*René Fournier's smooth glider-like designs have turned heads since 1957.* ***Peter Turner*** *tours and aerobats his own professionally restored single-seat RF-4D. Photographs by Peter R March.*

**I HAVE ALWAYS** admired the Fournier designs and although I had never flown the RF-4, to me it was the most elegant of them all. But how I came about owning G-AVWY, a 1967 vintage Sportavia RF-4D, was more by accident than design.

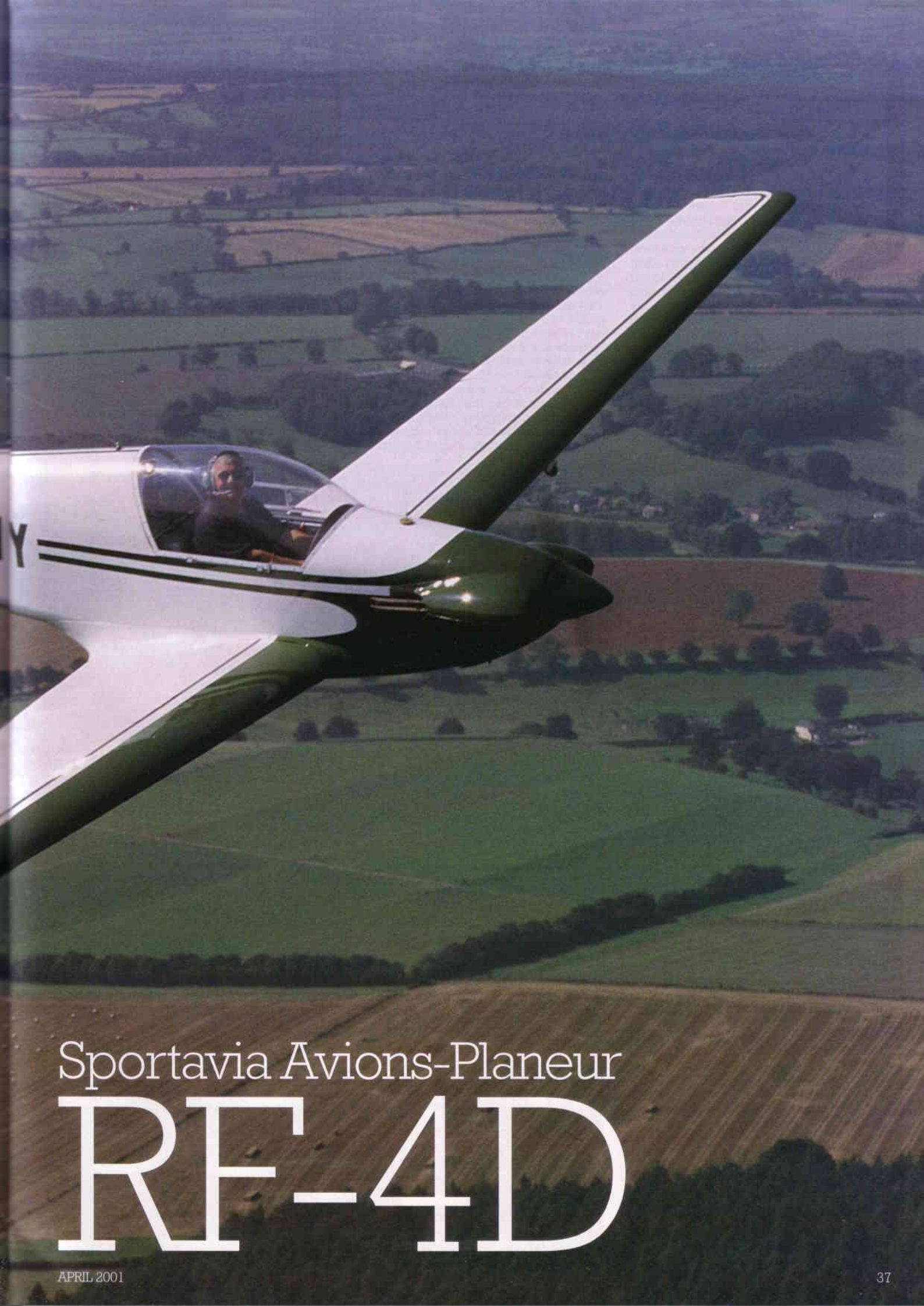
Brian, a flying colleague who had been restoring 'WY for ten years but never quite got there, had decided to up sticks and move to New Zealand. Being very much his baby, he was desperate for her to go to a new home to be completed and looked after by someone he could trust. He was aware that I was an enthusiastic glider and motor glider pilot/instructor and asked if I was interested in buying 'WY. With shares in a Dimona and Emeraude and a day-job flying HS 125s, Citations and a Hughes 500, it wasn't exactly as if I needed another toy!

