

Fournier's modest MASTERPIECE

The sporty yet frugal RF4D offers 'aerobatics for peanuts,' says our Fournier owner and display pilot, writing about the aviation love of his life

Words: Bob Grimstead



Sportavia in Germany built and sold 155 examples of the RF4D (D for Deutschland), turning them out at an impressive rate of six per month and exporting them to thirty countries worldwide



PHOTO: BOB GRIMSTEAD

Open that throttle wide and lower the nose to hear your puttering Volkswagen's note turn through a thrum to an almost-roar, ease out of the dive, crowd-centre at 300 feet, wings-level and ball-in-the-middle at Vne with that tiny propeller howling, and pull carefully into the widest possible loop with your slipstream dropping to a 30mph sigh as you become inverted and weightless over the top, before moving the stick backwards into your lap to accelerate back down with the green ground expanding in your windscreen. Blast through your triple smoke trails as you keep pulling, but harder this time to make a tighter loop, a quick glance left and right to keep straight and then, as the horizon reappears, check altimeter and ASI. At precisely 75mph and not one hair more, kick the right rudder hard and fiercely yank the stick over into the right corner.

This is the only time you apply full controls in a Fournier, and it results in the most graceful avalanche you've ever witnessed, while white engine smoke momentarily billows around your cockpit and a whiff of burnt baby oil drifts inside. Recovering to level flight, you raise the nose a few degrees and squash that stubby stick against your leg to fly a gentle slow roll, ruddering this way and that with a good push as you pass the inverted, finally lifting your eager little aeroplane's cowlings to the vertical as you look over your right shoulder to concentrate on the wingtip, quickly glancing in



PHOTO: BOB GRIMSTEAD



PHOTO: TIM JOHNSON

at the ASI to see forty mph before kicking full rudder again, but now for a stall turn, swivelling your head forwards as your long wings pivot, and laughing out loud as you glimpse that cloud of bright smoke blowing sideways, spanwise towards your cockpit, proving you got it right. There are your orange-white-orange smoke streams, just twelve metres alongside, so you parallel them precisely to become level. Now you're going downwind so you mustn't hesitate for a millisecond. Confirm airspeed, →

FROM TOP: Bob practising and performing in Australia. His wingtip smoke canisters house marine distress pyrotechnics that burn for three minutes

BELOW: ‘Australian’ RF4D cockpit. Black plunger throttle on the left, thigh-level spoiler lever below that, Citroën brake handle next to slip indicator (inverted slip indicator alongside). Green-topped trim and yellow-handle undercarriage lever on the starboard side

pull to the up-vertical again, check; whack on full right aileron with the stick going gently forwards along your thigh, and hold it until the crowd’s directly behind you. Centralise, hit full rudder and add a touch of opposite aileron then, the moment your pivot stops and you’re pointing straight down, yank and kick again into the three-quarter vertical downward flick-roll – and that’s the most



aerobatic display without losing height, and I shall never, ever tire of flying back and forth through my own smoke trails.

Half-century affair

To my shame, last November I let an important personal anniversary slip by uncelebrated. I remembered it had been fifty years since my airline career began, but I completely forgot about my half-century affair with René Fournier’s graceful aeroplanes.

Before starting employment with BOAC aged 21, I discovered I could jump two grades up the pay scale if I had a dozen more hours, so I joined Sportair at Biggin Hill to gain that time on their inexpensive Fourniers. For a handful of years thereafter I mostly enjoyed the pleasure of flying friends and relatives in Sportair’s tandem, two-seat RF5s. My subsequent association with the marque later waned to the occasional foray in the Tiger Club’s delightful RF4D G-AYHY because it was then, as Fourniers remain today, the cheapest possible way of turning upside-down.

I have always enjoyed looping and rolling, but when, in 2003 I retired from airline flying, I made the conscious decision to perfect my abilities in this proper, three-dimensional sphere of flying. By then I hadn’t flown a Fournier for two decades, but I had happy memories of the RF4D, its strength, grace, economy, excellent visibility and delightful control harmony.

