Alpavia Avion-Planeur R.F.3

AIR TEST No. 59 — *by the Manager*

"MOTOR-GLIDER" is an unattractive name, but "*Avion-Planeur*" is well suited to the graceful and attractive little aeroplane which is the subject of this air-test. The basic idea is a sailplane with an engine, like an auxiliary engine in a yacht. Hitherto combinations of this sort have not been particularly good in the air, nor particularly attractive to behold on the ground. The R.F.3 however has an excellent performance either under power or without, and also exceptionally good looks. The efficiency of the design may be judged from the fact that, with its Volkswagen engine of 39 h.p., the R.F.3 is faster than the Turbulent with 45 h.p., and can outclimb it. With engine off, its sailplane performance is superior to a Grunau Baby with enclosed cockpit.

The principal reason for this is the clean design combined with good finish. The wing of 36 ft. 9 in. span is built on normal sailplane lines, the forward part being ply covered and the part rear of the wooden main spar being fabric. Tail unit and fuselage follow normal sailplane practice, the essential difference being that there is an engine ahead of the pilot. The undercarriage comprises a single mainwheel which retracts into the fuselage, and is then enclosed inside two doors; a tailwheel, which is linked to the rudder pedals to provide steering on the ground; and a pair of wingtip skids which balance the aircraft upon its mainwheel. The actual aircraft used for this test had had a pair of roller skate wheels attached to the wingtip skids, to facilitate taxi-ing on hard runways.

The pilot is enclosed in a single-piece canopy, which hinges open to starboard. The cockpit is large, roomy, and comfortable for the largest pilot. The only difference which sailplane pilots are likely to notice is the presence of some additional controls for the engine, and the fact that he is seated over the wing instead of ahead of it as in a normal sailplane. This means that when circling the outer half of the wing can conceal a sailplane circling at the same level, and that in normal flight the view downward is not so good as in a pure sailplane. On the other hand, compared with the restricted outlook which most power pilots have come to regard as normal, the view from the pilot's seat of the R.F.3 is exceptionally good.

Controls

Because of its dual personality, the R.F.3 has controls which are not normally found, except in relatively high-performance and expensive aircraft. The retractable undercarriage has already been mentioned. This is operated by a cranked lever near the pilot's right knee. There is a positive lock which must first be released, after which an easy pull on the lever retracts the wheel into its housing in the fuselage and the doors close over it. The "up" lock automatically engages when the movement is completed. Retraction occupies perhaps ten seconds. The other feature is an airbrake/spoiler. These are similar to the DFS pattern found on many high-performance sailplanes, except that they are fitted to the top surfaces of the wing only; whilst powerful, they are considerably less so than those fitted to, say, the Skylark 3 sailplanes whose airbrakes extend from both upper and lower surfaces. The operation is by a lever placed adjacent to the pilot's left hand; an upward, and rearward pull extends the brakes, and when opened they stay open; they are locked closed by a geometric lock in the operating mechanism.

Engine controls are similar to those found in most ultra-light aircraft, with two exceptions. Being only single ignition, there is only one magneto switch; and as it is intended to be able to stop and start the engine in the air, there is an arrangement to lift the exhaust valves, so that the airstream can cause the propeller to windmill sufficiently fast to start; the mechanism will be familiar to anybody brought up on large motor cycles. There is also a carburetter choke to aid cold starting.

The fuel tank, which is just ahead of the instrument panel, contains 6½ gal. A visible stick which protrudes through the filler cap, and has a float on its lower end, provides a simple fuel gauge. Consumption varies according to how the engine is used. Disregarding any soaring ability, and using the R.F.3 merely as a power aircraft, an engine speed of 3,000 r.p.m. gives 97 knots, at a consumption of 2 (Imp.) gal. per hour. This provides an absolute range without reserves and in still air of 312 nautical miles. Flying more slowly, 2,500 r.p.m. gives about 85 knots, and a fuel consumption of about 1.6 gal. per hour, and range in still air of nearly 370 nautical miles. Our own checks substantiated these figures, and are testimonials to the very clean and efficient design. As a sailplane, of course, the range becomes much extended. For example, a Flairavia Club pilot having visited West Malling, joined a sailplane in a thermal, switched off the engine, and returned to Biggin Hill without further use of power. His miles per gallon were therefore very good indeed, and he still accomplished the journey as fast and in considerably greater comfort than could have been done by road.