I took the trouble to look her over. Despite the time spent on her, she was still in need of lots of TLC. On the basis that I'm a pilot and in no way a builder, I expressed only a mild interest. A week before Brian was due to leave, he called me to bend my arm. He had turned down offers from the usual time-wasters and was desperate to secure a good home for his project. My heart won over my wallet and a deal was struck.

After many delays due to engine problems, British weather etc, a PFA Ferry Permit was issued and on a clear, cold, February day she arrived at Gloucestershire Airport. At this point, I have to admit I regretted my decision. She needed lots of work and had sprouted a very ugly chin, which totally ruined her graceful lines.

I immediately flew 'WY to Nympsfield where Roger Targett Sailplane Services was going to complete the restoration for me. In addition to working on gliders, Roger is also very experienced on PFA types including the RF-4 with the 1,600 cc engine—one of which had recently been fitted to 'WY. He immediately reassured me that the ugly 'chin' was totally unnecessary and set about reducing her to a kit of parts for the restoration.

The following months were punctuated with many visits to the workshop. There was a lot to do. Although I was not physically getting involved in the work I wanted everything to be just right. Choice of colour was top of the agenda and I decided to use one of M Fournier's schemes of British racing green and white. As it turned out, we discovered ➤



## Sportavia Avions-Planeur

# RF-4D

this was her original paint scheme.

As the restoration continued my (and Roger's) enthusiasm soared. One of the highlights was to see the fuselage emerge in its new colours. It was far better than I had dared imagine; with a fabulous high-gloss finish it looked stunning. The inside of the cockpit was painted grey, as was the instrument panel, and I replaced the mph ASI with one calibrated in knots—just one of my many little eccentricities.

We fitted a dual battery system, as it had no generator or alternator, a Becker VHF and a Garmin Pilot III GPS. Finally, the seat base and back were totally rebuilt using high-density, energy-absorbing foam moulded to my shape and finished off in blue leather and cloth to match the grey cockpit. The result, if a little ostentatious, is a very comfortable and safe cockpit environment! There are two seat backs of differing thickness to allow for the short (me) and the tall (everyone else) and the use of a parachute for aerobatics.

I joined the Club Fournier International—the owners' club. CFI produces a very useful newsletter and runs various rallies etc. Meanwhile I bumped into Tizzy Hodson. She had flown 'WY when it was one of the Unipart Aerobatic Team aircraft back in the 1980s. Tizzy kindly loaned me some old photos and a video, which I was able to have copied—another piece of 'WY's history was in place.

By early June 2000 she was ready to fly. Dave Bland, who works for Roger and has a share in the Nympsfield based RF-4, carried out a brief test flight. That evening, with yet another Ferry Permit issued, I flew her home to Halesland—Mendip Gliding Club's airfield. She flew beautifully and I was absolutely delighted with my shining 'new' 33-year-old toy. What a contrast to the ugly duckling that had arrived at Gloucester back in February.

The next day was the club's 25th anniversary and over the weekend I carried out a number of flights checking performance and handling. The Fournier was admired by all, thanks to the superb workmanship of Roger and his team.

