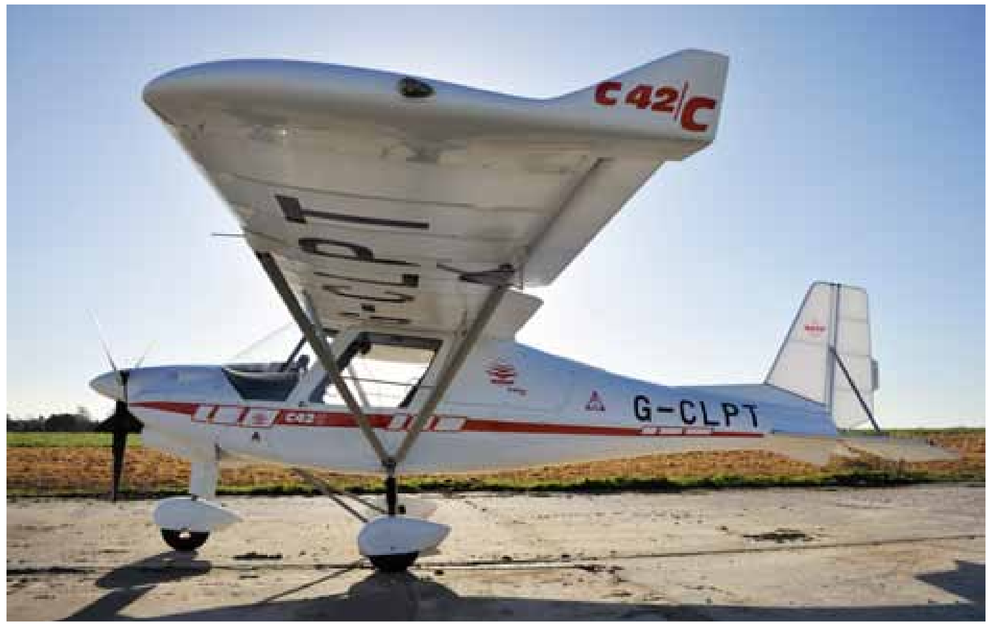
The strut-braced wings use tubular spars both front and rear and feature a much sharper leading edge than previous models, and winglets. The A and B's modified NACA 2412 aerofoil has been replaced with a more modern EH2.0-12 section. It is also apparent that an overall drag reduction programme had been instigated and there are now various extra panels shaped to reduce drag, and wing root fillets have been fitted between the fuselage and flaps, which have a slight upward reflex of about -5° for high-speed cruise. Interestingly, the differential ailerons now feature spades (which are more commonly found on aerobatic aircraft).

Aft of the cockpit there's a frangible cover through which the BRS parachute rocket fires, and a very large, quickly removable panel on the port side, through which the fuel quantity can be seen and a lot of the interior structure visually inspected. The rear baggage bay can carry up to 45kg and offers a variety of stowage options, including a hard luggage box, a custom Samsonite case or a rucksack-type bag that simply clips in.

The tail consists of a strut-braced tailplane and separate elevator, a slightly swept-back fin which carries a broad-chord rudder and a small ventral fin/tail bumper. I note with interest that there is now a servo-tab on the starboard half of the elevator, along with the trim tab on the port. The rudder also features a fixed trim tab, as does the starboard aileron. The wings, tail, flaps and control surfaces are all covered in Xlam, with Tanara teflon thread (which is impervious to UV light) used for the stitching.

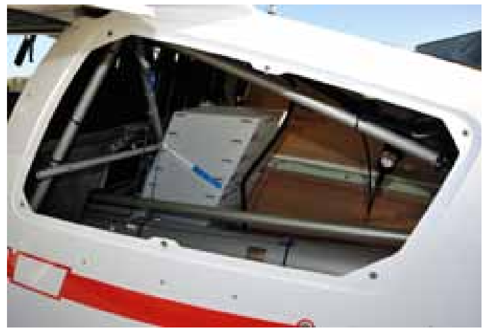
Less obvious changes include a significant revision of the wing structure, more use of carbon fibre (for example, wing ribs near the root and tip, and the wing tips) and making the tubular engine mount standard. The cockpit roof has been completely redesigned and the doors are now hung on redesigned hinges

