





It isn't often we get a chance to talk an aircraft manufacturer into telling us why he built a certain aircraft. So we were lucky to get permission from Russ Light, designer of the Sherwood Ranger, to tell our readers about his experiences.

Russ states: "When aircraft constructors are asked, 'Why did you decide to build an airplane,' the standard reply is 'Because it seemed like a good idea at the time.'

"While, to a large extent, this is true of my decision to design and build the Sherwood Ranger, the main reason was that, despite being involved in the design and manufacture of several light and microlight aircraft in the past, none of them completely met my personal requirements.

"The design of a airplane is a compromise at every stage, with many conflicting requirements. It is therefore necessary to create a priority list of specifications.

"Having flown a large variety of single- and multi-engine airplanes over the past 25 years, the only thing that has ever marred the sheer thrill and enjoyment of this fantastically rewarding pastime has been the drain on my pocket. I suspect that the majority of pilots who fly for pleasure have the same problem. "For safety's sake, it is essential that pilots remain current, but that can be an expensive business when the rental charges for a two-seat production aircraft can cost around \$50 per hour. Private ownership of this type of aircraft would not significantly reduce the operating costs either, the majority of the expense being attributed to maintenance, hangerage, insurance, and fuel charges.

"The first important requirement, therefore, was that the aircraft should be inexpensive to operate. In general, the lighter the aircraft, the lower the operating costs, and I decided that the basic airplane must be light enough to meet the European

RANGER FROM SHERWOOD

EVERYBODY LOVES
BIPLANES AND THIS
BRITISH DESIGN IS
SET TO BE AN
INTERNATIONAL
WINNER

BY NORM GOYER



Microflight (European term for Ultralights) requirements.

"Since I intended to produce an airplane which, if successful, could be manufactured for sale in kit form, it was also important that the basic airframe could be easily uprated to accommodate larger engines and possibly aerobatic capabilities.

"Although I suspect that the majority of private pilots spend most of their time flying alone, a two-seater aircraft is a much more practical proposition, if for no other reason than to check out prospective pilots. An analysis showed that the costs involved in building a two-seater were not much higher than for one-seat only.

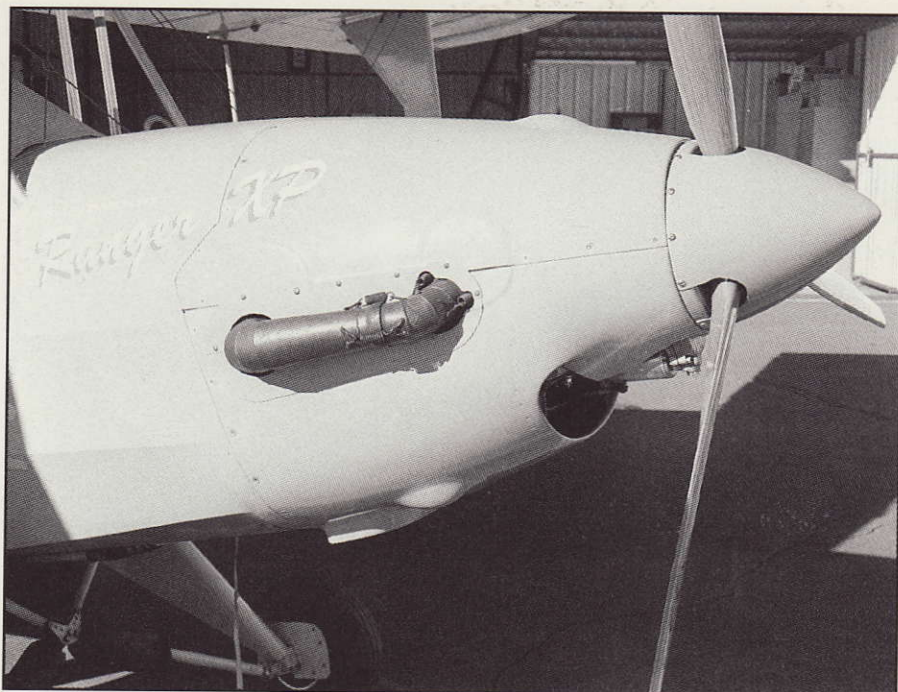
"Another major requirement was that, to save on hangarage and maintenance charges, it must be possible to quickly dismantle and transport the aircraft for storage at home. From previous experience with similar aircraft, I came to the conclusion that anything that took me longer, single-handed, than five minutes, from trailer to pre-flight inspection would preclude the possibility of regularly flying for the odd half-hour just when I felt like it. That magic period just before sunset when the wind invariably falls calm and the air becomes smooth as silk creates an irresistible urge in me to aviate.