On the Friday morning of the PFA Rally, the Permit-to-Fly arrived on my doormat (thank you PFA staff) and I flew to Cranfield. This and the 25th anniversary was our target for the completion of the project and we made both! Part of the restoration deal with Roger was to fly him to Cranfield in the Hughes 500. So it was with Roger, Hamish (another of his merry men) and my son James that I revisited Cranfield on the Saturday.

At Cranfield, I met some fellow members of CFI. A group had flown over from France, Germany and Italy to attend the rally as part of one of the club's annual tours. One RF-4 of particular interest (D-KAQI) had been fitted with an extra fuel tank behind the seat to extend its range to keep up with the RF-5s on their various European trips. These guys certainly use their Fourniers for some pretty serious touring.

## Meet G-AVWY

G-AVWY is operated on a PFA Permit-to-Fly restricting her to day/VFR flights only. She is cleared for spinning, inside loops, slow rolls, rolls off the top, stall turns and inverted flight with the engine stopped. $V_{ne}$ is a healthy 134 knots.

The fuselage is made of frames and four longerons covered with ply. The wing and tailplane have single spars with ply D-tube leading edges. Both are one piece and can be detached from the fuselage. RF-4s are powered by a variety of single-ignition VW-derived engines from 1,200 to 1,600 cc. 'WY is fitted with an Acro converted 1,600 cc unit, with a Ken Fern wooden propeller.

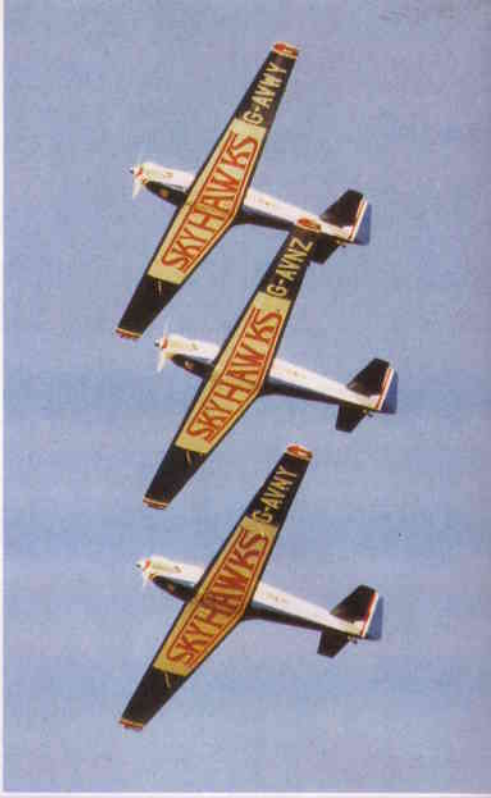
The fuel system comprises an 8.36 imperial gallon tank forward of the cockpit which feeds the engine by gravity. The fuel gauge is of the 'float with wire' variety protruding in front of the pilot and attached to the filler cap. A small breather hole in the wire guide provides positive pressure in the tank—provided the cap is secured with the hole at the front. 'WY has a red mark denoting one hour's fuel remaining and when the wire stops moving there is 1.1 gallons remaining.

On the right lower side of the instrument panel there is a fuel cock, choke and non-standard Ki-gas primer, with the throttle positioned on the left lower side. There is a fuel drain fitted to the base of the carburettor. The close cowling negates the need for carburettor heat. The oil capacity is half an imperial gallon and the dipstick and filler cap are on top of the engine.

There being no generator or alternator we have fitted dual 12-volt batteries with a three-position master switch: *Batt 1-Off-Batt 2*. Each battery is mounted in an easily detached aluminium box with fuse, test meter and mounting tray. The system enables the aircraft to be flown if either is removed for charging. Each battery lasts in excess of ten flying hours before needing a charge. The batteries provide power to the gear warning horn and light, stall warning light, the VHF and GPS.

The controls are conventional with an elevator trim tab activated by a lever on the right side of the cockpit. In addition, there are airbrakes on each main wing, activated by a lever on the left side of the cockpit below the throttle.

