



Better by design

This microlight trainer is affordable, rugged, flies well and has 'market appeal' in spades

Words Nick Bloom **Photos** Keith Wilson

We all have our dreams. Mine was to be like a Great War pilot and fly open cockpit biplanes in helmet and goggles. The Cessna 150 in which I learned to fly came as rather a disappointment. I was soon won over, though, especially since its docile character and in-built stability enabled me to get my PPL in just 35 hours. I guess that one of the most

popular dreams is to be an airline pilot, and schools like the ones at Cambridge and Goodwood cater for it. There – for around £180 an hour – you can learn to fly in a Cessna 172 with a 'glass cockpit'. Two passenger seats behind you may not be many, but it's at least a step in the right direction and the Garmin screens are just like the ones in 'the real thing'. But what if you can't afford to learn on a modern four-seater?

Dreamers often have to live with compromise in the aviation world, but a crafty bit of design can help soften the blow. The EV-97 Eurostar (price about £70,000) is a case in point. With its aluminium skin, 'proper' cockpit over the wing and clean lines; squint hard and you might be looking at the four-seat PA-28, an aeroplane used to train airline pilots. The Eurostar is, instead, 'merely' a two-seat microlight. There are



currently 174 Eurostars on the G-register – so it's certainly popular – and I'm guessing a lot of them are flown by PA-28 aspirants. It's a fine aeroplane, but not as rugged or, I would imagine, as long-lived as the PA-28 – but it is completely practical, easy to fly and above all vastly cheaper to operate than its Group A equivalent. And it has customer appeal. Clever Aerotechnik to think of that.

We live in times in which the rich get richer, the poor struggle and those in between are increasingly squeezed. The aviation market is split between customers who want the best and can pay for it and the cash-strapped who can only just afford to fly. Well-off three-axis microlight pilots can spend around £70,000 on a carbon-fibre-composite beauty like the Flight Design CT series with flat screens, a ballistic parachute

and a cruise speed of 130mph. (Their flexwing equivalents can pay around £30,000 for an 80mph-cruise Pegasus QuikR.) And you can learn to fly in the latest CT with Deepak at Damyns Hall for £150 an hour. But what about the rest of us? How does £115 an hour sound – because that's what Two Two Fly charges for its Ikarus C42. But before I get on to that; a bit of history (you'll see why in a moment). ➔

Flight Test | Ikarus C42

As an open-cockpit fantasist with a fondness for basic aeroplanes, I've always been rather drawn to the humble Thruster – and that was built down to a price. In days gone by, microlight pilots were trained in their hundreds in these basic open cockpit taildraggers. The latest models are still training pilots, and have enclosed cockpits and a nosewheel, but they still have the functional look.

The Thruster uses the, to my mind, brilliant technology developed in the microlight world whilst the rest of us were plodding on with steel tube, fibreglass, plywood and spruce, and either aluminium skinning or doped and painted Dacron. Microlights used aluminium tube instead of steel, floating wing ribs stitched into the wing covering, pre-stitched, pre-dyed, heat-shrunk fabric, a wing that combined leading edge with main spar and Rotax engines in place of Lycomings. After a flirtation with two-strokes, microlight engines are now almost universally four-stroke, but they are still high revving and geared, with liquid cooled heads. They also have dual carburettors. No longer cheap (a new one costs up to £20,000), they have a great power-to-weight ratio and modest fuel consumption. Rotax engines have also proved superbly reliable. I was recently shown one that had done 4,000 hours with little sign of wear. Even microlight propellers are different: carbon fibre, three-blade with adjustable pitch.

Early Thrusters looked, though, a bit like flying deck chairs. One quite sensible and practical feature gave them an unfortunate appearance of something flown by the Edwardian pioneers: you sat under the engine. And instead of having a fuselage, the tail surfaces were connected to the wings by a fat scaffolding pole. When you started the engine (by hand in those days), the tail surfaces would wobble alarmingly.