"By simply withdrawing four fixing pins, the wings of the Sherwood Ranger can be folded backward in seconds. This minimizes space if it is desired to hangar the aircraft, or allows towing on a suitable trailer. Rigging, including removal from the trailer, can be accomplished by one person in less than three minutes. No flying controls are disturbed.

"Initial calculations indicated that an engine rated at 50 hp would be the minimum size required to achieve acceptable performance. With the constraints on empty weight imposed by the microflight requirements, this dictated that a two-stroke engine was the only practical proposition for the minimum weight basic airplane.

"The power-to-weight ratio of a two-stroke is considerably higher than that of most four-stroke engines, plus the fact that the initial purchase price is invariably much lower. The main drawback seems to be their reputation for being less reliable, but the modern versions, which have been specifically designed for use in aircraft, are developing an excellent record.

"If it is possible to keep the airplane at home, why go to the trouble and expense of transporting it to an airport? It therefore seemed sensible that it



Installed in this aircraft is the new Rotax 618 engine.



Even those enthusiasts of supersonic aircraft admit there's something very special about a biplane.

should be possible to operate from short unprepared grass fields. Tailwheel aircraft, as well as being lighter and cheaper to construct than those with nosewheel configurations, are usually more suitable for this type of operation.

"The Sherwood Ranger series of aircraft can be successfully operated from unprepared grass strips as short as 200 yards.

"The performance parameters which usually interest pilots most are rate of climb and cruise speed. When operating from areas which would not normally be recognized as suitable for use as an airfield, the ability to both clear obstacles by climbing steeply, and to quickly reach operating altitude, is essential for safe operation. With the low-wing loading of the Sherwood Ranger, a perusal of other aircraft with similar power-to-weight ratios suggested

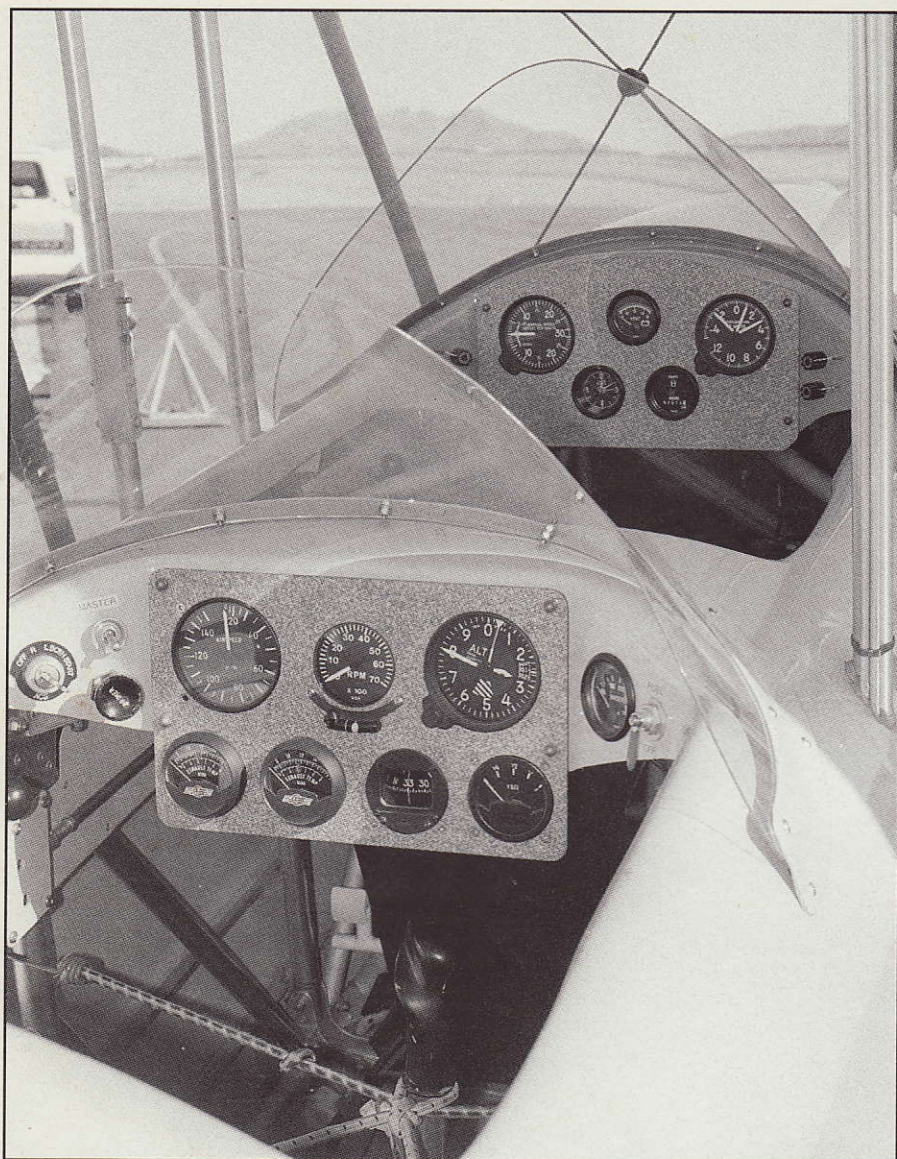
that climb rate would not be a problem. The prototype LW series, fitted with a Rotax 532, 64-hp engine, has a rate of climb between 900 and 1200 fpm, with a takeoff roll of 150 to 300 feet, depending on all-up weight, runway surface, and piloting technique.