The single, retractable main wheel is operated by a lever on the right side of the cockpit, which is released by a small locking latch.





***Top:*** **recalling a past life—G-AVWY leads a Skyhawks formation.**

***Above:*** **holding down after take-off with the main wheel up (the limiting speed is only 59 knots).**

***Right:*** **Roger Targett working on 'WY's fuselage.**

***Below:*** **replaced during restoration, the unnecessary and 'very ugly' cowl chin.**

The wheel has a drum brake which is operated by a lever to the right of the throttle.

Ventilation is provided by two adjustable vents at the front left and right of the seat, a direct-vision panel and an exit vent at the top rear of the canopy. The net result is an adequate airflow through the cockpit on those woefully rare hot summer days. There is no heating but with a good canopy seal, the vents closed and winter thermals the cockpit remains comfortable on all but the coldest days.

There are two storage areas. The one behind the seat back is big enough to hold either a briefcase-size, soft flight bag or overnight bag plus fuel drain, chock and tie-downs. The other is a parcel shelf behind the head which will take a one-man tent and sleeping bag. Nowadays I'm addicted to comfortable beds so I have not tried this myself but I know several who have.

## So how does the RF-4 perform?

The RF-4 sits low to the ground on its single, retractable main wheel, steerable tailwheel and outriggers under each wing. Despite sitting low, the prop clearance is good. Starting is straightforward. With a cold engine it is a matter of mag off, fuel on, throttle set, choke on and suck in four times, then it's two shots on the Ki-gas primer and she generally fires up on the first couple of swings. When the engine is warm, the amount of priming is reduced accordingly.

The single-handed start technique is somewhat different to other types and is well documented in the Flight Manual. Basically one stands behind the propeller on the port side with the left hand for swinging and right for hanging on to the cockpit sill. Once the engine is running, it is simply a case of adjusting the throttle and choke and climbing in over the leading edge of the wing. I have to admit I was a little sceptical of this procedure at first but in practice it works very well and is perfectly safe as long as the usual precautions are taken.

Entry is over-wing from either front or rear, stepping down into the snug cockpit and sliding down the seat back. The seat is non-adjustable but with the choice of two depths of semi-reclining seat backs this is not a problem for most pilots. The harness is of the five-point aerobatic variety and once settled in you get the feeling of wearing a comfortable armchair. However it certainly doesn't fly like one! Visibility is excellent with glider-like 340° panoramic view aided by the high seating position.

A common problem in single-seaters is the lack of some place to dump your kneeboard, charts, guides etc, and the RF-4 is no exception. Good pre-flight planning and careful cockpit organisation are the key and we all do that anyway, don't we?

Once settled in everything falls readily to hand. On the left side are the throttle, wheel-brake and air brake levers and on the right the Ki-gas primer, fuel cock, choke, landing-gear lever and elevator trimmer. Flight instruments are an ASI, compass, altimeter, glider type vario (VSI), g-meter and slip ball with CHT, oil temperature, oil pressure and tachometer indicating the health and power of the engine. A Hobbs meter is also fitted.

There are warning lights for the gear (orange) and stall (red). The gear warning is also accompanied by a horn which is activated when the airbrakes are opened. A Becker 720-channel VHF is fitted at the base of the panel with a Garmin Pilot III GPS below that on the wheel-well.

Taxying is easy with the responsive, steerable tailwheel, and good visibility. You do need to be aware of the extra long and low wings when avoiding obstructions. Take-off checks are minimal but still need to be done religiously. Although there are no mags to check there are little quirks such as ensuring the choke is in and the airbrakes locked.