Cross between a Thruster and a CT

Enter the subject of this Flight Test, the Ikarus C42. Let me sum it up, quickly, if perhaps a little unfairly. Aside from the seating position behind, rather than under the engine, it's a Thruster made to look like a Flight Design CT. And as a result you can learn to fly on one for just £115 an hour. The dream – well, almost – but priced for the struggling poor and squeezed middle. What's not to like?

Well, that's what Pilot's Editor Philip and I were saying to each other on the phone and the conversation ended with a challenge. "Why don't you find one and have a go in it? They can't be *that*

terrible," suggested Philip, and I said I would.

There are even more C42s on the UK register than Eurostars; no fewer than 180, in fact. I picked one based at Gransden and wrote the owner a letter, not realising he was an instructor and was using it to teach students. I received no reply, but I had reason to call in at the airfield and happened to bump into him. "Sorry about not answering your letter," he said, "but I've been so busy since I bought a C42, I haven't had a moment to spare. I'd love to give you a flight, though, if you don't mind waiting until things calm down." His name is Greg Burns and his flying club/school is called Two Two Fly, based at North Weald and Gransden (but with ab initio training from Gransden only). It has two C42s and he also teaches on Flexwings.

So now, in late September I'm at Gransden and getting my first really good look at the aeroplane. It appears quite like a scaled-down Cessna, although with Piper Cub-style wing struts (two per side with three jury struts mid-span) and additional external struts bracing the tailplane. Also,

It's a beautifully simple and elegant structure and it looks strong

the undercarriage is unlike Cessna's: three tubes per side with gas strut suspension.

The nose leg has what looks like rubber biscuit or coil springing inside a trouser fairing and all three wheels have rather nice wheel spats. The fuselage tapers in a straight line from the wing (like a Luscombe) and there's a rather neat strake in front of the fin. Flaps run one-third along the wing trailing edge, the remaining two thirds being taken up with ailerons, plain, not Frise, but with some differential travel to counter adverse yaw. The composite wing tips flare upwards, continuing the general look of careful streamlining and attention to aerodynamics. The doors are also unlike a Cessna's in that they hinge upwards, but they, like the fuselage and the engine cowlings, are made from composite. I don't see aluminium skinning anywhere, but there is a lot of aluminium tube, including what appears (rudder cables apart) to be an all push-rod control system.

There's a panel on the left side behind the cockpit for dropping your overnight bag into a net. The panel also gives access to the polythene fuel tank behind the seats and gives the game away as regards

construction – for there is the 'scaffolding pole' which, Thruster-like, is what actually supports the tail surfaces. The beautiful cone-shaped outer skin is just that: skinning. Inside the rear fuselage you can also just make out the essentials of the cabin structure: bolted-together aluminium tube and pure microlight. The fabric on the wings is semi-transparent and again, it's easy to see the Thruster-type structure: aluminium tube combination leading edge and main spar, floating wing ribs formed from booms stitched into pre-stitched fabric sleeves and all the rest of it. It's a beautifully simple and elegant structure and it looks strong and economical in construction time, keeping down labour costs. The new price for a C42 is around £50,000, which doesn't leave a lot for airframe construction after deducting £15-20K for the engine and maybe another £5K for radio, instruments and propeller.

