



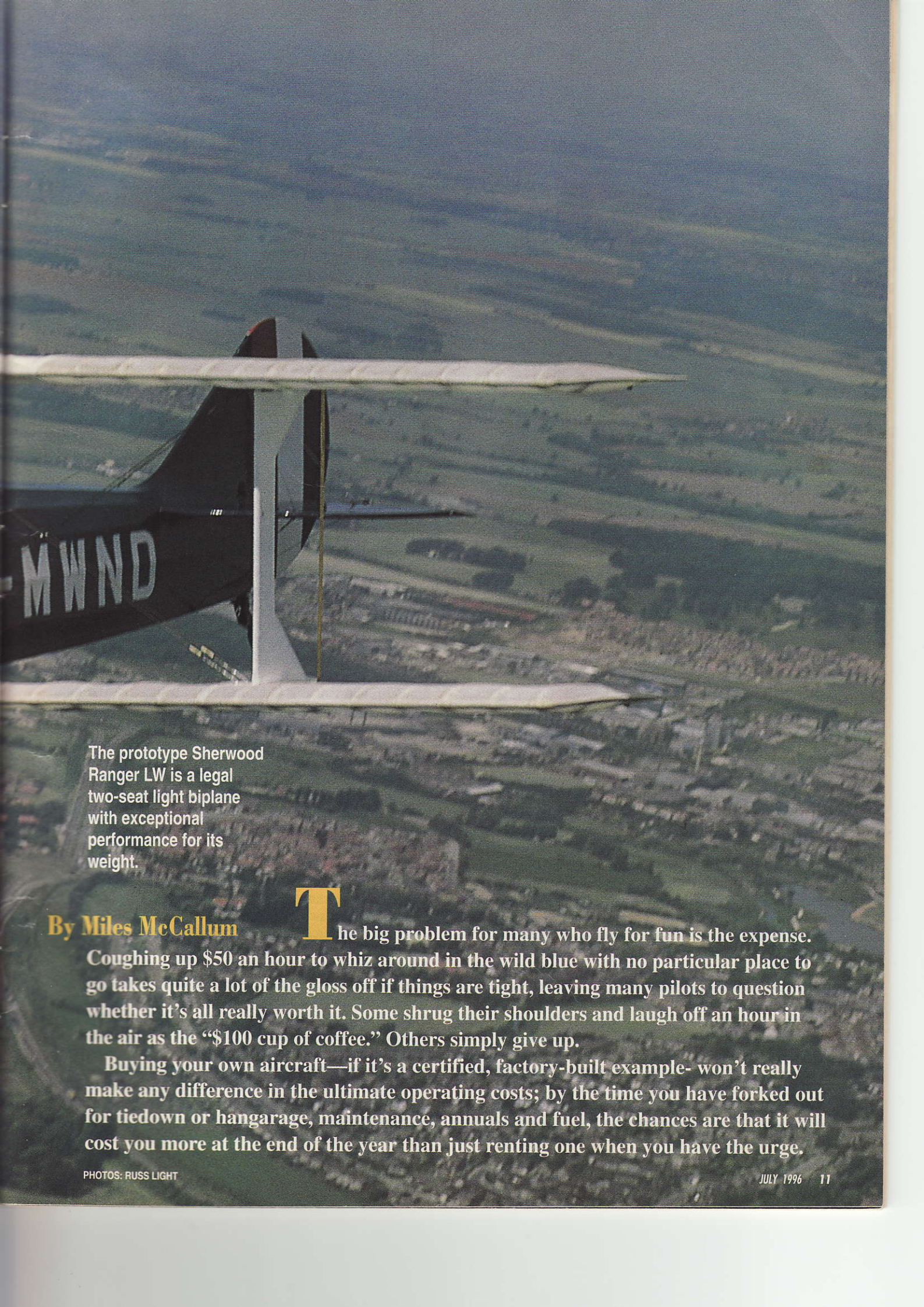
Ranger

to

the

We fly the Sherwood Ranger LW light biplane.

Rescue



The prototype Sherwood Ranger LW is a legal two-seat light biplane with exceptional performance for its weight.

By Miles McCallum

The big problem for many who fly for fun is the expense. Coughing up \$50 an hour to whiz around in the wild blue with no particular place to go takes quite a lot of the gloss off if things are tight, leaving many pilots to question whether it's all really worth it. Some shrug their shoulders and laugh off an hour in the air as the "\$100 cup of coffee." Others simply give up.