The sturdy-looking hydro-pneumatic tricycle undercarriage features nosewheel steering via the rudder pedals and carries Beringer wheels and hydraulic disc brakes. A useful



Low-slanting winter light brings out details of the C42's lightweight but robust structure


The delight is in the detail: cuffs around the strut mounts are one of many aerodynamic improvements aimed at reducing drag and enhancing performance


Removing the fuselage hatch reveals the hidden fuel tank and lamp post-sized fuselage boom that carries the structural load (the outer skin just defines the shape and aerodynamic profile)

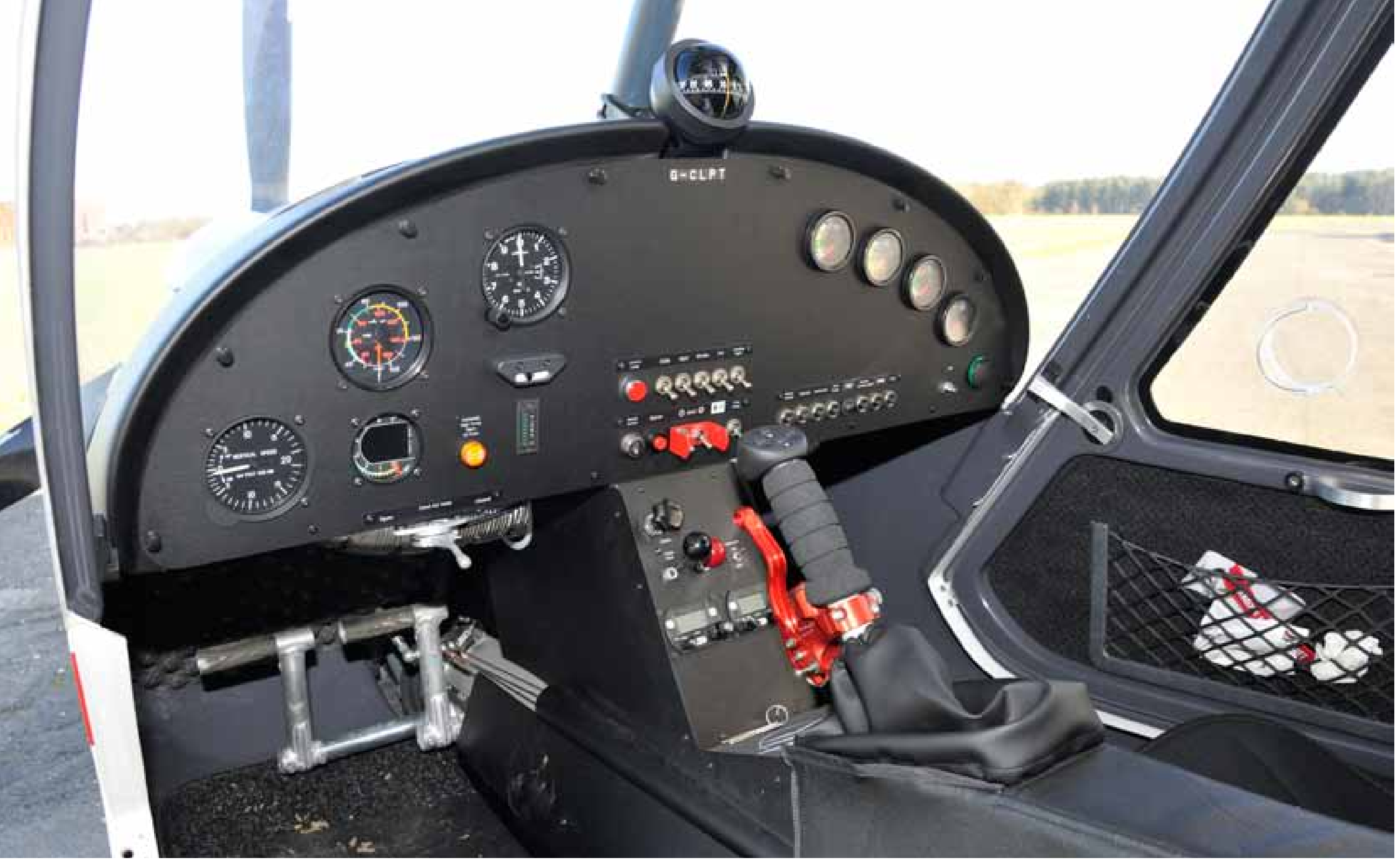

BRS aircraft parachute pack sits on top of the tail boom bracing tubes, ready to be dragged out by the rocket in the foreground


Aileron spades – aerodynamic surfaces ahead of the hinge line that give a servo effect, reducing control forces – are no longer things confined to aerobatic types

facet for flight schools is that the mainwheels and nosewheel (which feature snug fitting spats) are the same size.

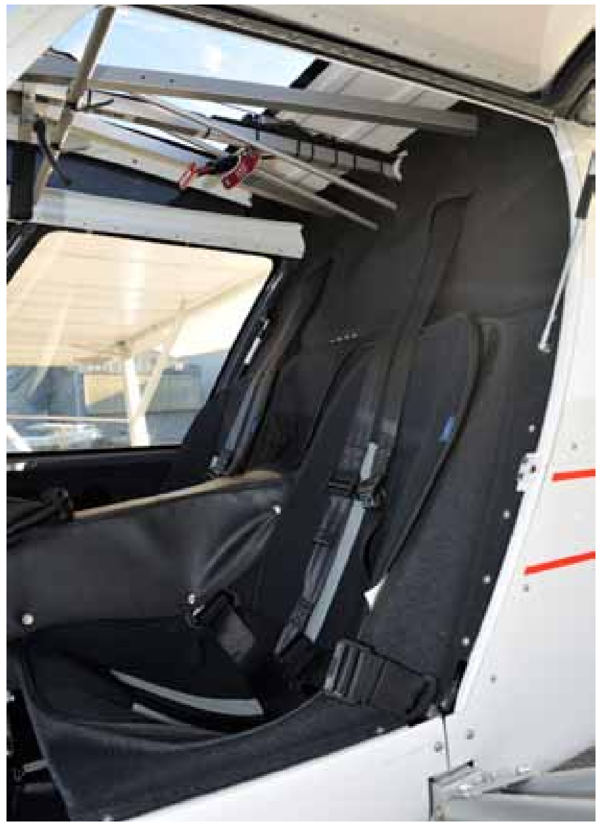
A subtle but significant change is that the C has two proper static ports, one on each side. Arranging the pitot/static system this way makes for a much more accurate air speed indicator. Many light aircraft ASIs tend to under-read at slow speed, and over-read at high speed. This is safe (for reasons which should be obvious) but isn't accurate.

The controls are actuated by pushrods, except the rudder which uses cables. Pushrod-actuated controls, dual static ports and electric trim are all features not often found on microlight aircraft, but as I'm →



ABOVE: fiitted here with the all the basic analogue instruments you need for Day VFR flight, the C42's panel offers loads of space for glass displays and other optional extras

BELOW: carefully contoured and thinly padded fixed seats are designed to be of minimal mass yet offer good comfort



seeing more and more while testing such machines, it is clear they are becoming increasingly sophisticated. The biggest change though is still to come—raising the maximum all-up weight. The A model I flew in 2001 had a MAUW of 450kg, and just like most of its contemporaries, was impossible to fly two-up with full fuel and remain legal. Although the test aircraft is currently restricted by UK regulations to 472.5kg it is ready to have its MAUW increased to 560kg as soon as the legislation changes.

Well-appointed cockpit

Big gull-wing doors and low sills make ingress easy, particularly as the doors are held up by powerful gas struts, which are strong enough to allow taxying with the doors open, but not in flight (although the doors can be removed completely). This makes the omission of a DV panel even more noticeable. However, the door locking design (two locking pins actuated by a single handle, which also functions as a latch) is both robust and simple, and seals the doors very tightly. I did not detect even a slight draught, even at high speed.

