THE RANGER'S RETURN

David Bremner FALLS IN LOVE ALL OVER AGAIN

"Flying it in 2000, I felt a bond with the aircraft. Nine years later, the feeling's back again

BACK in March 1982, when men were real men, and microlights were real microlights, unfettered by conventional airworthiness standards, *Flightline* (*MF*'s predecessor) published the first account of the Micro Bipe – a single-seat biplane with only 5.5m span and an open frame fuselage with a hammock seat and both nose and tailwheels. It came in a kit costing £2500 plus VAT and was powered by the Robin 250 or 330.

By the November of that year, it had morphed into the Tiger Cub, with a covered fuselage, no nosewheel, a 440 Robin up front, and wingspan enlarged to 6.7m to meet the wing-loading requirements of the microlight regulations of the time. The wings could also be folded for trailering in only about 5min. The Tiger Cub became a modest success despite some handling issues, and today there are still 23 on the register (though only one was in permit at the time of writing).

One of those involved with the Tiger Cub was the late Russ Light, and after the demise in 1984 of the original company, MBA, he provided support for existing owners. To him, the concept of a biplane with folding wings was exactly what a microlight should be: keep it on a trailer at home, then hitch up and go to the nearest farmer's field. Just 5min rigging time

and off you go. Cross-country performance was secondary to the elemental pleasure of getting air under your wheels on a beautiful day.

He was an experienced light-aircraft pilot, and knew that even the fastest light aircraft was useless in the dark or in cloud or heavy rain, and didn't become a practical means of transport (in the UK at least) until you could conquer those problems – and get to and from the airfield at each end! – which is still the case for even the most sophisticated microlights today.

But Russ also knew a thing or two about aircraft design and knew he could do better. Fast forward to the 1990 Trade Fair at Wolverhampton, and Russ had brought along the fuselage of his reworking of the Tiger Cub concept – still built from bolted aluminium tube and with fast-folding wings, but with nicely rounded lines that harked back to the 1930s. And for those that think the folding-wing concept was new, check out the Short 184 Seaplane of 1915!

When the prototype was finally finished in 1992, it was a beaut; not only on the ground, with its elegant proportions, swept-back wings and tapered nose reminiscent of between-the-wars classics with inverted Gypsy engines, but in the air, where its easy handling and light-as-a-feather roll control earned it a devoted following. And for the export market, there was the XP version, with a shortened wingspan and aerobatic capability.

Like the Tiger Cub, the Sherwood Ranger was only available as a kit, and the supply of parts was somewhat chancy, requiring a significant amount of persistence on the part of builders. I flew one of these aircraft, G-PUSY, for an *MF* flight test in Sep-Oct 2000, and this was the main criticism at the time. Nevertheless, there are still 10 on the UK register, with a variety of engines fitted – from the original Rotax 532 and 582 to the Rotax 618, Jabiru 2200, and even a BMW R100 boxer twin!

Tragically, Russ' life was cut short by illness, and the rights to this delightful aircraft went through a number of owners before ending up at The Light Aircraft Company (TLAC) in the delightfully-named village of Little Snoring in Norfolk.

TLAC is a family firm employing five people, and owned by Ivor and Beryl Smith with their son Paul. TLAC is a retirement project for them (!), having previously run a chemical company; they bring business acumen to their passion for flying. The main part of the business is light aircraft repair; when I visited there was a Cessna Skylane and a twin in the hangar – each dismantled for repair and maintenance. The projected repair bill for one of these would get you a whole new microlight! They hold Part M Subparts F, G and I approvals, both from the CAA and EASA, and are very professional.

The result is that the Sherwood Ranger kit is being manufactured by an organization with a stock of parts, all manufactured in-house, labelled and organized, so that delivery should be reliable. Paul's blog at www.g-tlac.com/bc_blog.html is excellent; if you scroll right down to the bottom you'll see the £60,000 Haas CNC 3D machining centre they bought specifically to make parts for the Sherwood.