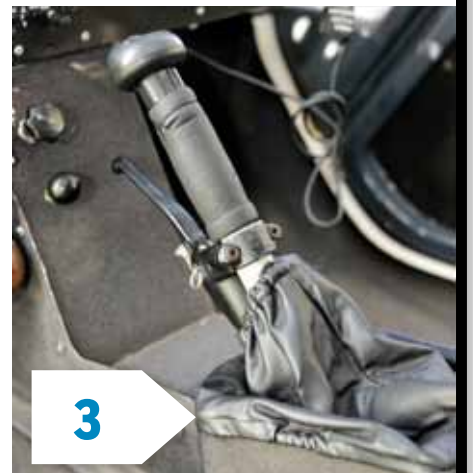
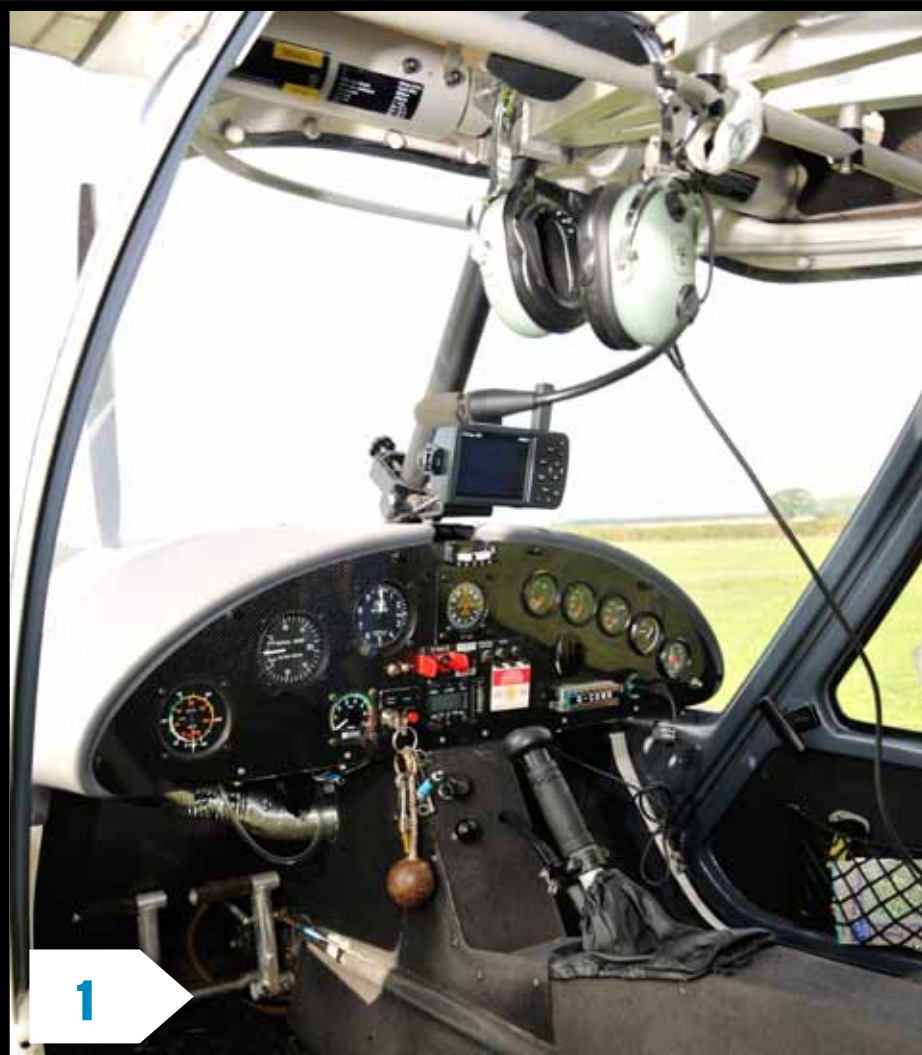
Shared control stick

Keith Wilson is going to be photographing from the left side of the cameraplane, so I elect to take the right-hand seat to get the best view for flying formation. The upwards-opening doors are held in place by gas struts and since the cockpit is quite low, it's easy from me to sit on the seat and swing my legs up and in. The seats are moulded and have excellent cushions. Inside it's roomy, although not in comparison to a Cessna 152 which has space for maps and other paraphernalia behind the seats. There isn't much room for such things in the C42, but I'll bet cognoscenti like Greg will know of a dozen stowage points. Controls are a shared centre stick for pilot and instructor with brake lever on it, rudder pedals, a flap lever in the roof and – rather oddly – a power lever for each of us on the front of each seat. I wonder if I'm going to confuse the throttle in my right hand, where I normally hold the stick, with the control stick in my left, where I normally hold the throttle. Time will tell.

We swing the doors shut – they lock with a proper handle I notice, very up-market for microlights, and one that would put some Group A aircraft to shame. Apparently you can fly C42s with the doors off, which would be nice, but not today. Besides, Greg has never tried it.

