Germany's Favourite Ikarus C42 - Flight Test Report

David Bremner

It may be new to the British market, but the Ikarus C42 is a long-standing best seller back home. David Bremner assesses this German contender.
Photos by Ian Bracegirdle, and Peter Lovegrove.

The Comco Ikarus C42 is very well established in its native Germany, and was the best-selling ultralight there in 2001. Total sales have now reached 400, and production is running at 1.5 per week. It is extensively used for training, but is also popular as a glider tug, and has been fitted with floats for use in Finland. It's also a popular mount for World Record attempts and currently holds World Speed Records in two categories. It's recently been given a full permit to fly in the UK and with 22 kits sold, six of which are already flying, it's proving a popular choice, in spite of the fact that it's only available in kit form.

Barrie Bayes (ex-hang glider and microlight pilot and sometime cameraman for Brian Milton) went to Germany to look at the Ikarus. He was very impressed with its quality, handling and performance and when asked to take on the dealership in the UK, he didn't have to think long before accepting.

Recently I was asked to Cranfield to fly the German-registered UK prototype, and I jumped at the chance. It varies from the UK specification in having a ballistic parachute fitted, and a glider tow hook. UK kits also have rather wider wheels to cater for our particularly muddy conditions…

First Impressions

On first acquaintance the Ikarus looks like a typical high-wing two-seat light aircraft; sturdy and dependable. As you get closer however, the similarities with the microlights we've grown up with become more apparent.

Latest UK 912S Aircraft
uses Arplast Prop. Warp drive
on this earlier example.

The wings, for example, use the same method of construction as the Rans and Thruster — aluminium leading and trailing edge spar tubes held apart by compression members (looking a bit like a ladder inside) and supported by twin struts, with a fabric 'sock', and preformed ribs fitted into pockets in the fabric which serve to tension it and form the modified NACA 2412 aerofoil shape.

Tail surfaces are made from bent aluminium tube with sailcloth covering. Non-structural fairings are added to the fuselage to give it an acceptable aerodynamic shape, and to keep the occupants out of the 80kt breeze!

The fabric is GT-foil, better known in the UK as Ultralam as used on the AX2000 — it's a coarse-weave polyester coated in clear plastic to give an impervious, waterproof and extremely durable, tear-resistant finish. UK kits are specified with the higherpriced UV-resistant version. Compared with a doped fabric finish, the colour options are limited, but its resistance to tears, oil stains and hangar rash more than make up for this.

The Ikarus was designed in 1996 by legendary Swiss designer Hans Gygax. He knew that high-tech was all very well, but maintainability counted for a lot, so he elected to use conventional aluminium tube construction rather than composite. As you get right up to it, you realise that under the composite fairings the fuselage is built around a single huge aluminium tube which runs between the side-by-side seats and back to the tail. A cockpit cage is constructed around this, but where the Americans have tended to make joints by flattening the tube end and pop-rivetting together, I'm pleased to note the Ikarus uses proper bolted rose joint fittings throughout.

The non-structural fairings cover the structure completely to give a look that is conventionally pleasing to the eye, the only jarring note is being the rather blunt cut-off of the fuselage tail cone and the slightly poor fit of the door at the back. The tight-fitting engine cowl is a rather complex shape, and might be thought to lack style, but that's a purely personal opinion.

Access to the rear fuselage and fuel tank is through a hatch on the port side. There's room to fit camping gear, tinned food, a change of clothes and the dog in there for long trips, but that's not what it's there for!

The tricycle undercarriage layout will be familiar to X'Air owners — damped coil spring suspension on all three wheels with the main gear fully triangulated — not a cantilever in sight and looking sturdy enough to deal with pretty much any combination of field and pilot. The propeller's ground clearance is ample too, so the blades should be pretty much immune to accidental ground strikes. It comes with spats, which might be a bit of a liability on the soft ground which seems to have become such a permanent feature of grass strips these days, but they could always be removed, and the mud flung up on to the flying surfaces would be easier to shift than from doped fabric.

In summary, there's nothing radical here, and the impression is of a thoroughly grown-up microlight.

It was originally planned to fit the ubiquitous 80hp Rotax 912, but enquiries were so concentrated on the 100hp Rotax 912S that either option is available for the UK kits.
The installation is conventional, with a close-fitting, horiz o n t a l l y - s p l i t cowling giving adequate access. Hatches allow you to check water and oil to check water and oil levels. Should you need to open the bonnet, the cowling top half is removed by undoing about 17 Quick-Lock fasteners. Hung on the front of the engine is a three-blade Warp Drive propeller with tapered blades that look far too emaciated to absorb 100hp. Absorb it they do, however — but more of that later.