Thus began a seventeen-year love affair with my blue-and-white Fournier, VH-HDO and my later acquisition, the red-and-white G-AWGN (nicknamed ‘Wagon’) – the very Fournier I first soloed fifty years ago.

Why did I choose to improve my aerobatics in an RF4D when there are so many other, apparently more capable aerobatic aeroplanes available? Predominantly because, by a huge margin, the Fournier is cheaper to operate than any other aeroplane with comparable strength and performance. A twenty-minute sortie including seven or eight minutes of full-on, full-throttle, +5/-2g aerobatics costs me about £7 in mogas. Yes, that’s just twenty pounds per hour!

Oh, there are other Volkswagen-powered, semi-aerobatic aeroplanes, but do they have pushrod controls with sealed-for-life bearings? My Fourniers do. Do they have two expensive magnetos to overhaul? Mine have just one. Do they have electrical systems with alternators, starters and batteries that must be maintained and periodically replaced? Mine don’t. How many wheels do you need to service? I have one big and three tiny ones (rollerblade and scooter wheels). And this marque was designed to huge plus twelve G ultimate loads and then proof-loaded to a massive +13.8g before it broke. I say again, nothing so economical is anything like as strong.

Of course, when I’m flying aerobatics before a crowd it doesn’t actually cost me anything at all, because the lovely display organisers reimburse my expenses, which are not inconsiderable despite that engine’s frugality. Six minutes of smoke oil, eight top-quality, three-minute marine distress smokes, a couple of kilogrammes of Roman candles, ‘gerbs’ and waterfalls, igniters, slow match, fireproof tape – it all adds up. And I need all this because, while my aim is to demonstrate the remarkable abilities of this apparently unassuming little aeroplane, like Coliseum audiences of yore, the spectators mostly want spectacle.

So I give them several minutes of the most complex aerobatics I can achieve, trying to incorporate at least one of everything my Fourniers will do (see ‘La carte des acrobaties’ opposite), but finishing with another full minute of pyrotechnics with a final flourish.

It can be a struggle, dragging into the air with less than forty horsepower, a full twelve kilogrammes of smokes and pyrotechnics plus fifteen kilos of fuel and 78kg post-lockdown me, especially from a short, tufty, temporary, airshow strip. So I’m on a personal weight-reduction programme to get back down to 74kg. No beer for Bobby in 2021. Of course I fly displays at much less than the 390kg maximum takeoff mass, but every gramme



counts in a low-power aerobatic performance. When flying internationally though, I can load ten kilos of clothes, camping gear and food in the baggage compartment plus full fuel and even a little more in a flexible auxiliary tank. Wagon is also a competent European tourer.

That is what my beautiful Fourniers mean to me; but what would you think of them?

Not difficult but different

First you should understand that, while they are no more difficult to fly than any other aeroplane (and nicer than most) they are definitely different. Any number of hours in an undemanding nosewheeler will not prepare you for such low mass and lively responses. Indeed, the more metal nosewheel hours you have, the more challenging you may find a Fournier.

Before tackling one you will of course need a tailwheel rating, but that’s not an issue because any pilot of skill and dedication would already have one. And don’t expect simply to jump in and go. The ideal preparation would be a few dual hours in its tandem, two-seat sibling, the RF5: otherwise, the Chipmunk is a good primer.

Unfortunately, because some CAA bumpkin lumped Fourniers into the Self-Launching Motor-Glider (SLMG) category back in the mid-eighties, you will also need a Touring Motor Glider (TMG) rating or a cheaper SLMG

logbook sign-off. Why, when it’s so obviously not a glider, despite its long wings (actually similar to a PA-28’s or C172’s) did the RF4D get forced into that SLMG category? Because it only has one magneto. British certification was approved on the basis of ‘equivalent safety’ meaning, while the chance of engine failure might be infinitesimally greater, it’s so aerodynamically clean you have a much bigger radius of action to find a useful field. And, landing with the wheel retracted, you need only two fuselage lengths to stop. Don’t worry about damaging the belly. Two stout skids underneath will prevent that.

In fact, I do have a secondary electronic ignition system available, made and certified →

ABOVE: ‘British Fournier’ G-AWGN’s similar original Day VFR instrument fit

Nothing so economical is anything like as strong...