Upstairs they've got racks of carefully labelled parts and stocks of tube all ready for delivery. The owners of the original aircraft are a dedicated band of enthusiasts who are a great self-help network, and have been of great assistance to Paul in building the first TLAC machine, and suggesting the improvements he's incorporated.

Meet the new boy

We moved outside to look at the object of all this investment and care, and there was G-TLAC, resplendent in her yellow and silver livery. It was time to see what, if anything, had changed.

And the answer is: not a lot. Russ Light's design has proved so successful in practice that the basic layout and structure has been retained pretty much intact – it's even been possible to upgrade the maximum all-up weight from the original 390kg to 450kg without any changes. G-TLAC, the demonstrator, is even fitted with a Rotax 582, as originally envisaged. So TLAC has mainly concentrated on the details and tidied up one or two areas as a result of users' comments.

For those who haven't come across the Sherwood before, the fuselage is made up of a Warren Truss in bolted aluminium tube with wood-framed turtle deck and stringers to fair the shape. The wings have a single aluminium-tube spar, with ply ribs bonded on. There's a single interplane strut each side, so the spar/rib joint is critical. The section is semi-symmetrical, and there's a ply leading edge and four ailerons. The wings are slightly swept back and only the lower wing has dihedral, but there's no forward rake (the top wing is directly above the other). This might not look as stylish, but is essential if you're going to fold the wings. Tail surfaces are preformed aluminium tube.

The main gear has bungee suspension. Rather sur- ▷

Main picture and above: Seventeen years from launch of the first prototype, the Sherwood Ranger is back, gracing the skies

Above right: You don't get into the Sherwood, you wear it

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G-TLAC was panting at our heels and rollicking round the sky like a puppy

▷ prisingly, the wheels and brakes are manufactured by TLAC. The original tailwheel was free castoring, which required a certain amount of pedal dexterity, and TLAC has opted to make this a steerable (but non-castoring) version.

Other changes include a new fuel tank. The original had a single tank in one upper wing root, which only held 23 litres. TLAC has made a carbon/kevlar tank in the fuselage immediately behind the firewall, which holds 41 litres and makes wing manufacture – and the plumbing – much easier.

Other changes include the cockpit coaming, which is now glassfibre and load-bearing (to make entry and exit easier), enlarged aluminium covers for the wing / strut joints for ease of access, and the use of Oratex UL600, a new heat-shrink fabric designed for aircraft use and manufactured in Germany. It comes impregnated with UV protection and colour, so you only have to bond it to the frame and heat-shrink it. No sealing or painting is required, not only saving vast amounts of time in the covering process but also eliminating surface cracking of paint and making any repairs very easy.

There are other changes under the skin which will be appreciated by the builder, but don't show on the completed aircraft.

This is only the second aircraft in the UK to use Oratex (the first was the prototype Escapade Kid) and it will be interesting to see if it proves attractive to builders. Oratex isn't cheap (in broad terms it probably costs about the same as having more conventional systems applied professionally) but the advantages are that application is much quicker, less messy and less smelly – and there is a significant saving in weight. A ball-park calculation against the figures quoted for Polyfiber lightweight fabric shows a saving of around 5.5kg, and the saving over a conventional doped fabric would be greater still.

The result is that G-TLAC weighs an astonishing 214kg empty, even though it's rated at the full 450kg. This gives a whopping 236kg payload. Even with a full tank, you can fit in two 100kg occupants and still be within limits – and there aren't many three-axis microlights which can do that! The reason, of course, is the biplane layout. It may not be particularly low drag, but you can certainly keep the weight down.

There is a reasonable range of colours to choose from, but if you want an exact match for your wife's eye colour, you'll need to apply specially mixed paint. This is possible on Oratex, but of course you lose some of the advantages and might as well use cheaper conventional systems. Applying a two-tone colour scheme is simple if the change in colour follows the framework, more complex if it doesn't. Trim can be easily applied – either as self-adhesive vinyl, or additional fabric.

The finish isn't glassy-smooth – it's more like a dyed fabric, and I would be slightly concerned that it would acquire stains and grime, though it's claimed to be proof against the strongest cleaning agents. Repairs for either system are relatively easy, with no repainting necessary.