The fuel tank is a moulded polypropylene box fitted in the fuselage behind the pilot, and contains 50 litre of fuel, with the filler cap tucked in a little too close for comfort by the starboard aileron root.

Settling in

Enough of the niceties. Let's get down to the nitty-gritty. Getting in via gull-wing doors is made easier by gas springs that hold them open. Park your bottom on the seat, swing your legs

round and in, and check out the controls. There is a central stick, and no apparent throttle. Don't despair, because Barrie has thoughtfully folded it out of your way while you got in. Reach down between your legs, and it can be swung up to go where a conventional stick would go. Confusing? No. At least, not for this pilot. The controls seemed entirely instinctive, even though I was flying from the right-hand seat, which might be expected to produce maximum confusion.

There is plenty of room (the cockpit's claimed to be wider than a Cessna 182) and the seats, while not adjustable, are set to give ample leg and headroom for giraffes like me (I'm 6ft 3 inch). I imagine cushions would do the trick for anyone who has trouble reaching the pedals. A central tunnel (hiding the main boom) acts as a very effective arm rest, and the central stick comes very readily to hand from either seat. A motorcycle brake lever on the central stick works the very effective hydraulic brakes, with a small locking cam to provide a parking brake. Flap and trim levers are overhead (trim is now electric with a rocker switch and indicator on the panel).

Sturdy rudder pedals are connected to nosewheel steering and rudder, as you would expect. The tail surfaces are pushrod actuated, with ballraces at all the pivots, and are very free. The aileron circuit consists of a closed-loop circuit up to a bellcrank above your head, with pushrods going out to the aileron horns — just like the Rans S6. Once again, no expense seems to have been spared on the fittings and there is very little circuit friction on the ground. The overhead flap lever has another motorcycle brake lever to work the catch that fits a series of detents for the various flap positions, and the trim lever, also overhead, is the only one that's slightly more difficult to reach from the right seat.

I wanted to bring my camera case with me, and we found that there was and we found that there was room for it under the seat. Getting it out in flight would have been slightly tricky, because the throttle mechanism gets in the way (apparently redesigned for easier access on current kits) but smaller articles would be no problem. Maps, airfield guides kneeboards and logbooks can go in the door pockets for easy access.

The view out is fairly typical of a high-wing aircraft, with a good slope to the cowling giving decent forward visibility, and a window in the roof panel giving a somewhat limited view through the welded steel structure upwards. This panel is non-structural and would benefit from being fully transparent to give as much view as possible in the turn. The windscreen and side windows are low, giving as good a field of view downwards as possible without bulged panels. If you need to, you can fly with the doors off for photographic reasons (or just for fun!). Barrie jumped into the left seat, we strapped in, shut the doors and fired up. There are a lot of horses under the bonnet, but their noise level is very acceptable. Conversation without headsets would be hard work, but the environment with them on is very relaxed, and long trips would be very comfortable. All the instruments and controls are accessible from both seats.

The Rotax requires minimum 50°C oil temperature, necessitating a brief hiatus on the apron while the engine warms through. Taxiing is straightforward, the controls being well harmonised and the brakes extremely effective. It will turn on a wingtip.

Flying it

Traffic at Cranfield was very heavy, so Barrie demonstrated the take off. The high power-toweight ratio means that acceleration is brisk and the roll short. Once airborne, Barrie pointed it skywards at about 60kt, and the VSI indicated 5m/s (1000ft/min). To those with 912-powered flexwings this will be a familiar sensation, but anyone trading up from Rotax 503s and 582s will be very impressed, and will need to be aware of the need to get the nose down quickly if things go quiet up front. I was impressed with the view forwards over the low-cut cowling even at this steep angle, which means one doesn't need to do weave to check for oncoming traffic.

Clearing the busy circuit,Barrie handed control to me, and we settled at an indicated 80kt cruise with 4000rpm showing on the tachometer. One's initial impression is of stability in both

pitch and roll: control forces are firm without being heavy and it seems capable of holding trim speed very accurately (on a calm day, anyway) without requiring continuous corrections. The overhead trim control worked in the opposite way to what I expected, but neither sense is entirely natural, so it's just a question of getting used to it. It's a well co-ordinated control, being powerful enough without being oversensitive, and it was very easy to get things set up in the cruise. The long throttle lever makes fine adjustment very easy, and straight and level flight was admirably easy to achieve.