Neither the seat nor pedals adjust, but (and although being significantly shorter than I used to be) I can see—and more importantly reach—everything I need to. Having strapped myself down with the four-point harness I raise the throttle into its correct position between my legs (both throttles fold flat to aid ingress and egress) and familiarise myself with the cockpit. The seats are firm but comfortable and overall the cockpit seems well appointed and logically arranged.

The panel is very big and could easily carry just about every possible permutation of instrumentation, from very basic analogue to the latest Garmin G3X touchscreen (which is an option). The test aircraft has (from left to right) a VSI (vertical speed indicator), ASI and altimeter, with the Kanardia tachometer directly underneath the ASI. The ASI isn't ideal, as fully 25% of the dial is past the 121kt V_{NE} and therefore redundant. I'd like to see better scale expansion around the typical approach speed, as that's where it really matters. To be honest, once the needle's gone past the red line, I'd rather *not* know about it! There is also a vertical strip of LEDs, which display pitch trim, a slip ball and a large, orange annunciator co-located with a placard that reads 'WARNING high temp — open air inlet'. Now, so far so good, but what I really didn't like was the control for that cowl air inlet. This is a large, silver lever which looks like the throttle of an old motor-mower. As you can see from the cockpit photos, it points right at the pilot's stomach—and the harness only has four-points. If you crashed, decelerated rapidly and 'submarined' this thing would spear, and quite possibly kill you. It really it needs to be relocated. Personally, I'd turn it through ninety degrees and put it on the central console, above the fuel selector and just below the panel—and I know TLAC is on the case.

In the centre, there is a large red 'control lamp' (which illuminates when the master switch is turned on and extinguishes when the engine has started) and a row of toggle switches for the transceiver and transponder, and the strobe, landing and position lights, with the starter button sandwiched between the key-operated master and the guarded magneto switches. The fuel pump switch is to the right of the mags, and I would've preferred it to have been slightly different from the other switches. On the right of the panel are analogue gauges for oil temperature and pressure, coolant temperature and fuel quantity, along with a single row of circuit breakers (not fuses, as per earlier C42s) and another PTT.

A central console braces the instrument panel and carries push/pull plungers for the choke, cabin heat and carb heat, the transceiver and transponder and a toggle switch for the intercom. A typical ergonomic irritation is that the cabin and carb heat controls are too alike. They are colour-coded but making them different shapes as well would've been better—particularly as the choke is already a different shape. I know that, along with the lack of a DV panel, this is a regular gripe of mine but honestly, how hard can it be?

On the plus side, I soon discover (much to my pleasure) that the cabin heater works very well. I like the location of the fuel selector, (at the base of the central column by the P1's right leg and easy to see and reach) and the large map pockets built into the doors. Further stowage space is available under the seats.

The centre stick features a very comfortable foam grip and carries a PTT, buttons for the electric elevator trim and bicycle-type brake lever with integral parking brake. The large, handbrake-type flap lever is set into the roof, in front of a red T-handle for the BRS.

Cue to start the engine

I've just about finished acquainting myself with the cockpit's controls and instruments when I see the 152's prop rotate sluggishly and then blur into a disc. That's my cue, and I set choke, throttle and mags and hit the starter. I get a nice 'soft' start and as soon as the engine is stable ease the choke in and completely close the cowl air inlet. As well as being poorly-sited the lever is much too stiff, and I quickly scribble a note to this effect. I've taken a profound dislike to this cowl air inlet control.