La carte des acrobaties

Feasible RF4D aerobatic manoeuvres* (in an approximate order of challenge): Wing-overs, Ballistic Rolls, Spins, Slow Rolls, Super-Slow Rolls, Two, four and eight-point Hesitation Rolls, Loops, Barrel Rolls, Quarter-Clovers (rolling upwards and downwards), Canopy up and down humpty-bumps, Rolls-off-the-Top, Vertical quarter and half Rolls (up & down), Stall Turns (right and left), Half-Cubans, Reverse Half-Cubans, Two-point reverse half-Cubans, Quarter, Half, Three-quarter and Full Flick Rolls, Avalanches, Split-Ss, Rolling Turns and circles, Tailslides.

*What is actually allowed depends on certification/ approval - and, as ever, what you should attempt depends on your level of skill and training – Ed.

PHOTO: KAREN GRIMSTEAD



ABOVE: it may look unconventional but this is the easiest and safest way to hand-swing the prop to start the Fournier's little VW engine

by an established Australian company, but of course that doesn't count in Britain where such things have to be gold-plated. It would only need a couple of days to install and test, but the laborious and time-consuming LAA approval process might take many months, so I stick with the lower performance, reduced redundancy and theoretical reduced safety of that single magneto.

What else is 'different'? Well, not much really. Its modified Volkswagen engine doesn't sound like a Lycoming, Continental or Rotax, and revs a bit higher than the first two. It uses spoilers

rather than flaps because it has low drag and stalls so slowly. It's got a retractable undercarriage and you'll need to understand its operation. There is only one mainwheel so there's no differential braking, and there's no real electric system so you start it by twirling the propeller.

Climb the low walkway, swing open that big hinged canopy and step down into the cockpit. It's nicely snug and far from cramped. I've spent over three hours in here on several occasions without discomfort. Everything is precisely where it should be. There's a proper five-point harness; pull it tight

and you really become a part of this magical machine. The short stick's right between your legs; waggle it – it doesn't move far and there's no friction.

A small plunger throttle's on the left sidewall. Under that, beside your thigh, is the spoiler lever. On the left panel are the headset plugs and master switch. On a standard Fournier this only supplies electricity from the small gel-cell battery behind the baggage compartment to the wheel buzzer, stall warning light and their test button (plus radio, if fitted). On mine it also energises the smoke and pyro systems, for which the arming switches and pushbuttons are nearby. I also have a stopwatch for split-second precision.

The rudder pedals are down tunnels either side of the mainwheel housing (called 'the snail' because of its shape) and the ex-Citroën handbrake is below the left panel. On the snail's right flank is the hand-starter lever – used for restarting the engine in flight. Under the panel are remote fuel cock and choke plungers, while the Jodel-type trim lever is below the right longeron. Above that is the canopy jettison lever. Down on the right sidewall, beside your shin, is the long mainwheel retraction lever, while its small locking lever and safety latch are under your knee. Do not fiddle with these on the ground.

Flying instruments are dead ahead, with the magneto switch and two engine dials (oil temperature and pressure) over on the right. This layout is ergonomically perfect. Oh, the fuel gauge? That's outside, directly in front where there's no excuse for missing it. Of the simplest kind, it's a float in the fuel tank with a calibrated wire pushing up through the filler cap. This can be substituted with an aerobatic cap incorporating a ball valve for minimal fuel loss during inverted flight.

Right, so now you've just got comfortable, it's time to set the handbrake (no more than three clicks or it needs adjusting) and clamber out again. That engine won't start itself.

Hand starting a Fournier is much easier than on other



PHOTO: KAREN GRIMSTEAD

VW aero-engines because its Bendix magneto has an impulse mechanism, so you only have to pull the propeller gently downwards through compression after four or five priming suck-ins. For these, I stand in front of the left wing facing forwards and holding back the aeroplane with my right thigh 'just in case'. Then pull the choke right out and close the throttle completely to get maximum suction through the carburettor's venturi past the idle and transition jets for the priming rotations.