***Left:*** **the restored cockpit now sports an ASI reading in knots—rather than mph—a compact Becker VHF unit (visible above the stick grip) and a Garmin Pilot III GPS. The chrome handle operates the wheel brake.**

The take-off itself is straightforward and brisk. The throttle is opened fully, rpm checked above 2,900, the brake released and the RF-4 bounds eagerly forwards. After the initial run, if the stick is moved to slightly aft of neutral it will fly itself off at about fifty knots reaching fifty feet in 270 metres from a ground run of 130 metres. This is at max take-off weight on a standard day. Not bad on 1,600 cc. The well-sprung main wheel absorbs bumps readily and the aircraft is easily controlled up to its crosswind limit of fifteen knots.

The initial climb is at 59 knots and once the 'can't land ahead' point is passed the wheel is raised and the pitch angle increased to maintain the speed. It is important not to exceed the gear's max operating speed of 59 knots until it is tucked away.

Control response is excellent and despite the longish wing, span harmonisation is very good. It is one of those aircraft that you immediately feel at home in, and very quickly evokes the silly grin syndrome. Average rate of climb to a typical cruise height of 3,000 feet pegs out at 800 fpm.

In a busy air traffic environment (the PFA Rally for instance) the superb visibility is immediately appreciated. The only appreciable blind spot is below, as with all low-wing monoplanes.

There are various cruise modes. For touring 3,200 rpm is used giving a handy ninety knots returning a fuel burn of just under three gph. With a thirty-minute VFR reserve this gives a still air range of a little over 200 miles and an endurance of 2¼ hours. I understand from the Nympsfield boys that with their new-fangled ground adjustable prop they do better than this, but I am not in that much hurry and I do like the aesthetic appeal of natural wood. Noise levels in all modes of flight are quite comfortable wearing a standard David Clark headset.

In sightseeing mode the engine can be throttled back to 2,200 rpm giving a cruise speed of 52 knots. With a consumption of just over a gallon an hour you could stay airborne for eight hours and still have thirty minutes reserve—if your bum and bladder could take it. For me there is nothing quite like poddling around the Somerset countryside at 1,000 feet on a summer's evening—and this is the way to do it.

In gliding mode (engine off) the best glide angle of 1:20 is achieved at 62 knots and the best minimum sink of 240 fpm (2.4 knots for the glider pilots) at 56 knots. In modern terms the glide performance is uninspiring, but in good soaring conditions it is adequate for some very enjoyable silent flight—especially in ridge and wave lift. With the engine rumbling along at low power the glide performance can of course be adjusted ad infinitum—but it's not the same. Shutting the engine down in flight is as on the ground. The battery however is left on for power to the radio and electric vario (VSI). Many RF-4s have a mechanical (hand start) for air-starting—'WY doesn't and due to the high cylinder compressions it takes a few thousand feet to dive-start the engine. Therefore I only shut it down in gliding range of the airfield.

Aerobating the RF-4 is a very pleasant experience. The first time I looped the aircraft I recovered straight through my entry slipstream. Fluke I thought, but no, it happens time and again as it does with steep turns. It is so crisp to fly that it makes life easy flying these basic manoeuvres. With the limited power and long wingspan, rolls take more practice to fly accurately—I have just started practising (out of sight of the airfield) so I am not there yet, but my son-in-law Paul cracked it very quickly and flies a very nice sequence. During aerobatics we have developed the habit of turning the battery switch off to kill the various unwanted and distracting lights and horns.

Stalls are very innocuous, occurring at about forty knots indicated (all configurations) preceded by the warning light five knots before. There is no warning buffet. Recovery is standard and immediate. Spins are also no problem. The rate is quite quick once allowed to develop but with the standard technique recovery is within ¾ of a turn and very precise.

If you make a horlicks of any of the above manoeuvres the *original* stress factors of +11/-6g should prevent you from pulling the wings off. I say 'original' because the Permit-to-Fly factors are placarded at +4/-2g. With a parachute as an extra comfort factor, aeros can be practised with some confidence—given a proper introduction by an instructor of course.

Returning to the circuit the usual joining checks are carried out ensuring the battery is switched back on to restore the warnings. Depending on the operating environment, either glider or power circuits are flown without problem. Downwind checks are standard but the actual lowering of the wheel must be below the max gear operating speed of 59 knots. Once the wheel is down there is no speed restriction.