It's too early to say exactly how the fabric will respond to age and wearing, though the 10-year accelerated-life factory tests have been sufficient for the LAA to be satisfied that it's airworthy.

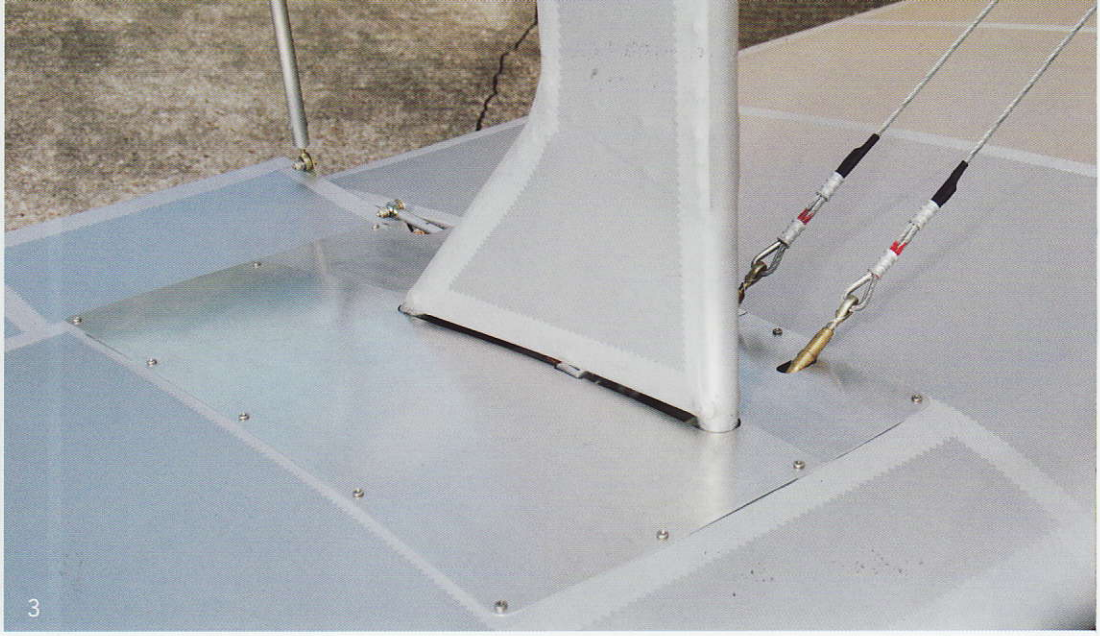
Certainly the simple colour scheme on G-TLAC is very attractive, the adhesion – whether of major panels or reinforcing tapes – was excellent, and G-TLAC looked as pretty as a picture on first acquaintance.

He sat in a cocky posture with a big grin on his face, and the yellow colour scheme gave him a sunny disposition. Pilot James Milne got suited up and we were off for the photo shoot, with the 582 settling down to a quiet hum. We had the airfield to ourselves, and he hopped into the air, crosswind and in no distance at all.

While the oil was warming up in the camera ship's 912, G-TLAC was charging round the sky like a puppy, and yapping at our heels as we took off. (I should explain that James' other aircraft is a Pitts S1B, and he's a very experienced aerobatic pilot). As soon as I opened the window for the photographs, there was G-TLAC, panting at our heels and rollicking around the sky. Up a bit, down a bit, back a bit. No problem; he's an obedient puppy and did exactly as he was told. Once the pictures were in the can, he was off the leash and back down to low level, sniffing out the exciting smells and sights behind every hedge.

Close inspection

Back at Little Snoring, it was time to get up close and personal. The back seat is more of a challenge to get into than a monoplane; there's a step in the fuselage side, and you need to swing one leg and then the other over and onto the seat, then wriggle your legs down, supporting your weight on the coaming. With a little practice, it's not too difficult, though you need to be familiar with the layout of the cockpit floor. The four-point seat belt is easy to get at, fit and adjust. TLAC says that the short-wing version can have a five-point harness for additional security.