Crack the throttle open a few millimetres, switch on the magneto and swing the propeller downwards with your left hand. It should start within a couple of flicks. Remove your hand smartly each time so you don't get rapped over the knuckles. Immediately the engine begins running you can push in the choke, set 1,000rpm and hop back up onto the wing to mount your trusty steed.

Fasten the straps, don your headset, lower and lock the canopy and release the brake; you're in for a treat... Just a

trickle of power gets it moving, and the tailwheel steering is nicely geared and positive, despite its interconnecting springs. Your first turn may startle you as the airframe gently rocks from one outrigger to the other, but you soon get used to that. Its long fuselage can cause weathercocking in a strong wind. If you have trouble taxiing, then don't fly. Later you'll learn tricks for dealing with significant crosswinds.

There is no need for a run-up because of that single magneto, and pre takeoff checks are minimal – ensuring the canopy is locked, the spoilers stowed and the fuel fully turned on being the important ones.

Line up and stop. Before doing anything else, note the attitude. You'll need this later (see 'landing'). I'm tall and have raised my canopies, moved my rudder pedals forwards and my seats back, so for me the cowling top just covers the horizon. Check where yours is.

Now you can gradually open the throttle, add a little left rudder pressure to keep straight (it's a European engine,

remember) and count to three before trying to raise the tail. You have control in all three axes the moment you're facing into wind, but you might need full rudder in a significant crosswind from the right, so there's no need to hurry. Once you're balanced on that central mainwheel, you'll float into the air in that attitude at about 45 mph.

Don't do anything yet; take your time, let the speed build to seventy and gently pitch up into a climb. Once you're sure you could no longer land safely on the remaining runway, give the brake lever a tug to stop the wheel spinning (being sure not to engage its ratchet). Now change hands on the stick, reach down inside your right knee and depress the little trigger on the retraction mechanism. This allows the locking lever to be pulled aft, and that in turn lets the main retraction lever swing backwards. Take advantage of its spring-assisted momentum to push it flat onto the seat beside you, and then finally waggle that small locking lever to ensure the wheel is properly secured. Newcomers may find →

ABOVE: the RF4D's monowheel handling is not difficult, but different and having some taildragger experience helps one master it

Fasten the straps... you are in for a treat...

the Fournier's nose bobbing up and down as they do this because the effort required on the retraction lever is so much more than the elevator needs. It's great spectator sport. Best just to use your fingertips on the stick at all times. These controls are light.

Spitfire-light elevator

Accelerate to eighty mph for good cooling and you'll see a climb rate around 600fpm, so it'll take you five minutes to attain a safe aerobatic height. Now you can get a feel for the controls. The elevator is Spitfire-light, and the ailerons and rudder are only slightly heavier, but the 'feel' is just right. You will notice a slow roll-rate.

Slow, that is, in comparison to a Spitfire or Pitts. It's actually about the same as a PA-28's or Cessna's; it's just that with such sensitive controls in pitch and yaw the ailerons seem less effective.

The biggest thing that struck me on first acquaintance was its superb visibility. After the constraints of Cherokees and Cessnas, the Fournier canopy's all-around vision was a revelation, as was the ability to tilt my head back as far as I could without any part of the airframe impinging on my line of sight. I immediately knew this would be a boon for aerobatics.

Now we're above 3,000 feet, let's accomplish our HASELL checks

and start with some turns. You will need the tiniest bit of coordinating rudder to keep the ball centred (those long wings again) and a trickle more power to maintain height and speed, but otherwise turns of up to sixty degrees of bank are straightforward and instinctive. The visibility for collision-avoidance is exemplary.

After a few turns each way with our head on a swivel we can be certain there's nobody else around so we can throttle back to sample a few stalls. No need to worry about carburettor heat because this carb permanently runs in hot air below the engine. You will however hear an annoying buzzing, accompanied by illumination of the yellow light. This warning happens whenever the throttle is closed or the spoilers opened without the mainwheel being extended.

The Fournier's low drag (both profile and induced) means it takes a while to slow down, but the red warning light will illuminate around fifty mph. The only audio warning is aerodynamic, with the airflow changing through two wing-root cooling vents. As the speed sighs below 45mph the airframe gives a tiny tremor and the nose drops. Even if the slip ball is not quite centred you won't get a wing-drop: that requires gross mis-handling. With spoilers out, the speed is two mph higher. Lowering the wheel makes no difference to either stall speed or handling.