Buying your own aircraft—if it's a certified, factory-built example—won't really make any difference in the ultimate operating costs; by the time you have forked out for tiedown or hangarage, maintenance, annuals and fuel, the chances are that it will cost you more at the end of the year than just renting one when you have the urge.



Even with its classic British '30s biplane fighter looks, this taildragger is tame enough for very low-time pilots, the author says.

The Ranger LW is powered by a 65-hp, liquid-cooled, two-stroke Rotax 582. Heavier Rangers use the Rotax 912.

Sherwood Ranger

continued

Fly Light

Building a light airplane is one solution, but if you're looking at some of the less-expensive homebuilt kits, there are concerns. Aside from the time spent building and not flying, weight and performance bear a direct relationship to the ultimate cost. So if you're looking to save money, you'll probably be looking at lighter designs with less performance.

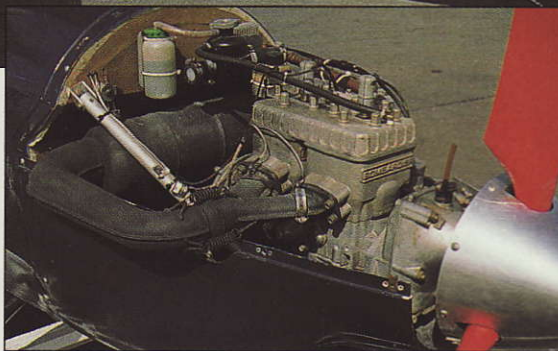
Unfortunately, flying light means tighter weather criteria. You can't fly if the wind is above 15 knots, and every gust or thermal gives you a good jolt. If you are into control and handling that puts a smile on your face, you're unlikely to end up with something that responds like a Lancair, Europa, Pitts or even a Grumman. Although people do choose to fly light airplanes on the basis that "flying is flying," for many the choice is either a proper airplane—one that feels solid in a bit of weather—or nothing.

The reality is, however, that the dividing line between very light planes and heavier aircraft is becoming blurred. You can still pigeonhole them purely on the basis of weight or speed, but the truth is that modern bantamweight aircraft perform well and can be unbelievably good fun—especially if you consider feel and handling to be at the top of the requirements list.

Case in Point

Russ Light's Sherwood Ranger is an airplane that we have been watching for a couple of years now, monitoring progress and waiting for a chance to evaluate it. I have to confess that the desire to fly it was partly based on the fact that it is a very pretty biplane with classic lines and partly because he promised that a heavier, faster, aerobatic version would follow.

The majority of the kit is manufactured in house, obviating quality-control problems, and it follows current very light aircraft tube, wood and fabric practices. The fuselage is largely made from aluminum tubing riveted together with gusset plates or machined fittings. All metalwork is thicker than 0.064 mm (0.016 inches) is pre-cut drilled, and formed where necessary, the rest being drilled and marked ready for cutting using tinsnips or a band saw. Some critical areas are bonded as well using a struc-



tural adhesive as a belt-and-braces backup. This is estimated to weigh 30% less than an equivalent steel-tube fuselage. All tubes are pre-cut and drilled with pilot holes (using CNC machinery), so any damaged components can be easily

replaced with off-the-shelf items that fit well. The tail surfaces are made the same way as the fuselage structure.

The Kit

The first kit builder, Dan Nelson of Palos Verdes, California, (now the U.S. agent for the Sherwood Ranger) reports that the entire fuselage framework can be assembled using Clecoc in around 6 hours, and it is effectively self-jigging. The pilot holes are then drilled to size and either bolted or riveted using aircraft-quality Cherry blind rivets. The turtledeck and sides are fleshed out with ply formers and spruce stringers, and the cockpit top and cowlings are fiberglass moldings. The ply components are marked, ready for band sawing, and the spruce is machined to section and needs cutting to length.

Construction of the wings requires a flat surface measuring 12x3 feet. Wing sections are four identical units—as long as you build right and left sides. This point should be emphasized because more than a few builders have ended up with a spare right- or left-hand wing component. An aluminum-tube spar takes all the bending and torsional loads, and a diagonal aluminum tube takes care of drag loads.