There are various techniques for the approach which is carried out at 55 knots in smooth air. As in common gliding practice I tend to add half windspeed as a gust factor up to a maximum of ten knots.

In a power environment the technique is to use half airbrake and appropriate power from base leg onwards controlling the approach with power as normal, leaving the airbrakes half open throughout. In a gliding environment the throttle is usually closed on the downwind leg and the approach controlled using the airbrakes. The airbrakes (on 'WY at least) tend to stay where put which is very useful. For the shortest landings the airbrakes should be fully open on touchdown à la glider. Crosswind landings up to the fifteen-knot limit are not a problem. Due to the low wing, the crabbing technique is used.

**Sportavia Avions-Planeur RF-4D**

| | |
|---|---|
| *Dimensions* | |
| Wing span | 36 ft 11 ¼ in |
| Wing area | 121.7 sq ft |
| Length | 19 ft 10 ¼ in |
| Height | 5 ft 1 ¾ in |
| Cabin height | 4 ft 2 in |
| Cabin width | 3 ft 9 in |
| Cabin length | 7 ft 6½ in |
| Seating | |
| *Weights & loadings* | |
| Empty weight | 627 lb |
| Mtow | 860 lb |
| Mtow for rolling maoeuvres | 816 lb |
| Max cockpit load (with full fuel) | 173 lb |
| Fuel | 8.36 imp gall |
| *Performance* | |
| Max level speed | 122 mph |
| Max cruise | 112 mph |
| T-O to 50 ft | 875 ft |
| Range with max fuel | 422 miles |
| $V_{ne}$ | 155 kt |
| $V_{ne}$ inverted, engine stopped | 134 kt |
| Stall | 40 kt |
| *Power off:* | |
| Min sink | 4.27 ft/sec |
| Best glide ratio | 1:20 |

*Engine:* Acro-converted 1,600 cc unit, with a Ken Fern wooden propeller.

*Club Fournier International (CFI):* contact Brian Griffin, tel: 01522 521906, e-mail: *griffin@canwick.demon.co.uk*

*The author* with his wife Linda owns Executive Aviation Services at Gloucestershire Airport. The company operates two Citation IIs on management and charter and a Hughes 500C for self-fly hire. It is one of three Citation training schools in the UK.


RF-2

RF-3

RF-4D

# The Fournier line

THE TALENTED René Fournier designed his first *avions-planeur* (motor glider) in 1957. This was the RF-01 prototype (F-WJGX) and was lovingly built by René over three years in a disused laundry in Cannes.

The prototype first flew from Cannes Airport on 6 July 1960, powered by a 25 hp VW engine. The pilot was Charles Fauvel, a gifted designer in his own right. Just over a year later, it was lost due to pilot error while performing at an airshow at Dijon. Thanks to the aircraft's immense strength the pilot, Bernard Chavreaux, was only slightly injured.

In 1962, with financial aid from an enlightened French government, the design was optimised to become the RF-2 and two were built at the Pierre Robin Centre Est factory in Dijon for evaluation and eventual flying club use. Powered by a Rectimo AR.1200 engine, the prototype F-WJSR was first flown in June 1962. Both prototypes survive, the second RF-2 (F-WJSY) being displayed in the Musée de l'Air at Le Bourget.

In 1963, M Fournier again improved the design, developing the RF-3 which received its type certificate on 7 June 1963. He teamed up with Compte Antoine d'Assche and Bernard Chauvreau to form Société Alpavia at Gap-Tallard, where 88 production RF-3s were built by 1966.

At this point the penultimate development of the RF single-seat design took place and the RF-4 was born. Although very similar in looks to the RF-3, it was a much-improved version, being strengthened and stressed to +11g/-6g, making it fully aerobatic. The prototype F-BMKA and two further RF-4s were built by Alpavia.