Having done so, the aircraft seemed set on flying exactly where you pointed it. This would be a very comfortable cruiser, the spacious seating, wide cabin, low noise levels and low control input leaving maximum time to enjoy the scenery and concentrate on the navigation. With the fuel meter indicating 10 l/h, a 50 litre tankful should get you well over 400 miles with reserves, by which time you'll certainly need a comfort break, owing to the unfortunate absence of an on-board toilet! You should bear in mind that due to its relatively high empty weight (265+kg), full tanks and two 86kg occupants will put you well over the 450kg mark, so maximum range will vary considerably with payload.

Then I got to waggle the stick about a bit. Side to side first, and the roll control was firm, powerful and precise: 45° left to right took about 3s and the wings seemed to follow the stick with what I can only describe as Germanic precision.

Stability in pitch was very good, both stickfixed and stick-free, and the trim was only very modestly affected by the throttle setting. Turns required a small amount of rudder to keep the ball in the middle, but only to please the cognoscenti. Non-flying passengers would barely notice the difference. Chopping the throttle and re-trimming to 60kt gave a descent rate of 3m/s (600ft/min).

The stall was extremely well-behaved. Power off, there was buffet at 35kt indicated and a stable mush at 33kt, in which the ailerons were still effective. We tried the same thing with the flaps extended and the response was the same, with the needle correspondingly further down the dial. In a turning stall the outside wing broke first, returning the aircraft to wings-level flight. All in all, this was a very confidence-inspiring feature.

Barrie encouraged me to try the sideslip, which is my preferred method for sorting out a badly judged approach. The effects were very gratifying — a relatively small slip angle produced a satisfying rate of descent, and sticking the controls in opposite corners of the cockpit produced an attention- getting manoeuvre that was nonetheless completely under control. Armed with this information, I tried an approach to a small field sometimes used by light aircraft. Visibility was fine and either sideslip or flaps could be used to control the approach. It's necessary to keep an eye on the speed during the final stages, but no more than for any other type — and with the high wing, there's no noticeable ground effect. The ample power and relatively slow approach speed (55kt) mean that goarounds are also straightforward. My notes at the time say 'landing on rails', and that's how it felt.

Many older three-axis microlights have flaps that aren't particularly powerful. Anyone trading up to an Ikarus will find that they're much more effective, but the benign handling and the lack of trim change shouldn't catch them out.

Heading back for Cranfield, we checked out the Vne, which at 105kt can be reached virtually in level flight (I understand that Vne has since been revised to 120kt and max level speed to 104kt). Once again, those controls were firm and positive and not too heavy, and the aircraft was positively stable in pitch. My impression of other ladder-type wings is that they are pretty flexible, so I was interested to see how the wing structure took this kind of punishment, and (to my secret surprise) I couldn't notice any movement at all.

I handed over to Barrie to negotiate the radio and circuit traffic at Cranfield, and he demonstrated the very short landing possible on tarmac.

Safely back on terra firma, Barrie was able to demonstrate two of the best features of this aircraft. While taking the ground-to-air pictures, I was struck by the unusually low noise level.

In a noisesensitive environment, I can imagine this aircraft silencing much criticism with its own silence.

The second feature is its folding wings — a rare treat even among threeaxis microlights. The system is rather more complicated than the Rans S6: the roof panel has to be removed, then flaps, ailerons and jury struts disconnected, lower lift strut attachment and two wing attachment pins removed, and then the whole wing slid out a foot or so on a dummy spar before tipping the trailing edge down and swinging the tips aft.

The wings fold flat alongside the fuselage and are secured to the struts between tailplane and rudder, and Bob's your uncle. Nonetheless, two people should be able to do it in half an hour to start with, getting down to perhaps half that with practice. It's too tall to fit in a standard garage, but it could be towed, and you should certainly get discounted hangarage (and reduced hangar rash) if it's stored like this.

Marks out of ten

At £29,963 (with a Rotax 912 and no wing fold) this looks an expensive kit — in fact only the Cosmik Eurostar, Dyn'Aero Ban-bi and Aeroprakt Foxbat are in that price range, and cheaper high-wing twoseater kits include the Rans S6 912, Jabiru, Zenair CH701 and Tecnam P92 Echo. Bear in mind, however, that comparisons on kit prices are difficult, because expensive bits like engines, instruments, painting, etc aren't always included. The Ikarus kit comes complete with everything you need (including engine oil and coolant!), and while it can't be thrown together in a weekend, it is realistic to expect her to be flying around the 500h mark. Expert help is available from Fly Buy Ultralights and its agents.

Of its rivals, the Ban-bi is a no-compromise performance machine and the Eurostar is an allmetal low-wing layout that will appeal to a very different market. The Foxbat is all-metal (without wing fold) and extensively glazed, giving a wonderful view. The Jabiru cockpit is significantly smaller, the Zenair CH701 is dedicated to short rough field performance, and the Tecnam is all-metal and the wings won't easily fold. The Rans S6 912 is of similar construction but is of a lighter build throughout. In this plethora of choice, what makes the Ikarus stand out?