One nice touch in the cockpit is the carbon fibre instrument panel, nicely finished like everything else in this aeroplane – it gives the cockpit a touch of CT-style luxury.

The view is excellent to both sides and over the nose, although I would prefer to be a touch closer to the windscreen. →



1 The cockpit is roomy but offers limited storage space; **2** No mistaking how much fuel remains, even if you have to look behind to see the polythene tank; **3** While it feels odd at first, the shared central control stick soon becomes natural – the hand lever operates the brakes; **4** Elevators are pushrod operated; **5** overhead operating lever for the rather ineffective flaps – one control that does take a bit of getting used to; **6** Neatly designed rudder pedals, staggered to allow the mounting tubes to be as short as possible; **7** hidden fuselage boom; and **8** combined wing strut/undercarriage mount



No missing the fabric covering and leading-edge wing spar from this angle, which also shows the excellent view downwards

There's a clear panel in the roof, which adds to the feeling of space in the cockpit.

Greg and I fasten our four-point harnesses and we are ready to start up just as the cameraship comes alongside. The Rotax – 100hp in this aircraft, but you can have 80 – is still warm from the last flight, so all I have to do is flick up the master switch, then both mag switches and press the starter. As we taxi out after the cameraship, steering by throttle and pedals is straightforward – the seat-mounted throttle lever feels natural from the start – and I have a good view of the wingtips for navigating confined spaces. The undercarriage feels just right: not too hard nor too soft. The brake lever also works well, and I'm guessing we have hydraulic disk brakes inside those pretty spats. Greg quickly talks me through the simple pre-flight checks.

I select first stage flap using the lever in the roof. This I find a little tricky at first, but by the end of the flight I'm used it. We exchange thumbs up with the cameraship, line up and begin our formation take off.

As in all these flight tests, the take off is flown by feel, since I need all my attention for the cameraship. The C42 feels light in relation to its power, so I open the throttle gradually to give the other aircraft plenty of room and lift off a fraction after it does. Then I have to throttle back to maintain

station, even though we are both climbing. For some reason, the radio and intercom in the cameraship go unserviceable at this point, but it barely matters, since I can see Keith's hand signals. I am glad I chose the right seat. My concern about left hand on stick, right on throttle is misplaced – there's no confusion and the controls feel quite natural. However, I do feel as though I have the stick canted over to the left and the aileron control feels rather on the heavy side. One disadvantage of having to reach across to the joystick is some loss of leverage. In all other respects, the C42 is a delightful formation aeroplane: responsive, light (the aircraft itself, as opposed to its ailerons) and with a good power-too-weight

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ratio giving plenty of control for drawing forwards when required. As for drawing back, while the C42 is pretty well streamlined, it does have all those undercarriage and wing and tail struts, so when I throttle back, drag acts like a brake. The ailerons are perhaps a touch weak, but the rudder is a powerful assistant to them for banking. Also, perhaps because of sitting to one side of the stick, it becomes apparent that I am flying with rather more slip than usual for close formation. I have

left stick and right rudder on without being conscious of it, although Greg notices and points it out later.

The slight weakness of the aileron control becomes apparent during the break away shots, requiring me to bank left. In most aircraft I have to bank with one-quarter aileron to give Keith time to snap off several photographs, but in this aeroplane it's closer to three-quarter. Also, in the head-on shots, which are with crossed controls, I run out of aileron. So a mental note, then, to see later if this is apparent in normal (cruise and circuit) flight.