The controls were very comfortable indeed; the position was exactly right, and while there are no adjustments, I know that the cockpit suits a wide range of pilot sizes. It's a hackneyed phrase, but apposite; you don't get into a Sherwood Ranger, you wear it. The view ahead is a little restricted by the passenger, and if not by them, the nose gets slightly in the way. But the fuselage is very narrow and a little weaving on the ground is all that's necessary. Everywhere else, of course, the view is pretty much unrestricted.

The controls are pretty standard; the stick is delightfully friction-free in both senses, closed-circuit cables for the ailerons and pushrod for the elevator. The rudder pedals are bottom-hinged and very comfortable to use. They also operate the tailwheel through springs. There are individual cable-operated heel brakes which aren't quite such a success; the position means you can either press left rudder or left brake, but not both. I would be tempted to convert to toe brakes so that one movement does both things and I understand that a retro-fit toe brake kit is under development.

The throttle is a quadrant suspended from the top longeron and is in a very comfortable position, ensuring you aren't tempted to take your hand off it for a rest.

Being a kit-built aircraft, the instrument fit will be up to the builder, but G-TLAC has a simple conventional panel, with ASI, compass, altimeter, water temperature, tacho, slip ball and a non-electric fuel contents gauge. Battery charge and EGTs are mounted in the front cockpit only, together with duplicate ASI, altimeter and slip ball.

But for insurance reasons I was going to have to fly from the front seat, and getting in is more of a challenge, as it's directly under the wing. This involves standing on the port wing root and putting your head right through the cabane struts to the other side. This makes it easier to get your legs into the cockpit, and wriggle yourself down. It requires a degree of suppleness, but I imagine that the vast majority of those who aspire to fly in an open-cockpit biplane will be able to manage it.

Once in, the layout is as in the rear, but with a simpler instrument fit and no brakes. The view is somewhat curbed by the wings above and below, but it's still extremely good.

We got in, me in front and James behind, and started the Rotax, which settled down instantly to a quiet, civilised murmur. There's an unusually long distance between occupants and engine, so noise levels are very civilised. Although the tailwheel is reasonably light when the aircraft's empty, the rear cockpit is a *loooong* way from the mainwheels, and by the time we were both installed, there was plenty of weight on the tailwheel. This should make it fairly difficult to tip it onto its nose (and no, we didn't try!)

Steering was pretty straightforward when one was manoeuvring on open ground, and should be fine in stronger crosswinds, but got a bit more tricky in restricted areas, due to the lack of a castoring tailwheel. In the front seat, I had no wheelbrakes, but there were circumstances where my left toe and James' left heel weren't enough to get the manoeuvrability we needed. I'm told TLAC is considering a more standard tailwheel that steers and castors; I'd certainly vote for that.

The brakes won't hold full power, but that's intentional as they don't want accidental applications to end up with a broken propeller.

We lined up for takeoff in a light crosswind, on a narrowish strip of mown grass next to the wartime taxiway. It's only 350m long, but takeoff was astonishingly simple, using standard tailwheel techniques as recommended by the big man in the back. We were airborne at an indicated 45mph in no more than 150m without trying to do anything special and settled into the climb at 60mph. A timed climb at this speed showed 570ft/min – very respectable with two big chaps, and I suspect we'd have got a bit more flying slower – and once we got a reasonable amount of height, I tried the controls.

I was delighted to find that nothing had altered since the last test in 2000; the astonishingly light and responsive ailerons that make rolling such a pleasure; the heavier elevator and rudder that seem to complement those delightful Frise ailerons. There's little adverse yaw – using stick alone to enter a turn will leave the slip ball more or less centred, but once established in the turn, you need some into-turn rudder to keep it that way, while the stick can be centred and it will maintain the set angle of bank. From the back seat, of course, the view into the turn is completely unobstructed.

Stalls are absolutely straightforward. Power off, we got warning through the stick at 49mph, and a mild, straight-through break at 45mph. With a bit of power on, the speeds dropped by a couple of mph, but there was still no hint of a wing drop.