Our own test of the R.F.3 comprised a number of flights, the first of which was on a day of low cloud, and no possibilities of soaring. This sortie was therefore used to examine general handling under power. Starting is by hand swinging, and it was noted that starts were easy, and usually at

first attempt. By standing behind the propeller, on the port side, it is possible to swing the propeller, and also have a hand on the throttle. The wheel brake can be locked on, and is powerful enough to hold the aircraft from moving forward, although the prudent owner might feel inclined to supplement the brakes with a chock. But single-handed starting is quite practicable and easy. Entry into the cockpit is by a rather narrow walkway over the port wing, after which the canopy can be closed and locked. The lock is large, rugged and so designed as to be unlikely to be undone unintentionally. A small ring adjacent to the pilot's right hand pulls out the hinge pin lock, and permits the canopy to be jettisoned quickly in an emergency.

Taxi-ing provided our first experience of a one-wheel undercarriage. At first it is a little disconcerting to tilt from one wing skid to the other, according to the side wind or if one makes a turn; one expects the skid in contact with the ground to create a turning moment in that direction, rather like the immersed wingtip float used to do on a flying-boat. In fact there is no noticeable drag from the wingtip skid, and one very soon discovers that the R.F.3 can be taxied exactly as though it was fitted with a normal two-wheeled main undercarriage. The tailwheel coupled to the rudder pedals ensures good control, though one must always allow for the fact that sharp turns, such as can be accomplished using the wheel brakes on a normal undercarriage, are not possible with the single central wheel. When taxi-ing the view in all directions is good.

Handling

Take-off from a hard runway into a 15-knot wind occupied only a few yards. The attitude on the ground is approximately the normal attitude for take-off, so that there is no need to raise the tail more than enough to let the aircraft accelerate on its mainwheel, and it will then fly off the ground cleanly when it attains the right speed. At full throttle on take-off the Volkswagen engine gave 3,150 r.p.m., and was as smooth almost as a little turbine. Recommended climbing speed is 54 knots (100 km.p.h.) and it was noted that the vertical speed indicator showed a fairly steady rate of climb of 4 metres per second all the way up. Some of this may have been hill lift from the wind blowing up from the Biggin Hill valley; subsequent checks in still air at 3,500 ft. over flat stratified cloud gave 3.5 metres/second (690 ft./minute). The maker's figure is 785 ft./minute at sea-level. By way of comparison, the figures given for the Turbulent and the Tipsy Nipper, each with 45 h.p., are 450 and 720 ft./minute respectively at sea-level.

Flying at normal powered cruising speeds, the R.F.3's ailerons are somewhat heavier than would be expected. But on slowing down to the speed for circling in the sailplane mode, about 49 kts. (90 km.p.h.), the ailerons are much lighter and the rate of roll about what one would

The R.F.3 used in this test. The tip skids have been fitted with roller-skate wheels to ease taxi-ing on hard runways (Photos: "Air Pictorial")

expect in a sailplane of comparable span. The large fin and rudder give good positive directional stability, but there is sufficient aileron drag when rolling into a turn, or coming out, to require the use of rudder to avoid skidding. Apart from this the aircraft can be flown comfortably feet off. It can also be trimmed to fly level hands off over the full range of normal speeds, by means of the pilot-controlled trim tab fitted to the port side of the elevator. Tab and controls are identical to those fitted to the Jodel D.117, no doubt accounted for by the fact that Alpavia who make the R.F.3 also constructed many Jodel-designed aircraft. The aircraft has good positive fore-and-aft stability at all normal speeds, but is very light on the elevator throughout its speed range.