Well, it isn't a radical aircraft. The rag-and-tube construction is utterly familiar to microlighters, but the composite fairings allow higher speeds than we're used to. I think what defines the Ikarus is solid, dependable quality. The quality of construction stands out, and the flying qualities are very straightforward. The aircraft should withstand general handling better than most and repairs should be straightforward and cheaper than some. Barrie has had lots of interest from UK gliding clubs who see it as a cost-effective tug. It should take all but the very roughest of strips in its stride and I can imagine instructors taking a particular shine to it; it will inspire confidence in nervous students.

They have to use factory-built aircraft, of course, and Barrie is making considerable progress towards the CAA A1 status that will allow him to sell them ready to fly. He knows this is the mainstream market and he has already sold the first six off the production line. Touring would be a real pleasure and it should be possible to operate out of all but the shortest, muddiest fields, where plastic fantastic machines would suffer stone chips etc that would be difficulty to repair. Where repairs are required, the Ikarus, with its conventional construction, should be simple for an owner with no special skills to fix. It might not be the most glamorous boy's toy, but it's likely to prove a very sensible choice. Serious kit alternatives include the Tecnam Echo and Foxbat, but if the ready-to-fly version is available soon, Barrie can expect lots of interest from schools and microlight instructors.

TECHNICAL DATA
Comco Ikarus C42

MANUFACTURER
Comco Ikarus, Flugplatz Mengen, Am Flugplatz 11, D-88367 Hohentengen, Germany; tel +49 (0)7572 60080; fax +49 (0) 7572 3309;

IMPORTER
Fly Buy Ultralights, Ambelside, Bourne End Road, Cranfield, Beds MK43 0BD; tel 01234 751110; mob 07889 199329 & 07885 787711; fax 01234 751784;

SUMMARY
Side-by-side two-seat high wing monoplane with conventional three-axis control. Wings have unswept leading and trailing edges and constant chord; conventional tail. Pitch control by elevator on tail; yaw control by fin-mounted rudder; roll control by ailerons. Wing braced by struts from below; wing profile NACA 2412 (12% thick); 100% double-surface. Undercarriage has three wheels in tricycle formation; oil/gas damper suspension, on main wheels. Push-right go-right nosewheel steering connected to aerodynamic controls. Disc brakes on main wheels. Tube and fabric construction with composite panels. Engine mounted below wing, driving tractor propeller.

EXTERNAL DIMENSIONS & AREAS
Length overall 6.25m, 20.5ft. Height overall 2.20m, 7.2ft. Wing span 9.45m, 31.0ft. Constant chord 1.32m, 4.3ft. Dihedral 0°. Sweepback 0°. Main wing area 12.5m2, 135ft2. Other areas NA. Aspect ratio 7.1/1. Wheel track 1.61m, 5.3ft. Wheelbase 1.50m, 4.9ft. Main wheels dia overall NA.

POWER PLANT
Rotax 912S engine, liquid cooled. Max power 100hp at rpm. Three-blade propeller, diameter and pitch 1.73m x 21°, 68 inch x 21°. Gear reduction, ratio 2.43/1. Max static thrust NA. Power per unit area 8.0hp/m2, 0.74hp/ft2. Fuel capacity 50 litre, 22.7 Imp gal, 18.9US gal.

WEIGHTS & LOADINGS
Empty weight 262kg. Max take-off weight 450kg. Payload 183kg. Max wing loading 36.0kg/m2. Max power loading 4.5kg/hp. Load factors +4, -2 recommended, +6, -3 ultimate.

PERFORMANCE*
Max level speed 120mph. Never exceed speed 139mph. Economic cruising speed 108mph. Stall speed 39mph. Max climb rate at sea level 1200ft/min. Min sink rate 390ft/min at NAmph. Best glide ratio with power off 11/1 at 50mph. Take-off distance to clear 15m obstacle 79m** on grass. Landing distance to clear 15m obstacle 46m on grass. Service ceiling 10,000ft. Range at average cruising speed 400miles. Noise level 73.5dB(A) LEL. * Under the following test conditions Airfield altitude c300ft. Ground temperature 13°C. Ground pressure 992mB. Ground windspeed 20kt, gusting 30kt. Test payload 390kg. ** This item tested with 912-engine, shorter take off with 912S-engined aircraft version

PRICE INCLUDING VAT £30,786 as tested, with specification as above £29,963 with 912 engine and two-blade prop

NA = Not available Figures above are manufacturer's/aimporter's data Figures in text are tester's experience.