"While as high a cruise speed as possible is desirable, it was not given the highest priority for the following reasons:

"1) I fly because I enjoy flying. If it takes me an extra 15 minutes to get to my destination, as far as I am concerned it's another 15 minutes of enjoyment, another 15 minutes' experience, and another 15 minutes in my logbook.

"2) Unless an airplane can be flown IFR, its use as a reliable and dependable means of long-distance transport, especially in England, is very restricted.

"The prototype Sherwood Ranger



The Ranger's cockpit is large and roomy, and all controls fall naturally into the pilot's hands.

will cruise at speeds between 50 and 85 mph depending on throttle setting.

"The quest for producing minimum-weight flying machines has resulted in some rather unorthodox-looking creations taking to the skies. There is no doubt that weight, cost and kit-build time can be saved by resorting to such configurations as tailless or pod-and-boom fuselages. While I have every admiration for these machines, I feel that an airplane must inspire and excite me sufficiently to justify spending thousands of dollars of hard earned cash, and hundreds of hours of spare time on its construction.

"Styling is also important for economic reasons. The latest futuristic machine will only be state of the art until the next futuristic machine appears, after which its value on the open market plummets. Another important decision, therefore, was that the aircraft must be of conventional layout and preferably of

a style which would not quickly date. The classic styling of the Sherwood Ranger guarantees admiring glances wherever it is seen.

"The trend these days seems to be toward composite construction, using fiberglass or carbon fibers. While these are excellent materials for aircraft construction, it is my opinion that the level of inspection and control of working practice which are essential to guarantee the integrity of this type of structure is extremely difficult to achieve for both the homebuilder and the inspection authorities. For this reason, it was decided to use composite techniques on either non-structural components such as cowlings and fairings, or structural components that could easily be loaded to the ultimate design load for testing.

"With the type of fuselage and empennage structure envisioned, there are really only two viable alternative

methods of construction, *i.e.*, steel or aluminum tube.

"For airplanes in this weight category, to utilize the full benefits of steel would mean using extremely thin-walled tube. Such sections, apart from being difficult and expensive to obtain, are difficult to weld, and prone to corrosion.

"A weight analysis showed that an aluminum tube fuselage, using bolted and riveted joints, could offer a weight savings of over 30 percent over a welded steel-tube fuselage, using commonly available tube sizes. In addition, it would be very easy to repair.

"Since the Sherwood Ranger has four virtually identical wings, ease of construction is of prime importance. A tubular aluminum alloy spar was chosen to carry both bending and torsional loads. Pre-formed ribs are then slid onto the spar and bonded into position. Alloy ribs were considered, but the required gauge of material is so thin that it is extremely prone to handling damage. It was therefore decided to use birch plywood ribs with spruce caps.

"As is common practice with this type of structure, heat-shrink polyester fabric was the obvious choice to complete the airframe. Safety is another extremely important consideration in the design of any civil airplane. There are many aspects which affect the safe operation. By safe operation, I mean the likelihood of any person, pilot, passenger, or onlooker being injured through any direct or indirect cause associated with the airplane. The final major requirement was therefore that the airplane must be safe and easy to operate.

"Some of the main points to consider are structural integrity, handling characteristics, landing and takeoff speeds, engine reliability/configuration, durability, performance, visibility, and crash protection.