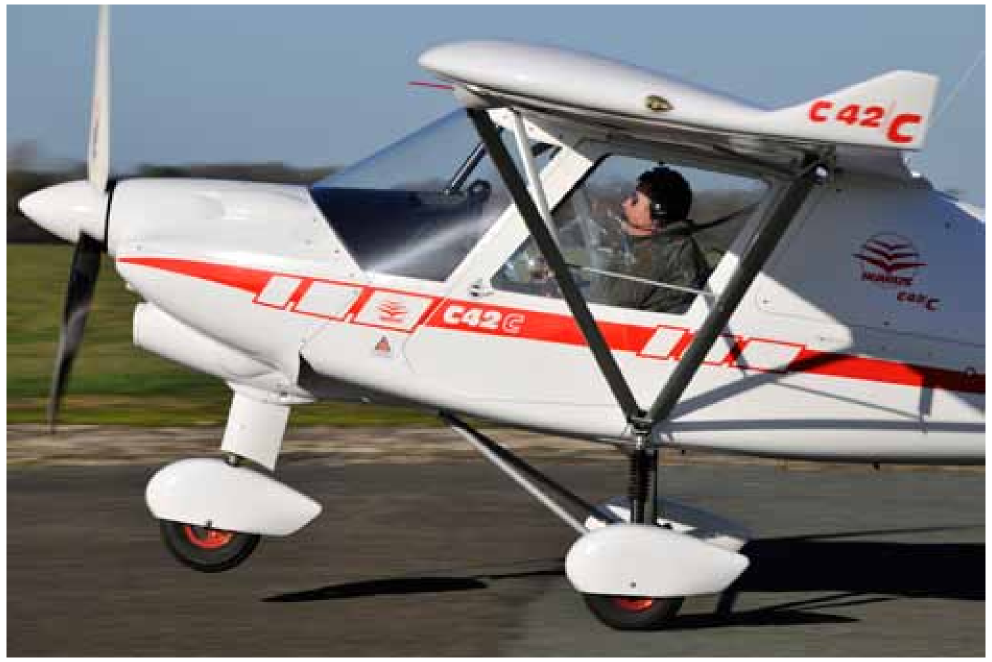
Taxying out behind the Cessna reveals essentially good characteristics. The suspension seems well damped and the turning circle acceptable, bearing in mind there's no differential braking. Having flown aircraft fitted with practically every type of retardation system, from heel brakes and hand brakes, nose skids and tail skids to thrust reversers and drag chutes, I will always prefer toe brakes, and not only are the C42's Beringer brakes very powerful, they are possibly too powerful, as the wheels can be locked up very easily. Luckily the system incorporates an over-pressure control valve.

As expected, the pre-takeoff checks are simple, no tanks to change or prop to cycle, and despite my dislike for the cowl air inlet control lever's location and stiffness, it cannot be denied that it works, as the oil temperature is rising nicely, despite the cold air.

One thing I always do at the start of a *Pilot* flight test is check the vital speeds, and here I note both V_A and V_{FE} are quite low. In the event of a missed approach care will have be taken not to exceed the limiting speed. There's a yellow triangle on the ASI, which indicates the minimum recommended approach speed in nil wind, as per EASA's CAS-22 for sailplanes. It is set at 52kt, and V_{FE} is 63, so if you were at max weight and approaching on a windy day at, say, sixty you could be within three knots of it. Worth knowing... Once the oil temperature reaches 50°C→

The pre-takeoff checks are simple...

