pilot flight check

Motorglider – Best of Two Worlds

You can soar without need for tow plane, winch—or thermals—in "self-launched" Sportavia RF-5B

by DON DOWNIE / AOPA 188441

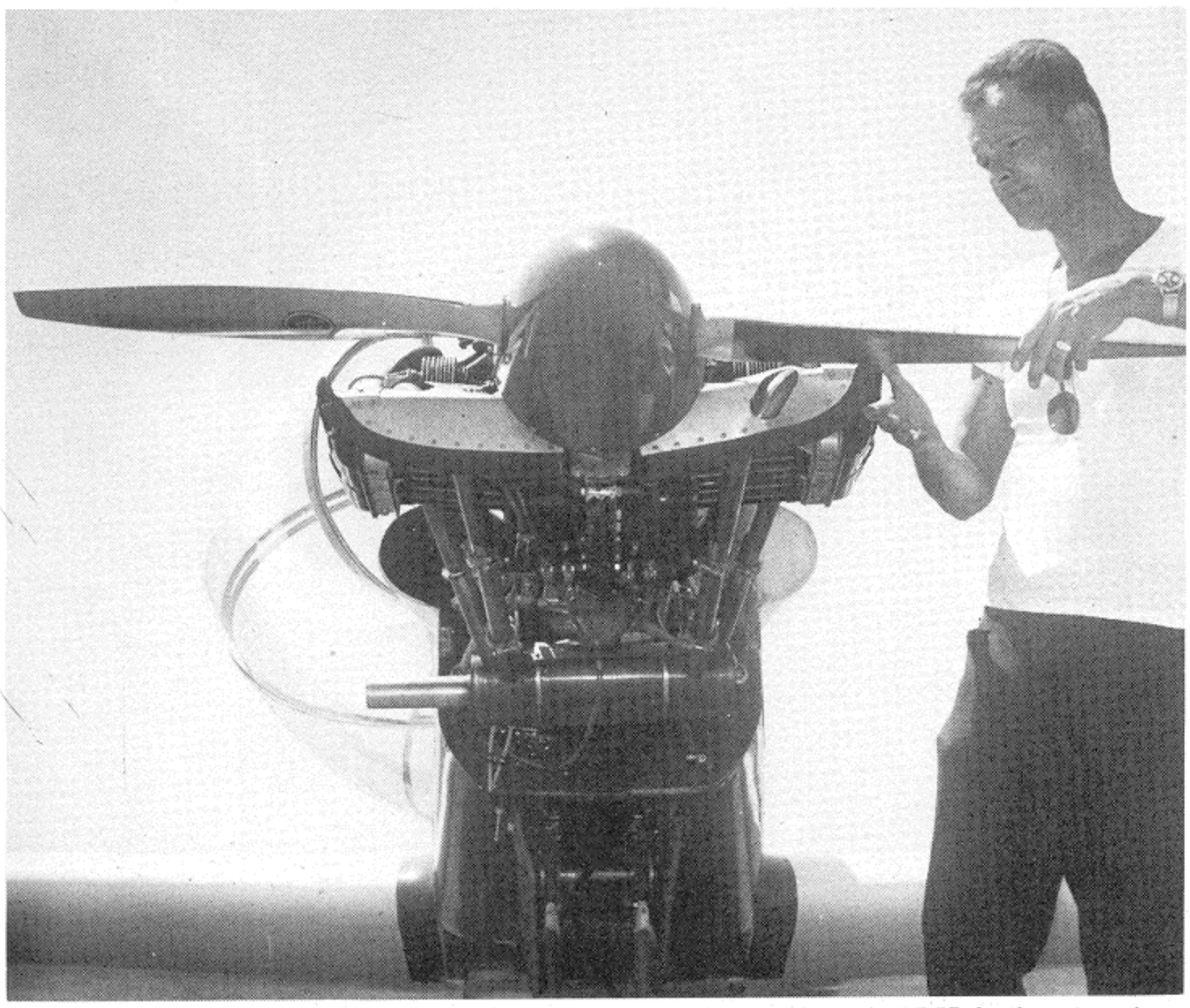
■■ Pure soaring is a great sport and a fine training tool. Unfortunately, it requires a tow plane, a winch or an auto tow, and lift-producing weather, a combination not always available when you have the time, money, and urge to slide silently through thermals or coast along a ridge.