"Bearing in mind all of these desirable requirements, and having spent many hours deliberating on the most desirable compromise, I eventually decided that a biplane configuration would be best for the following reasons:

"1) Without resorting to the complexity of fitting flaps or slots, the relatively large wing area required for slow stalling speeds would require wingspans in the region of 35 feet, and wing chords of around 5 feet for a monoplane. Wings of this size would be very difficult to remove or fold quickly and easily, whereas biplane wings of

SPECIFICATIONS

	LW	ST	XP
Wingspan	26 ft	26 ft	23 ft
Wing Area	164 ft	164 ft	140 ft
Length	20 ft	20 ft	20 ft
Height	7 ft, 4 in	7 ft, 4 in	7 ft, 4 in
Width (wings folded)	7 ft, 7 in	7 ft, 7 in	7 ft, 7 in
Fuselage width	24 in	24 in	24 in
Fuel capacity	12 gal	12 gal	12 gal
Empty weight	400 lbs	500 lbs	500 lbs
Gross weight	860 lbs	1000 lbs	1000 lbs
Load factor (solo)	+9 -6 Gs	+9 -6 Gs	+9 -6 Gs
Load factor (gross)	+6 -3 Gs	+6 -3 Gs	+6 -3 Gs

PERFORMANCE

	LW ROTAX 503	ST/XP ROTAX 618
Stall Speed	38-42 mph	38-42 mph
Cruise Speed	55-70 mph	60-90 mph
Top Speed	85 mph	95 mph
Climb	500-800 fpm	900-1400 fpm
Takeoff distance	100 ft	100 ft
Landing distance	200 ft	200 ft
VNE	100 mph	120 mph

NOTE:

Performance figures are those obtained under standard atmospheric (ISA) sea level conditions. Climb performance in particular, varies according to height and increased temperatures.

Figures shown are considering average pilot techniques. These figures can be improved by using short-field techniques.



KIT PRICES:

Effective 15 November 1996

Kits are available starting at \$4450 for the empennage kit, to \$16,000 for a complete kit, not including engine, propeller and other accessories.

PARTIAL KIT:

Includes plans and construction manual, all main structural items, pre-cut/bent and pilot drilled tubing, wing spars, ribs, leading edges, fuel tanks, standard fiberglass components, and packaging.

FULL MATERIALS KITS:

In addition to the items listed in the Partial Kit, the Full Materials Kit contains wheels, hydraulic brakes, steerable tailwheel (except LW), tailwheel spring, rudder pedals, instrument panels, headrest, cables, flying/landing wires, turnbuckles, windshields, seats, wheel pants (ST/XP only), and all necessary nuts, bolts, rivets, rod ends, adhesives, and fiberglass.

ENGINE KITS: (Less Engine)

Includes engine mount, cowling, throttle quadrants, control cables, fuel lines, fuel valve, gascolator, primer, spinner, and necessary hardware. About \$8000 for Rotax engines or Jabiru engine.

OPTIONS:

Long-range fuel tanks, streamlined flying wires, instrument packages, enclosed canopy, covering package, recovery chute. (Call for price quotes.)

NOTE

All prices will be quoted in US currency and are subject to change without notice. All prices are FOB Rolling Hills Estates, California. Freight charges are COD.

For more information about the aircraft and various kit prices, please contact: Sherwood America Aviation, 904 Silver Spur Road, Suite 333, Rolling Hills Estates, CA 90274. Tel: (310) 325-3422, fax (310) 378-7685.

similar total area can simply be folded back, the overall width remaining within the legal limit for trailering.

"2) The biplane wing configuration is lighter for a given strength than the monoplane wing, or put another way, for a given weight the aircraft can be made stronger.

"3) The cockpit is surrounded by structure. This greatly reduces the chances of injury during and emergency landing. The cockpit area of the Sherwood Ranger is designed to form an extremely strong cage-type of structure for maximum pilot and passenger protection.

"4) The aesthetic appeal of the

biplane is timeless. The design will not be out of date in 50 years time.

"5) The flying qualities of a correctly proportioned biplane are invariably docile. The lower wings generally stall slightly ahead of the upper wings, thus giving gentle stalling characteristics.

"All the pilots who have flown the

FLYING THE RANGER

NO SURPRISES — JUST A NICE-FLYING LITTLE BIPLANE

BY JOE FITZGERALD

When I first spotted this pretty light blue-and-pink English-designed biplane, it was at the Copperstate Fly-In a few years ago, and I thought it was a very attractive aircraft. I remember hoping I'd get lucky enough to fly it some day. Then I'd find out if it flew as good as it looked. I got my chance just recently!

Norm Goyer had contacted Dan Nelson, owner of the Ranger, and set up an appointment to fly and photograph the plane. After a few cancellations because of rainy weather (inherent to California in January), we finally got a forecast for a good day.