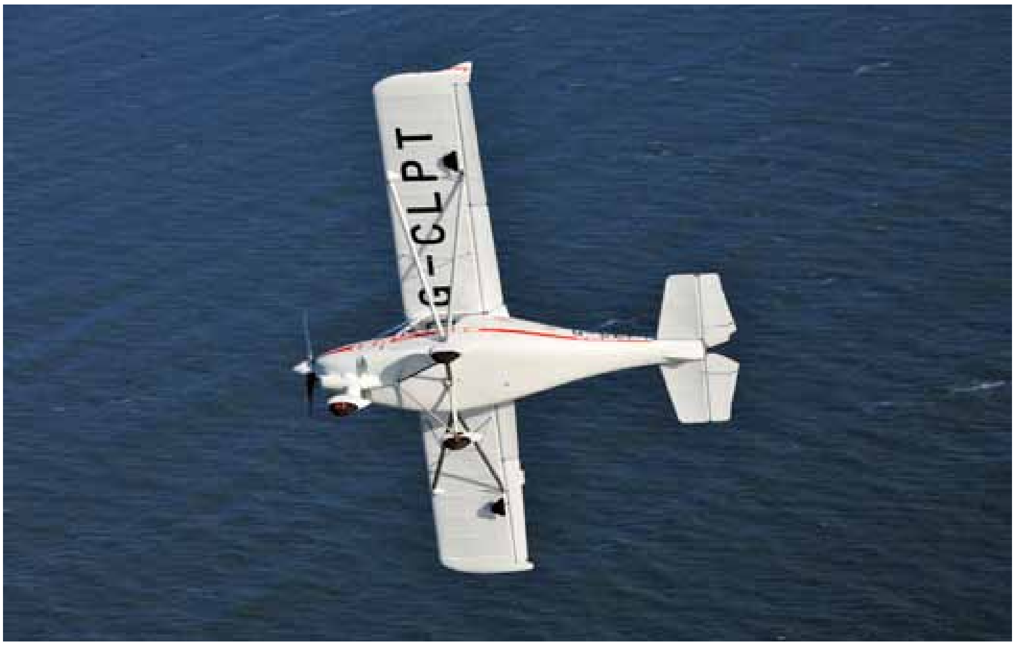
BELOW: 100hp in such a lightweight aircraft delivers an impressively short takeoff and steep climb



I test the mags and carb heat, then half-open the cowl air inlet control, check the trim, fuel pump 'on' and I'm good to go, but before lining up on R25 I note the ambient conditions and aircraft weight. These are a fresh 15kt breeze right down the centreline, a chilly OAT of only +2°C and a QNH of 990hPa. As Little Snoring has an elevation of 196ft, the well-below ISA conditions mean the density altitude is several hundred feet below sea level, while 80kg of Dave, no baggage and half fuel (22kg/32 litres) mean the actual weight is almost 90kg below MAUW. Light, a tarmac runway, a brisk headwind and the density altitude 500ft below sea level? I'm anticipating stellar takeoff and climb characteristics and am not disappointed! The propellor is pitched for cruise but you'd never guess. I reach 1,000-ft agl before the airfield boundary, and set off towards the coast in search of the cameraship.

The air is super-smooth and I soon slot into formation, Keith does his thing and they head home leaving me to have some fun. It really is a beautiful day, so for a few minutes I make the most of it and simply fly around, revelling in the simple pleasure of being airborne and enjoying the fine views afforded by the north Norfolk coast

Eventually I decide I really ought to do some work and start with a look at the general handling. For a high-wing aircraft the visibility is quite good, and although the C42 is a tiny bit blind in the turn, the transparent panel in the roof means that if the aircraft is rolled into a very steep bank it is possible to look into the turn through the roof. All the controls all seem quite nicely harmonised and authoritative. The roll rate in particular is much more sprightly than the A's, while the stick forces felt lower than I remembered, due almost certainly to the spades. The stubby centre stick does not confer significant mechanical advantage, and I'm sure the A needed a bit of muscle, particularly during steep reversals at high speed. Control around both pitch and yaw axes is equally effective, and keeping the slip-ball centred requires only small amounts of rudder. The electric pitch trimmer is effective and nicely geared.



ABOVE: **banking away reveals the C42s tubby fuselage plan form - all the better to give decent cabin room**

The roll rate is much more sprightly...

Moving onto an examination of the stick-free stability around all three axes reveals the directional stability is definitely 'soft' to the left and neutral to the right, while spiral stability is slightly positive from the right and neutral to the left. The longitudinal stability is quite strong—a ten-knot displacement from a trimmed speed of 70kt resulting in a long wavelength low amplitude phugoid that damps itself out after three lazy oscillations. Importantly, it is not divergent around any axes.