Prestamped birch-ply ribs fitted with spruce U-section capstrips are slid into place, and extra nose riblets are fitted before bonding on the formed-aluminum leading edge. The trailing edge and wingtips are spruce, and the aft outboard corner of each panel is then lifted a specific amount to provide the washout demanded before all the ribs are bonded into position using chopped-mat fiberglass and polyester resin. Critical areas—such as the drag strut fixing—are backed up with rivets for safety. Again, Dan reports that it's simple, strong and light.

The airframe is covered with heat-shrink Dacron fabric bonded to the structure, and only the elevators and rudder require rib stitching for security. Careful attention to keeping the weight as low as possible is a must when finishing the airframe: The pro-



The wings fold for quick and easy trailering. Straight braces (painted red) are used to support the folded wings.

prototype has only the minimum amount of dope applied to the wings in an effort to keep the weight within the U.K. legal maximum, although this may change.

Building It

The kit has been designed to be built in a little over 500 hours (the legal minimum in the United Kingdom), hence various parts have not been prefabricated as much as they could be. Showplane builders will undoubtedly take longer, but even the rawest novice shouldn't have any problems with construction. The instructions are detailed, clear and simple, with plenty of illustrations. In theory, you could build the Ranger using hand tools only, although Dan relates that a Scotchbrite wheel was invaluable for deburring brackets, and a drill press helped drill the aft wing root fittings and some of the smaller components. The engine, prop, instruments, upholstery and finishing materials (paint and dope) are not included in the kit.

Currently, the instructions cover installing Rotax two-stroke engines only, but the factory is willing to help with other options. The LW version has been designed for 50-65 hp motors, and the rest for up to 80 hp—although I'll be surprised if the XP (extra performance aerobatic version) doesn't end up with a 100-hp two-stroke pretty soon. Eventually, cowlings for the 912 will be available.

There are some optional extras available: long-range, wing-mounted auxiliary fuel tanks, wheelpants and a canopy. The ST and XP versions differ from the LW in various areas. The fuselage tubing and wing spars have been increased in thickness to deal with higher gross weights and G loads, and the rear cockpit has been moved back 3 inches, giving more leg room and extra panel space for more instruments. The top wing is positioned slightly higher and is mounted on streamlined cabane struts. The wing leading edges are sheeted (using premolded composite skins) as far back as the spar to improve the airfoil section and provide better damage resistance.

The XP prototype is fitted with a 75-hp Rotax 618. It has clipped wings—18 inches were shaved off each panel to improve the roll rate—with fiberglass tips, a little more fixed vertical fin area, and curved, slightly taller windshields. Some of these modifications may become standard items. This has



raised the empty weight by 100 pounds, but at around 500 pounds it is still a very light two-seat airplane.

Towing It

Hangarage or tiedown can account for one of the largest chunks of fixed costs when you own your own aircraft. You'll see various competitors extolling the advantages of keeping an airplane at home, proudly quoting only 20 or 30 minutes rigging and derigging time. Pretty good compared to a Cessna, I suppose, but that's enough to put most people off from using the option. Indeed, all the pilot/owners I know who have such airplanes usually only derig them and tow them home for winter or for repairs.

The Ranger has been designed with folding wings so it can be towed home on a trailer—no mean feat for a biplane—and a dedicated trailer has been designed specifically for the airplane. The entire operation is simplicity itself—without helpers. The forward inboard ends of each pair of wings are held apart with a temporary brace, and the wings are swung into position, and locked in place with a pin through each forward root fitting. The brace is removed for flight...and that's it. Lift the tail off the trailer, wheel the airplane forward 20 feet, and you are ready to go. The fuel and pitot/static lines remain coupled, as do the aileron cables, and the flying and landing wires require no adjustment—it can be unstrapped and rigged in about the same time it takes to read about it.

Preflighting It

Walking around the airplane reveals that it is surprisingly big—the wingspan is 26 feet, larger than a Skybolt or a Star-

Sherwood Ranger

continued

duster, and rather elegant, with a slight amount of sweepback and clean lines. The LW has a single fuel tank (enough for about an hour and 20 minutes) in the left top wing, but another three tanks—one in each wing—can be fitted. The fuel gauge is a simple sight level tube at the trailing edge. Climbing into the rear cockpit is straightforward, with a step built into the fuselage side, but getting into the front pit is not quite so simple. There is a procedure involving climbing through the cabane struts (and half out of the other side), but once demonstrated it poses no problems. The advantage is that the passenger sits right on the c.g. and doesn't affect the handling at all. Both cockpits have full dual controls with the exception of pitch trim in the rear cockpit only, but that is an optional extra in the LW—not that I'm convinced it really needs it, once the airplane has been trimmed for cruise. In an effort to keep weight down, the flight and engine instruments are divided between the two pits. Both cockpits are surprisingly roomy and comfortable, and are fitted with four-point harnesses.