To increase output a larger factory was needed and Sportavia-Putzer GmbH was formed by the Compte d'Assche and Alfons Putzer at Dahlem in West Germany, to take

RF-6C

RF-7


*Above:* **Peter Turner's dream machine, 'a classic aircraft of beautiful proportions' that has handling to match its looks.**

Any attempt to land on will result in a bounce. The standard taildragger three-point technique is used and if the stick is fully back on touchdown, the net result is a smooth landing. With careful use of the wheel-brake a very short roll of 110 metres is achievable in still air. The distance over a fifty-foot obstacle is quoted as 230 metres.

Going around is a matter of closing the airbrakes, applying the power, climbing away and carrying out the after take-off checks. Despite the small but important complication of the airbrakes there is little height loss.

To shut down, simply close the throttle and switch off the electrics and the magneto. The silly grin eventually fades... until you strap in for the next flight.

The RF-4 is a fascinating aircraft in my own (totally biased) opinion. I can tour in it, aerobat it, glide it or sightsee in it. It is a classic aircraft of beautiful proportions and excellent handling qualities. It's cheap to operate and easy to get out and put away. It would be nice to have electric start but the only real downside is its single seat—or is it? In a word, it's a dream.

By today's standards the glide angle of the RF-4 of 1:20 makes it of little interest for serious use as a motor glider, although in good ridge and wave conditions it is perfectly adequate. What the design has always been is a very economical single-seat touring and aerobatic aircraft that is an absolute delight to fly.


**RF-5**


**RF-5B**


**RF-6B**

over the production leaving Alpavia as the main distributor. A total of 155 RF-4Ds were built by Sportavia. A further, experimental single-seater with six feet shorter wingspan and a Limbach 1700 engine, the RF-7 (F-WPXV), was flown on 27 February 1970 but did not go into production.

Although not a true Fournier, Sportavia produced a dozen examples of the SFS-31 Milan. This was a combination of the RF-4D fuselage and tail with the 15-metre wings of the Scheibe SF-27M glider, and was powered by a Rectimo AR.1200 engine. The prototype D-KORO was flown for the first time on 1 August 1969.

***RF-1*** Prototype only. Single-seat motor glider (25 hp VW). 1960.
***RF-2*** Developed RF-1. Two built (39 hp Rectimo AR.1200). 1962.
***RF-3*** 89 built by Alpavia from 1963 (39 hp Rectimo AR.1200).
***RF-4*** Strengthened RF-3. Three built in 1964.
***RF-4D*** Production by Sportavia-Putzer (155) from 1966.
***RF-5*** Larger tandem two-seat development of RF-4D (65 hp Limbach SL.1700). 127 built by Sportavia from 1968.
***RF-5B*** Bigger wing-span and cut-down rear fuselage, 99 RF-5B Sperbers built by Sportavia and Helwan (Egypt) from 1971.
***RF-6B*** Tricycle undercarriage, side-by-side two-seater. 43 built by Fournier (100 hp R-R Continental O-200A) from 1974. This design led to the composite Slingsby T67.
***RF-6C*** Sportsman, a four-seat development of the RF-6, four built by Sportavia with 150 hp Lycoming O-320-A2B from 1976 and 18 more powerful RS-180s followed.
***RF-7*** Short-span RF-4D with Limbach 1700. 1970.
***RF-8*** Prototype two-seat, tandem, all-metal, tricycle/retractable undercarriage development of RF-4/5 in 1973 (125 hp Lycoming).
***RF-9*** Side-by-side, two-seat motor glider. 14 built from 1978 (68 hp Limbach SL1700E).
***RF-10*** T-tail, plastic-composite development of the RF-9 (80 hp Limbach L2000-EO-1). 13 built in France from 1981-85. Production switched to Aeromot, Brazil where it is in production as the Ximango and Super Ximango (80 hp Rotax 912A).
***RF-47*** Prototype two-seat, side-by-side, low-wing, fixed tricycle undercarriage trainer (90 hp Sauer) flown in 1993.


**RF-9**

**RF-10**