It's got good stability in both roll and yaw, and stick-fixed in pitch. Stick-free, (push the stick forward in trimmed flight, let go and see what happens) ▷

1 Sleek lines, verging on skinny: G-TLAC is rated empty at just 214kg
2 Oil injector tank filler
3 Close-up view of wing strut

▷ it takes a couple of cycles pitching up and down until it returns to trim speed. No problem there, then.

There's one other stability check I like to do, since it can significantly affect your flying enjoyment, and that's to find out what happens to your trim speed if you change the power setting. Normally you'd expect the speed to increase if you let go the stick, and in some microlights the effect can be quite dramatic. But the Sherwood Ranger behaves impeccably. If you cut the throttle from a trimmed 60mph, the nose will drop, and the speed will settle at... 60mph. Increase power to full throttle, and the speed will settle at 60mph.

Next on the agenda was to check out the speed range. We opened the throttle and at maximum continuous engine speed of 6800rpm, we were getting about 75mph. The V_{ne} is 100mph, but to be honest we chickened out before reaching it – it requires such a vertiginous descent to get anywhere near it that there didn't seem much point. Suffice to say that at around 90mph indicated, everything seemed perfectly solid and the controls continued to do what we expected.

A comfortable cruise speed for this engine / airframe combination seems to be 60mph, at which speed the engine's doing about 5500rpm. A little left rudder was needed to keep the ball in the middle – in fact it was needed throughout the flight envelope. A trimmer would help here (a short length of draught excluder on the right side of the rudder at the trailing edge would do). I couldn't check the operation of the pitch trimmer, since it was only fitted in the rear cockpit, but James was able to set the trim for speeds between 50 and 75mph without difficulty.

Flying in winter, or for longer distances in summer, I'd want to invest in a helmet of some sort (bone dome for comfort, leather with silk scarf and goggles for posing), but there was relatively little breeze, even when you're 6ft 3in.

It's too early to establish accurate fuel consumption figures, but 15 l/h would seem to be a reasonable estimate with the 582, and that would give you 3h until it all went quiet – say 2.5h safe time. Not much range, you say, sucking your teeth. But you've missed the point. If you want to go somewhere, pop it on the trailer, hitch it up to the back of the car, and go wherever you like in all weathers, or at night. Pop it off the trailer when you get there, rig it in 5min and go flying for 3h. And no worries about the weather for getting home. How's that for range?

In any case, those controls are too nice to leave them alone for 3h. The Sherwood Ranger wants to dance the skies on laughter-silvered wings, and who are we to say no?

So we gave up on straight-laced flying and headed back to the deserted airfield, using a monster sideslip to get back down to low level. The Ranger sideslips beautifully, and in the absence of flaps, it's a great means of glide-path control which also gives you an unobstructed view of the landing area. Back near the ground, I handed the controls back to James, and he flew a tight military approach, banking to allow me to catch our own shadow in the camera lens *en passant*.

After that, it was time for me to try the landing, and although there was a significant (maybe 10mph) crosswind, I felt completely at home with these wonderful controls and slid down the glide path with one wing low, speed easing off from 60mph to about 50 at the round out. The landing itself was completely straightforward; there was little tendency to bounce, and although you've got to keep your feet working until you've come to a stop, it's a lot more relaxed than some of the taildraggers I've flown. On my first attempt, we were down in no more than 100m.

We taxied back to the hangar, shut down, and reluctantly climbed out. I tried to work out whether my views had changed over the last nine years – but they hadn't. Back then, I felt a bond with the aircraft and now I felt it all over again. Back then, I regretted the lack of availability of kits, and hoped the design would find a good home. Well, it has. TLAC is a careful and responsible owner of the Sherwood Ranger design, and has made minimal changes to what is quite simply a classic.

Why would you buy one? Because you're a microlighter, that's why, and this is the essence of microlighting. The wing fold and trailer make it utterly portable; you can keep it at home, or tow it to wherever you want to fly. You can make it personal; a dummy Vickers gun and WWI paint scheme or a tongue hanging out of the radiator opening, and maintenance and repairs involve minimum cost because it uses standard aluminium tube and fabric.