Around dawn on a Thursday morning, a warm, calm, blue-sky day, Dan called Norm to confirm the good weather, then said he was towing his Ranger up to Apple Valley Airport. He arrived a couple of hours later.

I watched as Dan, and Jim Henderson, his friend and father-in-law, expertly removed the plane, its wings folded, from the trailer, a long-distance type he uses to tow the Ranger behind his motor home. He's travelled thousands of miles with the trailer, bringing the plane to lots of airshows and fly-ins in order to give demonstration flights. Dan said that, with the trailer, which is specifically designed for the Ranger, the plane can be off and ready to fly within five minutes, and remember, this is a biplane! Sounds great.

In what seemed less than heartbeat, Dan and Jim had the Ranger off the trailer, the wings unfolded, and the four locking pins inserted in the spar fittings. They removed the extra wing-strut brace, added the wheel pants, and the Ranger was ready to fly.

The cowl is very well done and reminded me of the nose of an early P-51 or P-40. Workmanship on the entire aircraft was outstanding. Dan built the aircraft, and his friend Kurt Owen, owner of Custom Aircraft in Torrance, California, helped with the fabric work.

The Ranger we were to test was powered with a Rotax 618 tuned-pipe two-cylinder two-stroke engine — which puts out close to 80 hp.

For those who may not be aware of it, tuned pipes, which have long been used on motorcycles with two-strokes, give the engine an incredible boost in power. A tuned pipe works like a turbocharger — in reverse. While a turbocharger pushes air in, a tuned pipe sucks out the exhaust, giving more impetus to the charge coming in. The exhaust can be tuned to obtain maximum rpm, and when going full bore, that engine sounds very exciting.

This modified version of the Ranger was built with clipped wings and its structure was beefed up to handle the extra speed and stress of the more powerful engine.

Apple Valley Airport is at an altitude of approximately 3000 feet, and the temperature on Saturday was about 70 degrees. This meant that the engine wouldn't have as much power as it would if the test had taken place at sea level, but the tuned exhaust would certainly help even out the difference.

Further, I weigh around 200 pounds, and at 6 feet, 2 inches, Dan is no lightweight either. I thought that the Ranger, loaded as it was, was going to show us a lot of runway before breaking ground, but this was not true. The Ranger rolled down the runway, got off in about 250 to 300 feet, then proceeded to climb nicely at a rate of approximately 700 feet per minute. Really good, considering our weight (Dan's and mine, that is.)

As I was flying the Ranger, I tried to think of some other plane I'd flown over which might compare with it, but I couldn't seem to find one. The Ranger is unique, and has a very pleasant feel. Designed to comply with strict European flight standards, the Ranger was extensively checked out before and tested before it was ever allowed to be sold. While the ailerons were very light, just as called for in the requirements, the elevator had a good, solid feel.

The Ranger performed all maneuvers right on the money, and was very easy and simple to fly. Speeds ranged from 50 to 90 mph, with a cruise speed of about 80 to 85 mph — very similar to that of many 65-hp aircraft popular in the 1940s. Weightlifting capabilities of the Ranger are excellent.

If, like me, you're a large person, the Ranger will fit you perfectly because the cockpit is very roomy. Because its top wing is quite high off the fuselage, too, it's easy to enter and exit the Ranger, and that's quite an unusual benefit for a small biplane.

Visibility was typical of that in most biplanes, but certainly safe to fly in any crowded pattern. You might have to jink the plane a bit to uncover some sky or terrain, but that's what the controls are for.

The Ranger stalled very slowly, at about 40 mph (with our weight) and recovered easily — with just a slight lowering of the nose to regain flying speed. It showed no tendency to break right or left, but just fell ahead, straight and true. Even on the verge of a stall, we were able to make 360-degree turns in both directions, with no falling-off noticed.

We flew the plane about 20 minutes, then I took it back to the airport and made a no-brainer landing. Dan told us that the plane is very good in a crosswind and shows no tendency at all to get bent out of shape while rolling out. I came over the fence at about 55 to 60 mph, then flared it at 50 to make a not-quite-a-squeaker landing, but not bad for the first time I flew the aircraft. At the right kind of airport, the Ranger would make a very good aircraft to learn to fly in. (The easier-to-fly version with a slightly larger wing and smaller engine should be a real pussy cat.)

I taxied back to my hangar where Dan's trailer was parked, then we debriefed the flight. I've always loved to fly good-looking airplanes, and I especially enjoy flying a biplane. What can I tell you? The Sherwood Ranger meets all my qualifications!





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