The ideal would seem to be an aircraft which would not only soar, but would be self-launching, with an acceptable rate of climb, speed, and fuel range. The best of two worlds.

Motorgliders and ultra-light aircraft have been with us for many years and they have evolved into sophisticated and sometimes expensive flying machines.

Sportavia's RF-5B "Sperber" (sparrow hawk) is such an aircraft. A development of the Fournier RF-5, the plane is manufactured in Schmidthein, a town just outside of Cologne, West Germany. Production is presently 60 to 70 units per year and there are now 34 Sperbers in the United States.

The RF-5B is a big machine with a



Optional three-position propeller of Sportavia RF-5B feathers to reduce drag for soaring flight. Powerplant is a 69-hp Limbach Volkswagen engine. Photos by author.

MOTORGLIDER continued

span of 55.8 feet, but wingtips fold 9.5 feet from each tip, much like carrier aircraft, for normal storage. When extended, the wing is locked into place by a single sliding pin, one-half inch in diameter. This pin can be checked visually and the fairing over the gap will not go into place unless the pin is securely locked. The ailerons are self-aligning.

When you talk about motorgliders, you have a two-phased report; one with power on and one with power off. The RF-5B has its own idiosyncrasies while under power. Since there is only one main wheel, twenty-two-inch teflon outriggers (pogos) are mounted three feet inboard of the wing-fold point. These pogos touch the ground lightly, so there is almost no wing-down tipping during a turn on the ground.

Once on the ground, directional control is via a steerable tailwheel. The pilot must be careful to avoid high edge lights and other runway obstructions while taxiing, due to the very low and extremely long wings.

Even though the RF-5B is a production aircraft in Europe, in the United States it must be operated in an exhibition and racing category. This prohibits purely commercial operations, but permits club use and share-expense flights. This arbitrary FAA designation is partially due to the single-ignition system on the 68-hp Limbach SL 1700-E version of the Volkswagen engine.

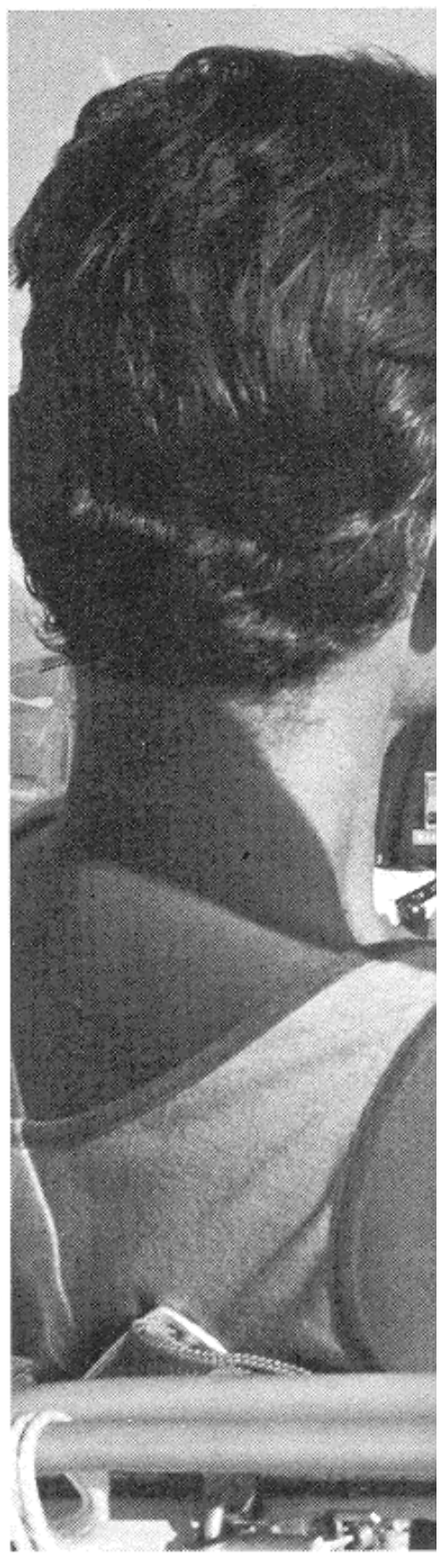
"I can take this engine down to the local Volkswagen agency and get an overhaul for $600 to $800," grinned Charles M. Gyenes (AOPA 438137), vice president of Aerosport in Long Beach, Calif. The Limbach engine differs from the standard VW powerplant primarily because of its accessory drive back plate and thrust bearing changes, and the installation of either Slick or Bendix magneto in place of a distributor. Cylinders, connecting rods, bearings, valves, etc., are VW.