Flying It

Giving the stick a stir reveals that there is very low friction in the all-cable system, something that adds greatly to the feel of the airplane in flight. The only slightly odd aspect was the brakes. A small lever in the rear cockpit can be positioned in one of three positions: Off (completely) gives no brakes and full rudder travel for serious messing around, Off (partially) gives differential brake at nearly full rudder pedal travel (like a de Havilland Chipmunk), and On gives run-up brakes by slipping your feet in front of the rudder pedals—not that they're really ever needed.

The view ahead taxiing is excellent; there is no need to weave to clear the way ahead unless you have a very full front cockpit. Rudder on a turn produces a gradual change in direction, and getting onto a brake tightens it to a point where you can do a 180° turn in a wingspan's width. The tailwheel is a full-swivel unit with no lock, but it all felt quite natural and easy to taxi. The ST and XP will have steerable tailwheels and normal toebrakes—either cable operated or hydraulic, according to the builder's preferences.

Shoving the throttle forward for full noise results in good acceleration. Push forward on the stick, and the tail rises in a second or so; and in another 3-4 seconds it's light on the gear. As the ASI swept through 50 mph, a slight tug persuaded the ground to drop away rapidly. There was little tendency to yaw, and the rudder and ailerons were effective from the moment the throttle went forward. The climb rate was comparable to something with twice the horsepower, and watching Russ take off for the photo session demonstrated how quickly it'll get off the ground solo. In a 10-knot wind, I doubt he rolled more than 50 yards before disappearing upward at better than 1000 fpm.

Visibility is excellent from either cockpit, and both are surprisingly wind free, with just a little buffet on the top of my helmet. Slightly taller windshields will sort that out, but you need to be organized as losing a chart over the side is the penalty for



Up front, it's simple, but effective.

inattention. The noise is pure biplane: Push the nose over, and the whistle turns to a howl, pull back and it abates to a gentler wail. A few hours of experience, and you'll never need to look at the ASI; the noise will tell you all you need to know about airspeed.

The controls are a delight. Designed with aerobatics in mind, the ailerons are light with no breakout forces, elevator is a touch heavier, and rudder complements the other two perfectly. Of the three, the ailerons stand out—in fact, compared to the majority of aircraft, light or heavy, they are quite outstanding. The response is linear, more pressure producing proportionately faster roll; while the roll rate isn't anywhere near that of say a Pitts—at around 90°/second, it's noticeably faster than that of a Cessna 152—the roll acceleration is instant. Complementing that, releasing the stick stops the bank dead at whatever position you happen to be in. The aerobatic-legal versions are going to be a ball for doing hesitation rolls.

It does exhibit classic taildragger traits: Forget what your feet are for, and there is a fair amount of adverse yaw, but lead with a squeeze of rudder to keep the ball centered, and the turn rate speeds up considerably. Power off, the Ranger is positively stable in roll (it'll level the wings of its own accord), but checking the stick-free pitch stability was difficult in the prevailing conditions. It was fairly windy, with a good smattering of thermal activity keeping things lively, however, trimmed for a 70-mph cruise, it required very little attention to peg the altitude selected, showing that it is positively stable in pitch.

Yaw stability is on the light side, but that, too, showed itself to be positively stable. Kicking in a good slip and releasing the controls smoothly allowed the nose to straighten up with no oscillations or wandering—pretty good considering that we were flying at an aft c.g. position. Stronger rudder centering springs have been fitted, which improved things from the initial test flights, but a little more fixed vertical fin area will take care of any nit picking in that direction.