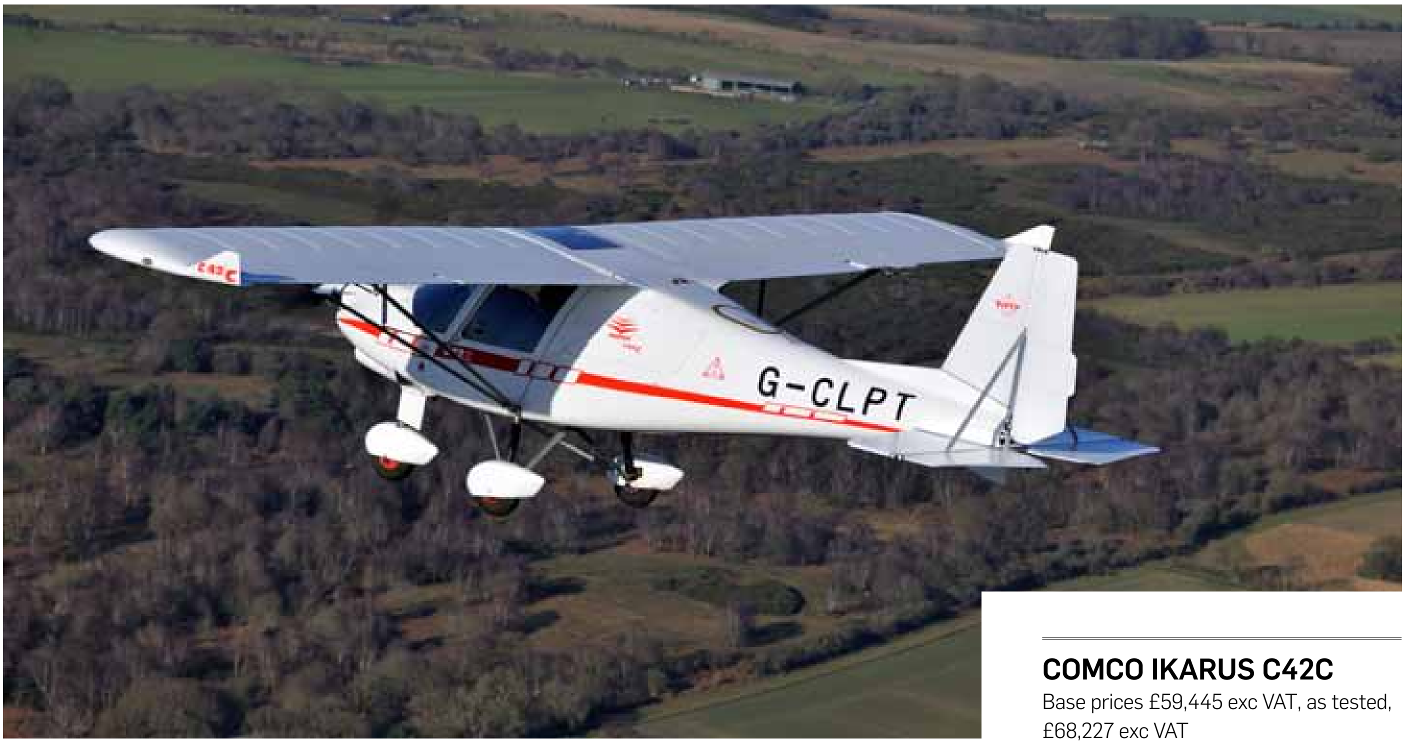
Slowing down to explore the low speed side of the flight envelope revealed no unpleasant traits. As the speed sinks past sixty, I move the flap lever to +2, which lowers the flaps to their maximum of 40° and causes a significant change in pitch trim, although this is easily trimmed out.

The nose is right into the wind, which must be about 25kt as it seems like the C42 is practically hovering as it slows to a stall. As is common with this class of aircraft, with full flaps and a reasonable amount of power the Ikarus shows no real desire to stall at all, and decelerating conservatively at one knot per second and with the nose just above the horizon it just mushes and wallows while the sink rate increases. There is no stall warner but a mild aerodynamic buffet is felt. Hold the stick on the backstop and the aircraft hunts slightly in pitch while sinking. Adequate aileron control is available post-stall. Use a more aggressive technique and it will stall with a slight wing drop, which at today's weight occurs at around 32kt.