The Flight Manual says 'loss of altitude is about 65 feet'. It also says 'Spins is [sic] allowed, recovery by normal procedure'. Having made hundreds of Fournier spins, some of them with aerodynamic tufts on my wings to see exactly what's happening out there, I can say the RF4D is the most honest and predictable aeroplane I have spun. For a display recovery I apply full opposite rudder, full forward stick and full throttle to end vertically downwards, but that's definitely an advanced technique.

This of course leads on to aerobatics. If you want to know more on this subject, visit YouTube and search for FournierBob. There are lots of clips, also many posts on the Fournier Forum: cfi.america.com and tap the Forum tab.



PHOTO: BOB GRIMSTEAD

BELOW: Bob holds station, line astern, in a RedHawks formation



PHOTO: MATTHEW HILL

There are only two main caveats for flying Fournier aerobatics. Keep the nose high at all times—letting it get low will lead to an overspeed, and it's much easier to recover from a stall than from flutter. The second is to concentrate on fingertip-easing, coaxing and teasing the aeroplane through manoeuvres and figures. Effort is absolutely *not* required. No aerobatic pilot who brags of 'smash' gets anywhere near my aeroplanes! You would be better advised to develop 'safecracker's fingers' by rubbing your fingertips on sandpaper before touching an RF4D's sensitive controls.

No sailplane!

Over its five decades many people have soared Fourniers with their engines stopped. The manual suggests a twenty-to-one glide ratio at 62mph and a minimum sink of 250fpm at 56mph, but it also claims a 690fpm climb rate with the original 1,200cc engine, but that's all sales puff. You need a 1,400cc engine and Hercules propeller to achieve 600fpm, while a sixteen-to-one glide ratio is the best I've achieved at 65mph, although I have timed the *inverted* glide at exactly 500 feet per minute at sixty knots, and did once glide seven miles back from 4,000 feet over the coast to

my Australian base, inverted all the way.

Approaching the circuit, roll erect, flip up that ignition switch, pull the hand-starter and get the engine going again. Fly downwind at around seventy mph. You can go faster, but you'll have to slow down to extend the wheel, its limit being 68mph. Close the throttle, note the horn, reach down, pull the little trigger and move the small lever rearwards. The wheel will fall and you only have to push the big lever forwards to lock it. Do not push it with your foot, because they are tubular and have been known to buckle. The horn's silence is no confirmation; it only tells you the wheel is up, not that it's down, so do check it's locked by wiggling the locking lever.

Now you can speed up again because there is no limit with the wheel locked down. This is good because although the manual quotes 56mph for the approach, I never fly final at less than seventy, and often more, depending on wind velocity and turbulence, because of the Fournier's low mass and power.

Once you're in a good position to glide in, close the throttle and open the spoilers. Grip that lever firmly because the aerodynamics

tend to pull them fully out. They cause very little pitch change, just a bit of a lurch. Then you can modulate your descent angle with the spoiler lever just as you would with a throttle: pull it further back to descend more steeply and vice versa. For a steeper angle still, just sideslip. Plan to arrive over the threshold at around 65mph, wings level and in balance with full spoiler. Then flare and hold off, but not to the stalling attitude, only until the picture's the same as it was before takeoff. Pin that attitude and eventually it will settle on two points.

Now, if there's the right amount of friction in the spoiler linkage you can relinquish that lever and gently pull on the brake while holding back the control column. Some Fourniers' spoilers will pop in as soon as you let go, and you don't want this, so if the system friction's low, hold the lever and be patient. When the aeroplane has slowed below forty mph it won't fly again and you can forget the spoilers to concentrate on braking.

Finally, chug your way back to the hangar and open that Champagne bottle. If you're anything like me, you'll be celebrating the beginning of a lifelong affair with the greatest little aeroplane in the world.

ABOVE: on the approach with the spoilers extended, wool tufts showing how those surfaces do to lift just what their name implies