The stall behavior is good, too. Power off, there was no real aerodynamic warning, with a gentle break just above 40 mph indicated. Holding the stick hard back produced a gentle right wing drop that could be contained by either rudder or aileron—still fairly effective in departed flight. Popping the stick forward slightly and getting on the power produced a full recovery with about a 50-foot altitude loss. Repeating the exercise with some power, the nose eventually dropped to the horizon. Keeping the stick full back produced no tendency to drop a wing, and it just sat there, descending gently with wings level. Full-power stalls brought the airspeed back to the mid-thirties, wings level, and produced a gentle climb. All in all it was very docile, and seemed among the safest airplanes I have flown.

Electric Stall Warning

The ST and XP will come with a nifty stall warning device, available as an option on the LW. It's a small pressure transducer patch about the size of your thumbnail and about 1mm thick, stuck to the leading edge of one wing. It senses the change in aerodynamic pressure around the leading edge as angle of

attack approaches the stall, triggering a beeper in the cockpit that can be clearly heard despite helmets, headphones and the wind in the wires. By moving the patch up or down, the margin of warning can be altered to suit your tastes or legal requirements. Powered by a battery that requires changing only every couple of years, it is always on, and totally independent from any electrical system—should you have one. Hopefully, Russ can be persuaded to do a version that interfaces with a standard avionics suite, delivering the tone to your headsets.

Landing It

Back in the pattern, it was slightly daunting to be informed that the wind was 30° off the runway, blowing at about 15 knots. Sliding down final at about 60 mph was a breeze, with excellent speed stability (and no need to trim) but a healthy dose of crab to offset the crosswind. Fortunately there was no need for concern: The controls are powerful enough to handle worse conditions, and despite touching down a little tail high, it skipped once and settled gently with no tendency to weathercock. Just to make sure we tried it again. Full power had us off the ground in 300 feet, and the subsequent landings followed suit. There is a danger with very light aircraft as they will bleed speed off quickly when you pull the nose up because they have very low inertia. It's the opposite side of the fast takeoff coin: If you flare a little high, it's all too easy to find the airspeed has bled off faster than you expected, resulting in the airplane dropping in. In skilled hands, it will allow the Ranger to be landed in a short distance. I reckon that this is one of the easiest taildrag-

gers to land I have come across.

Final Impressions

The Sherwood Ranger LW is not an airplane to go traveling in unless you have plenty of time and no particular schedule: It's designed more for local area messing around. With an effective range of about 70 miles (burning 3.5 gph, with a 20 minute reserve), it will require frequent stops, but for pure fun, it is hard to beat. Full throttle pushes the speed up to 85-90 mph, probably a realistic cruise speed for an 80-hp example. That is fast enough to contemplate cross countries, especially as the gross weight is 140 pounds higher for the ST and XP, and not all of that will be swallowed by a larger engine.

Given a few hours of taildragger training (absolutely essential if you've not flown with the little wheel in the proper place), you could happily let a very-low-time pilot loose in a Sherwood Ranger, and be confident of a return with no dramas. Experienced pilots will find it puts a broad grin on their faces, both in the air and after totaling up the expenses. I'd quite happily settle for an LW, but the prospect of the ST or XP is really quite exciting. Another 15-30 hp will make this a pocket rocket: a real hooligan's airplane.

KP

FOR MORE INFORMATION, contact TCD Ltd., Larkfield, Retford Rd., Mat-tersey, Doncaster, S. Yorkshire, DN10 5HG; call 01777 817975, fax 01302 752643; in the U.S.: Sherwood America, 904, Silver Spur Rd., Ste. 333, Rolling Hills Estates, CA 90274, call 310/325-3422, fax 310/378-7685.

Sherwood Ranger LW

Prices:

Kit price.....	\$16,180
Video	\$15
Info pack	\$15

Specifications:

Wingspan.....	26 ft.
Length.....	20 ft.
Height.....	7.3 ft.
Width.....	7.6 ft.

Weights and Loadings:

Max weight.....	860 lb.
Payload, including fuel.....	435 lb.
Wing loading.....	5.1 lb./sq ft.
Power loading.....	13.2 lb./hp

Performance:

Engine.....	65-hp Rotax 582
Fuel consumption, 75% power 3.5 gph	
Top speed.....	85-90 mph
Cruise speed (75% power).....	70 mph
V _{NE}	100 mph
Stall speed.....	42 mph
Rate of climb.....	800 fpm
Takeoff (ground roll).....	300 ft.
Landing (from 50 ft.).....	500 ft.
Range (20-minute reserve).....	70 s.m.

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