Although most motorgliders in the past have suffered a drag penalty when the propeller was stopped, the RF-5B has, as an option, a unique three-position Hoffman variable-pitch prop that will allow climb at 3,000 rpm, cruise at 2,800 and will full-feather for powerless flight. The feathering prop is $1,695 extra and Gyenes reports that all his units have been sold with it. The actuator is a three-position lever across the bottom of the main instrument panel in the front seat only. This lever controls six springs in the prop hub and will allow the prop to return to high rpm in case of any malfunction.

We made two flights in N99814 with Gyenes and found a distinct advantage in a two-place anything when it comes to checkout. With a high-performance single-seater, the new pilot can take all the ground time he or she wants, taxi as fast as seems prudent, but when that throttle goes forward and the ship leaves the ground, it can be a whole new ballgame.

Our first flight was from the comfortable back seat, so Gyenes made the simple engine start and run-up. We received a nod from the Chino, (Calif.) tower and applied the power. You find out instantly that the propeller turns "the wrong way" (counter-clockwise as viewed from the cockpit) and what torque there is wants to turn the ship to the right.

Normal takeoff roll at gross weight is 640 feet with liftoff at about 47 mph. Gyenes called for a climb speed of 62



Full IFR instrumentation, VOR, and transponder seem strange for a sailplane cockpit, reflect cross-country capability of motorglider.

mph with the rate of climb holding just under 450 fpm until he retracted the main wheel at 500 feet agl.

At about 1,000 feet, Gyenes recommends coming back to cruise power since maximum power is permitted for only five minutes. Power is cut to about 2,000 rpm and the positioning lever for the prop pulled out three or four inches to relieve part of the load on the springs. As full throttle is re-applied, the rpm goes to about 2,800 and rate of climb, clean, is a comfortable 500 fpm.

Visibility out of the rear seat is outstanding. We climbed out toward the south and worked over toward 5,696-foot Saddleback Mountain. The smoggy air was relatively calm so soaring possibilities looked bleak. We crossed Prado Dam and the Santa Ana Canyon to pick up patchy areas of lift on the windward side of Saddleback.

Once within a good gliding range of either Escape Country, the hang glider area west of the El Toro Marine Base, or the Lake Elsinore glider and parachute center, I asked Gyenes if he would feather the prop so as to sample the silent half of the RF-5B. With power, conversation had been easy between cockpits, even without intercom. Without power, of course, there was no problem at all.

Gyenes cut back on the power to let the engine cool slowly for the recommended two minutes, before moving the throttle to the idle position and feathering the prop. Then, the single ignition switch was turned off, while the master remained on for radios and electrical instruments. The Sperber has an audio reminder and a yellow warning light on the panel to announce any time the throttle is reduced below 1,000 rpm or the spoilers are extended beyond 20%.

After the prop has stopped, the recommended procedure is to advance the throttle sufficiently to silence the gear-up horn and then use the starter to turn the prop to a horizontal position. Gyenes estimates that there is 1% to 2% less drag with the prop horizontal rather than vertical because it tends to act as a canard wing. The glide ratio is 28:1 with the prop feathered as opposed to 25:1 with a fixed-pitch prop.