Despite the reliance on hand signals we complete the photo sortie in record time, and the cameraship banks away to return

to Gransden. Greg points out that I've been flying in slip and suggests I set the throttle to 4,000rpm and then let go the controls altogether. At first

the C42 goes into a shallow dive, gathering speed, but after one pitch gyration (and one nudge by me on the ailerons) it settles into what he says is Greg's preferred cruise speed of 70kt... "although it will just as happily cruise at 80 or 90, and sometimes, when flying home at the end of a long day, I cruise at 100kt," he adds. His other C42 has the 80hp Rotax and is maybe 5kt slower. "The difference is mainly in take off run and initial climb, plus the more powerful engine has a higher fuel burn." ➔



SPECIFICATION

IKARUS C42

■ DIMENSIONS

Wingspan	9.45m
Length	6.25m
Height	2.24m
Wing area	12.5sqm

■ WEIGHTS AND LOADINGS

Empty weight	265kg
Max takeoff weight	450kg
Useful load	185kg
Fuel capacity	65 litres
Baggage capacity	10kg

■ PERFORMANCE

Vne	120 kt
Cruise	70-90kt
Economy cruise	82kt
Stall clean	42kt
Stall, landing flap	32kt
Climb	1050fpm
Take off distance (over 50ft)	150m
Landing distance (over 50ft)	170m
Range	280nm

■ ENGINE AND PROPELLER

Rotax 80hp or 100hp with Ecoprop, Neuform or Warp Drive propeller, two- or three-blade, ground adjustable pitch

■ MANUFACTURER

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While the long-focus lens foreshortens the scale, the C42 offers an impressive takeoff performance

ultralights. The ailerons no longer feel weak, nor do they for the rest of the flight. Visibility is great for navigation and (not needed today) there's cabin heat and cockpit vents to keep the occupants comfortable. The C42 steers very well on rudder alone, to a point where you could almost dispense with elevator and ailerons, just like the single channel radio controlled models of my youth, I tell Greg, chattily. You see, it's that sort of aeroplane – it's so relaxing, it encourages conversation. I continue to play with it, sampling steeply banked figures of eight at various speeds (best at 75kt) and loitering steep turns "to wave to the girlfriend" at 50kt, which go a little better with first stage flap.

Then I climb to try out the stall behaviour. This is benign, but still with a *little* bite, just as you would wish in a training aircraft. So with some power on you can demonstrate a sharp nose, and wing drop in a wings-level stall, although with no power (and especially with flap set) the aircraft is inclined to just mush down. And stalling out of a steep turn with not enough power and too much pull on the stick, it doesn't just descend, it flicks wing level. Flicking the other way and dropping the nose into a steep dive (a Piper Cherokee would do this) would be overdoing it. Demonstrating lurking misbehaviour is one thing, but you don't want to frighten students.

And finally, it's time to drop down and sample circuit flying. The elevator trim control (and possibly the flap – we'll see later) may be superfluous in an aeroplane of this size and weight, so up until now I've left it alone. Still, this is a flight test, so I try it now. It's an electric one with buttons on top of the stick and a row of coloured lights on the instrument panel to

show the setting. It works well and is a fairly essential training aid.

Turning downwind to base and then onto final, I find my view rather curtailed by the roof and my head being just a little further back from the windscreen than I'd ideally like. Actually, this is no bad thing, as it provides a good preparation for subsequent aircraft – the problem is far from uncommon. The instructor can use the limited view to emphasise that there are other aircraft in the circuit and that you're not driving a car and are free to bank the wings and have a look occasionally.

Now on final I check to confirm that we are within the fairly generous white arc on the ASI (no glass display in this aeroplane), reach up to the roof lever and set it aft two notches for landing flap. This is getting easier, but I still need to watch what I'm doing, as the lever is a little clumsy. Nicely built though. This probably lowers the nose, but not dramatically enough for me to be sure. The view of the runway on final is great and the stability and instant throttle response give a feeling of security. Greg pointed out a marker on the ASI for approach speed. The instrument is right over on the left and I'm on the right, so rather than go for a speed (52kt), I aim for the marker.

I'm way too high, so try sideslipping, but can't get it to work properly, aileron being overcome by rudder. The gentle sideslip I produce is enough, though and has us coming over the hedge at just the right height, needle on the marker. We float a reasonable distance with throttle closed and the control forces are just right, making it easy to avoid any hint of porpoising. I can feel the grass blades just below the main wheels and when they touch, it's almost imperceptible. The nosewheel loading is equally well judged,

Having tried both, Greg is in no doubt that eighty horsepower is enough. In the 100hp variant, he plans on a consumption of thirteen litres an hour. The fuel tank holds sixty litres, so that's four hours plus reserves at 70kt, a range of 280nm. He's flown the aeroplane to France a few times.