Stalling the R.F.3 demonstrated once again the exceptional cleanliness of the design. Throttled right back and using the V.S.I. to ensure level flight, the aircraft loses speed so slowly that it takes some moments to reach the stall. The tick-over speed of the engine if at all fast can be sufficient to prevent the speed falling below about 40 kts. and one can remain in this condition almost indefinitely. This is a factor which will no doubt be considered by those who are interested in using the R.F.3, or a two-seater version of it, for training sailplane pilots; for, with the tiniest whiff of power, the flying characteristics closely resemble those of a high-performance sailplane. Instructional flights can, however, be of whatever duration is required, and not limited by lack of thermals, or by the time which an instructional glider takes to glide back to earth. This can be a very real advantage in a busy gliding school where flying has to be carefully organised to get through a full week-end or course programme.

The actual stall throttled right back was preceded by the stall warning light coming on at 85-90 km.p.h. (46-49 kts.). There was no perceptible pre-stall buffet, but this particular aircraft emitted a high-pitched organ-note about 2 kts. above the stall. The actual level stall occurred at 72 km.p.h. (39 kts.) I.A.S. and on each occasion the nose and right wing dropped simultaneously and relatively gently. Recovery was always normal, and positive, and loss of height not more than 150 to 200 ft. With airbrakes extended the performance was similar, except that the warning light appeared at 100 km.p.h. (54 kts.) and the stall occurred at 78 km.p.h. (42 kts.) I.A.S.

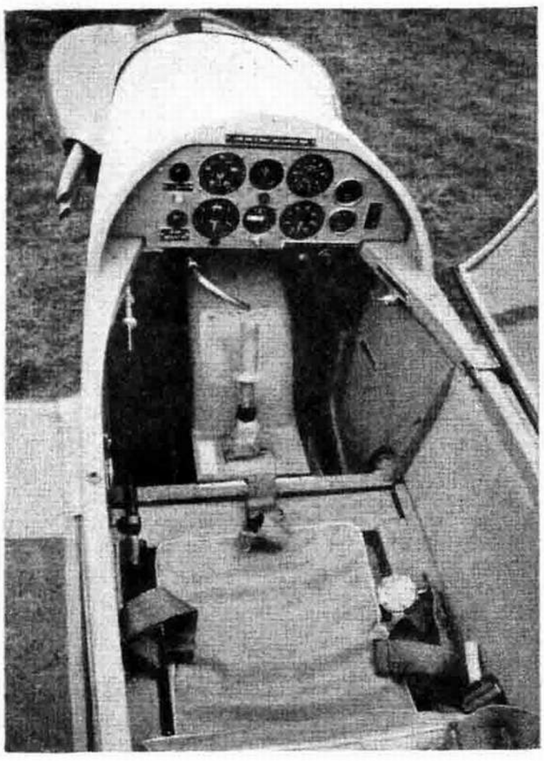
It should be noted that although the R.F.3 is cleared for spinning and for aerobatics not involving negative "g" in France, in the U.K. it has been licensed in a category which permits it to be used by clubs for hire to their members but which does not allow spinning or aerobatics.

To stop the engine one merely slows right down, closes the throttle and switches off. The engine runs on for a few revolutions, and stops, and one can fly on in such a beautiful peace and silence as only sailplane pilots know. Handling in the sailplane mode does not differ significantly from handling with power on, but is generally more pleasant, because of the silence, and because at lower speed the ailerons are lighter. In still air at 3,000 ft. at 100 km.p.h. (54 kts.) I.A.S. the rate of sink was 2 metres/second (394 ft./min.). With airbrakes out the rate of descent is approximately doubled.

Airbrakes' limiting speed

In this connection it was disappointing to find that the limiting speed above which the airbrakes may not be opened is 81 kts. (150 km.p.h.). It is customary in all modern sailplanes to have air brakes without a limiting speed and designed so that they may be used to make it impossible for the aircraft to exceed its own limiting speed when they are extended. This is a valuable safety device, in particular for pilots who intend to enter turbulent cloud and to gain height in it on instruments.