Thus, we were quickly into the silent world of soaring. According to the book, the best glide ratio of 28:1 is at 61 mph. In this configuration, you'll drop 206 fpm. If you slow to just above a stall, the sink rate drops to 198 fpm with two aboard and, solo, the sink rate is 175 fpm at 47 mph. Circling calls for 62 mph so it's comfortable to glide and soar in the high 60-mph bracket until you pick up the subtle feel of the big craft.

All long-winged aircraft, except those equipped with spoiler ailerons, have a noticeable aileron yaw in which the nose wants to go up and to the outside of a turn as aileron is applied. Careful attention to detail in design causes this yaw condition to be minimal in the RF-5B. In starting a left turn, for example, you can lead slightly with left rudder and then apply almost normal aileron without having the slip indicator go clear to the inside of the turn. For soaring purists, this control coordination can become the subject of many a night-long "soaring circle" discussion. For the not-so-purist motorglider pilot, normal coordination techniques will work out quite well with this aircraft.

We probed the silent canyons of Saddleback Peak, picking up a little lift in one area and losing it in another. Actually, we were still parallel with the peak when we turned downwind toward Chino some 30 delightful minutes later. Gyenes sat sideways in the front seat during this flight so that we could see key instruments. There was little discussion; just the pure sport of flight without power. Soaring is always a tussle with Mother Nature, and when you can come out even, it is most satisfying.

For a restart in flight, you do the feathering procedure in reverse. Move the prop control lever to high rpm, partially open the throttle (let the gear horn blow) and when you pick up 70 mph the prop will begin windmilling on its own. (For a start at slower speeds, flick the single ignition switch and touch the starter.) Now you're a powered plane again. A slow warm-up is recommended until the oil temperature begins to rise.

"Chino Tower, this is motorglider N99814. Five south for landing."

"Roger, motorglider 814. Clear to land Runway 21 following traffic on left base."

Gyenes explained that the prefix "motorglider" was normal so that both the tower and pilots in the pattern would know that the glider was under power and did not need priority handling.

For training and checkout purposes, power is carried at pattern altitude until the runway is made. The Limbach VW runs with carburetor heat on all the time and there is no mixture control. Gear down speed is a low 81 mph because the gear extends backward and higher speeds would cause it to snap back.

While the RF-5B will slip, the big 6.16-foot by 6-inch spoilers are normally used for glidepath control. The rate of sink with spoilers retracted at a normal 70-mph approach speed is 300 fpm. With spoilers fully extended, you'll drop 1,400 fpm. Thus you should plan to come across the fence with a little spoiler open, flare to what you think may be one foot in the air, and carefully ease on more spoilers to counteract the ground effect of the long wing. As the wheel touches, you need full spoilers to stay on the ground or things begin to get interesting.

Unlike a conventional sailplane, where the landing wheel is aft of the center of gravity, the motorglider must have the wheel far enough forward to keep that expensive propeller off the runway. Thus, any bounce on landing tends to throw the nose back into the air, much as it does with a taildragger. Learning to make smooth landings with spoilers is not mastered on any first flight, but with a little practice it becomes easier. Of course, experienced RF-5B pilots delight in those greased-on wheel landings with nary a bounce.

Spoilers remain fully open during roll-out and taxiing. Because of the long wing span, taxiing should be at relatively slow speeds.

On yet another day, we joined Gyenes for a series of touch-and-go's from the busy air carrier airport at Long Beach,

Charles M. Gyenes, vice president of Aerosport, shows how to shorten almost 60-foot wingspan to less than 37 feet for hangaring. Ailerons align automatically when wings are extended and locked.

Calif. This time we flew from the front seat and had a chance to experiment with starting, prop and gear control, as well as the regular flying chores. With a top speed of 112 mph and a rate of climb of 650 fpm, wheel up and full high rpm, the RF-5B was able to stay up with the normal training traffic.

Gear retraction is reminiscent of the older Mooney in which you unlatch the handle and pull. If your pressure and momentum are correct, the gear linkage goes over-center and remains up. If you miss your timing, try it again. The gear handle on the 5B is low on the right side of the front cockpit. A yellow indicator light blinks at midpoint and goes out when the wheel is up with full power and spoilers retracted.