For an examination of a departure stall I retract the flaps to the takeoff setting of '+1' (15°), open the throttle and pitch up... and up... and up! It feels as if I'm lying on my back before the wing finally gives up and the nose falls through.

The claimed glide angle is a reasonable 11:1, while the minimum sink rate is around 400fpm, and a couple of minutes with the power pulled right back leads me to conclude these numbers are probably about right, while a quick scan of the panel reveals that the oil temperature is barely above fifty (the air is cold, and I've been using very little power) so I partly close the cowl air inlet and move onto evaluating the other side of the speed envelope.

As I'd anticipated, this C42 is considerably quicker than the earlier models, and as the air is as smooth as glass I'm quite relaxed as the ASI's needle slips into the yellow arc, before that completely unanticipated encounter with some turbulence rapidly changes →



my mind! I quickly reduce power and speed, and initially am completely confused as to what produced the rough air. Upon reflection, it was probably curl-over from the cliffs at Hunstanton, but it certainly got my full attention. Anyway, it was still accelerating at 5,000rpm. 'Top-of-the-green' is 82kt at 2,000ft and 4,800rpm, for a TAS of 86kt and 16 lit/hr, so you can comfortably plan for 300nm plus 30 minutes' reserve. For older readers, that's about 25 nautical air miles per gallon, although you can use as much as 18lit/hr or as little as ten.

I wrap up the test with several circuits at Little Snoring, and for the first time I find the roof-mounted flap lever slightly intrusive; it requires constantly swapping hands. It's not a big deal, but I must complain about *something*.

Keith and Paul are now standing by the runway, so having flown a couple of typical GA circuits with 90° turns and a Vref of 55 (both as touch 'n' goes) I try a short-field landing and takeoff, concluding with a flaps-up, constant-aspect glide approach with side-slip as required. By now the wind has dropped considerably compared to when we took off, and because I'm solo with no baggage and close to minimum fuel, the C42 is really light—so for the short-field landing I use 48kt (five below 'yellow triangle' speed) and a hint of power. Over the runway I flare, chop the throttle and the C42 sits straight down. Strong braking and I'm stopped before Keith, who isn't that far up the runway.

Set T/O flap (the first time this flight, as I contend that machines in this class very rarely need flap for takeoff) full power against the brakes and we're off... and up in very short order! The combination of a very light aircraft and cold dense air sees the VSI peak at almost 1400fpm, which is pretty impressive with the prop pitched for the cruise (although I must reiterate that the weight is now 100kg below MAUW). Throttle to idle as I turn base, trim for sixty and glide home. Piece of cake, while the flapless landing lets me roll all the way to the end of the runway with the nosewheel off the ground.

While shutting down I note the placard that says, 'Category: Small Light Aircraft'—and that's exactly what this is. Although designed as a 472.5kg microlight, the C42C just needs the legislation to change for the MAUW to go to 560kg and give it a useful load of up to 280kg. And that will be truly useful.

COMCO IKARUS C42C

Base prices £59,445 exc VAT, as tested, £68,227 exc VAT

Dimensions

Length	6.38m
Height	2.20m
Wing span	8.71m
Wing area	11.90sq m

Weights and loadings

Empty weight	277kg
Max AUW	472.5kg
Useful load	195.5kg
Wing loading	39.70kg/sq m (8.14lb/sq ft
Power loading	6.33kg/kw (10.42lb/hp)
Fuel capacity	65 lit

Performance

Vne	121kt
Cruise	100kt
Stall	34kt
Climb rate	1,200fpm
Service ceiling	14,700ft
Take off to 50ft	160m
Land over 50ft	205m

Engine

Rotax 912S air/liquid-cooled flat-four, producing 100hp (74.57kW) at 5,800rpm and driving a Helix composite three-blade fixed pitch propeller

Manufacturer

Comco

UK Agent

The Light Aeroplane Company
Little Snoring Airfield
Tel: 01328 878809
Email: *sales@g-tlac.com*
Web: *www.g-tlac.com*