To restart the engine the aircraft must be dived fast enough to start the airscrew



R.F.3 cockpit; undercarriage retraction lever on right (Photo: "Air Pictorial")

R.F.3 . . .

turning. Throttle must be fully closed, and fuel and ignition on. Perhaps because the engine in G-ATBP, the aircraft used in this test, is relatively new and stiff, the minimum speed at which a restart was obtained was 175 km.p.h. (94 kts.) I.A.S. Sometimes the speed was greater. When the engine starts, its acceleration up to closed-throttle speed results in a further increase of airspeed, so that on every occasion the aircraft exceeded the 180 km.p.h. (97 kts.) I.A.S. limit for rough air, and sometimes approached closely to the 210 km.p.h. (113 kts.) I.A.S. absolute limit (Vne). The loss of height was normally 500 to 600 ft. No doubt this could be reduced with practice, but taken overall, restarts in the air are something to be done with care, and always with adequate height in hand. If a pilot-operated hand starter could be fitted, as in a number of Turbulents, all starts could be accomplished easily and without the special care needed at present.

The approach and landing emphasise again the extraordinary dual personality of the R.F.3. It exhibits some of the characteristics of a high-performance aircraft, such as reluctance to lose speed, has a flat glide and of course a retractable undercarriage to remember.

After a variety of experiments, which included some pretty rough touch-downs, it was concluded that the best all-round compromise was to position the aircraft for final approach, extend the airbrake/spoilers fully, and to complete the approach and landing as for a normal powered aircraft. This is probably the best technique for the shortest possible landing, but it should be said at once that a certain amount of practice is necessary before contemplating a field landing. The alternative method is, having positioned the aircraft for final approach, to close the throttle and to govern the approach and landing by use of the airbrake/spoilers, as in a normal sailplane. Either method works, according to preference.

It was found that a circuit speed of 110-120 km.p.h. (60-65 kts.) I.A.S. was convenient; speed should not be less than this on finals, or when the airbrake/spoilers are extended in gusty conditions. A speed of 100 km.p.h. (54 kts.) is about right "over the hedge" and this may be reduced with practice.

The actual touch-down requires some judgment. It should be tail down and at minimum speed; a fast wheeler, in addition to being noisy, results in a series of skips and hops familiar to some Auster pilots, and, as the wheel suspension is undamped, these do not die out quickly.

The actual aircraft used for this air test is the property of the Flairavia Flying Club at Biggin Hill, to whom *Air Pictorial* is most grateful. Registered G-ATBP, it is the fifty-ninth R.F.3 built.

The designer, M. René Fournier, is in partnership with M. Antoine d'Assche who is the Managing Director of Alpavia, the manufacturing company, based at Gap in the Hautes Alpes. It is not without significance that Gap is not far from the National Gliding Centre at St. Auban, famous for its waves; and in one of these an R.F.3 which motored up to some 4,000 metres to contact the wave, then ascended a further 7,000 metres to reach a height of 11,000 metres (36,000 ft.) with the engine switched off.

The cost of the R.F.3 delivered in the U.K., duty paid and ready to fly, is approximately £2,500—about double that of the Turbulent and Tipsy Nipper with which it has been compared in certain respects. Part of the R.F.3's cost is, of course, import duty; but in addition one is paying for those refinements, such as a retractable undercarriage, which help to impart the truly remarkable performance which the R.F.3 possesses, and £2,500 is by no means an excessive price. It is a fascinating aeroplane to fly and as indicated here, requires a considerable amount of practice before any pilot can learn to exploit all its unusual capabilities. For one who loves flying, this is an added attraction.

Specification

Engine: V.W. Rectimo, 39 h.p. at 3,600 r.p.m.

Span	36 ft. 9 in.
Length	19 ft. 8 in.
Weight empty	529 lb.
Max. take-off weight	772 lb.
Max. cruising speed	97 kts.
Economical cruising speed	87 kts.
Stalling speed	38 kts.
Rate of climb at S-L	785 ft./min.
Min. rate of sink, engine stopped	230 ft./min.
Max. range	310 naut. miles
Service ceiling	19,000 ft.