There are a couple of minor production items I'd like to see changed. Whoever put the elevator trim tab where it will gouge the pilot behind his right knee in either cockpit must either be under five feet tall or have a perverted sense of humor. As it is, a small boxing glove could cover each elevator trim tab until the location is moved.

The front canopy hatch must be opened before the rear one since the two overlap. Goof up and it could cost $650 for two new canopies.

Until you've lived with this beautiful flying machine for a few hours, it is too simple to reach for the canopy latch in either cockpit when you're looking for the throttle. The fuel shut-off valve and choke knob could be moved to the front center console for easier access.

The heavy chrome handle for the wheel brake, in front cockpit only, is inside your left knee and is difficult to reach. The control has a ratchet that could cause trouble, since it sets the brake in the parked position.

The 10 U.S. gallon fuel tank would make a J-3 Cub pilot homesick. There's the same float on the end of a wire to indicate fuel quantity that's been around since shortly after Orville and Wilbur. The float in this airplane is brass rather than cork, but the system is just about as goof-proof. Gyenes figures a normally powered flight to be a climb to 8,000 feet and 250 miles of cruising with three gallons remaining.

N99814 was equipped with a transponder, VOR, and a full IFR panel that made the front cockpit a little cramped. However, the ship is not approved for IFR flight. There is no heated pitot tube. Aerobatics, except spins, are also not approved. However, the flight manual notes, ". . . the 5B will not spin easily . . . at mid or forward CG . . . In aft CG, it can be made to spin more readily (but) recovers in less than half a turn."

Aerosport imports RF-5Bs two at a time in sealed shipboard containers. Delivery costs are $2,500 per unit plus 4½% import duty. State taxes go on from there. Basic price is $29,950 including shipping and import charges.

Aerosport is now working with Revmaster of Chino, Calif., to install one of their California-bred RS-2100-D dual ignition VW engines, complete with Rajay turbocharger, for $3,500. Service ceiling with this installation is estimated at 24,000 feet. Inherent advantages, in addition to dual-ignition that could be FAA-certified in time, include a U.S.-based supply of custom modified engine components. Such a combination could make the proven RF-5B even more acceptable to U.S. operation than the present model.

What does it take to fly a motorglider except the opportunity? Unless you want to feather the prop and put on an approved tow-hitch, you'll need a regular power student permit with solo endorsement, or a private power rating. To get the job done within any reasonable time, you should have previous sailplane and taildragger experience. Gyenes says that RF-5B checkouts have taken all the way from three to seven hours, depending upon the background of the pilot.

The RF-5B is a delight to fly. It is different enough from conventional aircraft to be a challenge. It is efficient enough, either under power or soaring, to be exhilarating. Whenever Aerosport has one of these ships that needs ferrying somewhere in the Southwest, I have a bid in to do the job. This would be a fun flight with a liberal education in soaring, but without the ever-present possibility of an off-airport landing.

Motorgliding in equipment like the RF-5B can really be the best of two worlds. □

SPORTAVIA RF-5B

Basic price $29,950

Specifications

Engine	Limbach SL 1700E, 68 hp @ 3,600 rpm
Propeller	Hoffman HO-V62R
Wing span	55.83 ft
Length	25.3 ft
Wing area	204.5 sq ft
Wing loading	7.3 lb/sq ft
Passengers and crew	2
Empty weight	1,050 lb
Useful load	450 lb
Gross weight	1,500 lb
Power loading	22 lb/hp
Fuel capacity (standard)	10 gal

Performance

Takeoff distance (ground roll)	640 ft
Takeoff over 50 ft	1,630 ft
Rate of climb	648 fpm
Maximum level speed	112 mph
Economy cruise speed (65% power)	85 mph
Range at normal cruise	266 sm
Service ceiling	14,000 ft
Sink rate, propeller feathered	2.9 fps
Glide ratio, propeller feathered	1:28
Stall speed	42 mph
Landing distance (ground roll)	669 ft
Landing over 50 ft	1,190 ft