We get seduced by the idea of a sleek machine that goes 5mph faster or 50 miles further than our mates', but the buzz provided by the Sherwood is absolutely what we got into microlighting for, and I defy anyone, young or old, first time or 10,000th time, passenger or pilot, not to come back to earth from a ride in the Sherwood with a grin on their face.

I concede that if you mostly fly two-up, the tandem seating might be a bit of a disadvantage, and you

Why would you buy one? Because you're a microlighter, that's why, and because this is the essence of microlighting

might want to look at the likes of the Escapade or a microlight Kitfox. For pretty much everyone else – and I include dedicated flexwingers here – the Sherwood Ranger should be high on your list of Christmas presents to yourself.

And what will it cost? Because it's homebuilt, the options are enormous. The airframe kit is £14,375, but you'll need to budget for an engine, propeller, instruments and covering – and, if you're going to make the most of the concept, a trailer too. You might be able to do it for £20,000 using a secondhand engine and carrying out all the work yourself.

A Rolls Royce version fitted with the Jabiru engine – for which it's approved and it surely deserves – a trailer and professional help to build it would probably work out around £30,000. But its classic lines and portability will make it a winning combination of wicked pleasure and practicality. □

1 Liftadots tether wing pins
2 Tailwheel made in-house
3 Radiator duct gives the Sherwood a grin
4 Flying jacket not obligatory, but it feels so right!

TECHNICAL DATA
Sherwood Ranger ST

MANUFACTURER
The Light Aircraft Company Ltd, Hangar 4, Little Snoring Airfield, Fakenham, Norfolk NR21 0JL; tel 01328 878809; mob 07747 840007; fax 01328 878004; sales@g-tlac.com; www.g-tlac.com

SUMMARY
Two-seat tandem biplane with conventional three-axis control. Wings have sweptback leading edges, sweptback trailing edges and constant chord; conventional tail. Pitch control by elevator on tail; yaw control by fin-mounted rudder; roll control by four ailerons. Wings braced by wires and interplane struts; 100% double-surface. Undercarriage has three wheels in taildragger formation; bungee suspension on all wheels. Push-right go-right tailwheel steering connected to rudder pedals. Cable operated drum brakes on main wheels. Construction: bolted and riveted aluminium tube and plate with wood ribs and composite turtledeck, wing tips and wing roots, carbon/kevlar fuel tank. Engine mounted between wings, driving tractor propeller.

EXTERNAL DIMENSIONS & AREAS
Length overall 6.1m. Height overall 2.21m. Wing span 7.92m. Constant chord 1m. Dihedral 3°. Sweepback 3.8°. Main wing area 15.6m^2. Aileron area (each) 0.4m^2. Aspect ratio 7.92/1. Fin area 0.43m^2. Rudder area 0.58m^2. Elevator area 0.88m^2. Tailplane area 1.16m^2. Wheel track 1.34m. Wheelbase 3.65m. Main wheels dia overall 33cm. Tailwheel dia overall 20cm.

POWER PLANT
Rotax 582 engine, liquid-cooled. Max power 65hp at 6500rpm. Arplast three-blade propeller, 1.65m diameter. Gear-drive reduction, ratio 2.58/1. Max static thrust NA. Power per unit area 4.17 hp/m^2. Fuel capacity 41 litre.

WEIGHTS & LOADINGS
Empty weight 214kg. Max take-off weight 450kg. Payload 236kg. Max wing loading 28.84kg/m^2. Max power loading 6.9 kg/hp. Load factors +4, -2 recommended, +6, -3 ultimate.

PERFORMANCE*
Max level speed 80mph. Never exceed speed 100mph. Economic cruising speed 70mph. Stall speed 40mph. Max climb rate at sea level 800ft/min. Min sink rate NA. Best glide ratio with power off NA. Take-off distance to clear 15m obstacle 200m on grass. Landing distance to clear 15m obstacle 245m on grass. Service ceiling NA. Endurance at average cruising speed 2.5h.

** Under the following test conditions*
Airfield altitude 212ft. Ground temperature 18°C. Ground pressure 1020mB. Ground windspeed 10kt. Test payload 450kg.

PRICE
£14,375 in kit form, including 15% VAT

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