In cruise the C42 is stable and has none of the friskiness you sometimes get in

so that the feeling of stability remains until that too descends... I've been holding it off with back stick.

"Okay to go around with full flap?" I ask Greg. He says it is, so I open the throttle and in no time at all we're flying again. There's a tendency to pitch up because of the flap, which Greg says can catch out students, so he discourages more than first stage flap for takeoff. We make a tight circuit so that I can have another go. This time I get the feel of the sideslip. The trick in the C42 is to lower the nose, whereas in most aircraft you raise it slightly. This makes a really steep descent possible, a useful facility should you need to land over trees, for instance. Anyway, I enjoy it.

This is a relaxing, fun aircraft and by now I've fully got the hang of flying left-handed on the centre stick, and it feels quite natural. For my penultimate tight circuit, I go from takeoff to maximum cruise, boring round the circuit like a PA-28, then throttling back, lowering two stages of flap and sideslipping steeply, setting the wheels down just inside the hedge. You could land this aeroplane in 150 or 200 metres if you had to. Takeoff is much the same and the initial climb is around 700fpm with the 100hp Rotax, maybe 600fpm with the 80hp engine.

Does it really need flaps?

I'm curious about the flaps, so make the final circuit without them. Takeoff doesn't seem to be much affected, and neither does landing, but they shorten the

distances just enough to justify their inclusion for the private owner. For a flying school, flaps, like elevator trim, are pretty much essential.

"Whooh," I say to Greg as we taxi in. "I really enjoyed that." He says he could tell.

Greg, who is 52 and comes from North London, had a career in the leisure industry, owning two pub companies and at one time working as a holiday rep (which I can believe; he's awfully easy to get on with and one of the nicest flying companions I've encountered). He discovered microlights and in 2005 he had

You could land this aeroplane in 150 or 200 metres if you had to. Takeoff is much the same...

his first flying lesson. He's been an instructor for six years, the last three with C42s. He gets 1,000 hours a year on each of them – a figure that includes hiring them to ex-students. Prior to that, "I was a flexwing instructor and my business wasn't making me a living. Since I got into C42s I won't say I've become wealthy, but I no longer have to worry about getting through the winters." He is planning on buying a third C42 next spring. He tells me, "A lot of GA pilots discover the C42 fills a gap between simple single-engined aircraft (SSEA) and traditional microlights. I have airline pilots who do the microlight conversion because they say they miss real flying." He also gets students who can't afford Group A flying, get a microlight licence, convert to Group A and some of them even go on to seek airline careers.

Greg got his SSEA licence a year ago in a PA-28. "It was like driving a Transit van," he says. During my visit one student, Chris Rogers is there. He's flown 32 hours and is close to his General Skills Test. Chris went flying in a friend's Cessna years ago, tried the controls and liked it but couldn't afford to learn. Then he started with paragliding, which began to drag after six years; "Too much hanging around". He had a go in a flexwing microlight seven months ago but decided three-axis microlights would take him further in greater comfort. A technician in the wind turbine industry,

Chris lives near Gransden and saw the Two Two Fly stand at the annual Airshow. "It's got to be a two-seater for me," he says, "so I can take the wife

flying," adding, "I might go on to Group A later, just to have more choice of aircraft to buy."

According to Greg second-hand C42s typically cost around £30,000 and that's what he paid for his first one, which he bought from a flying school. There is a waiting list for new ones. Hangarage and insurance rates will match those in the Group A world, of course, but for a flying school in particular, I'm betting that maintenance will be a fraction of what people are having to pay on PA-28s and Cessnas in today's post-EASA world. And fuel costs are also low.

However, all those are arguments of the head, not the heart. Why are there 180 C42s on the register in these hard times? When you come down to it, I'll bet the biggest factor is the way it looks. ■

