

# RM Plan Feature

## Your Full-Size Semi-Scale Plan

**Build Peter Miller's  
56" span Fournier  
lookalike for .049  
engines**



# O-Fourier

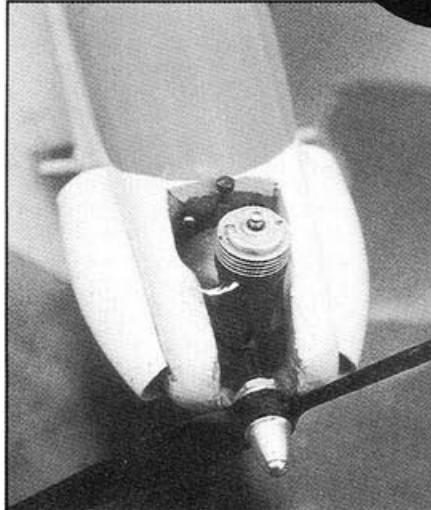
**H**ave you ever seen the aerobatic display put on by the two full-size Fournier powered gliders? The slow, graceful manoeuvres, the incredible mirror flying with the top aircraft inverted on a dead engine. The display was such a contrast to the usual power and fury that it remained in my memory.

Most modellers enjoy aerobatics but many also like to have a chance and do some gentle soaring. I know that I like this variation but quite often I take a vintage model out and then wish I had taken an aerobatic model and vice versa! I wanted to combine the two types of model in one and decided that the Fournier would be an ideal subject. With a .8cc (.049) it would be a reasonable size and yet handy for transporting and could be flown almost anywhere with a PAW 80 Classic.

When I started drawing the model up I realised that there were snags. The fuselage was quite gigantic for a model of this size and the taper on the wing was rather excessive. I slimmed the fuselage down and reduced the taper on the wing. I added strip ailerons for simplicity but I kept the moments about scale, I also increased the tailplane size a little.

The resulting model has managed to keep all the atmosphere of the Fournier while being a more practical model design. The proof of this came when I took it to test at our flying site on a private strip. By sheer coincidence there was a full-size Fournier parked outside the hangar, the model was admired by all the pilots gathered there and no one really noticed the slimming down until it was pointed out to them!

Before beginning building it is important to realise that the scale moments will result



Cox .049 Texaco glow powers the prototype.  
Cowl cheeks house ballast.

in a tail heavy model. Use very light wood for the tail assembly - you could build it up out of strip wood. Do not beef up the rear end and make sure that you can fit a full-size 500 mAh battery in the nose. This is good policy anyway in case you hook a thermal. You will probably still need some lead but more of that later.

### Flying

In common with the sensible practice being adopted by many writers these days, I am going to talk about flying before we get to the construction!

I have three servos fitted on rudder, aileron and elevator. You could use one for throttle instead of rudder or fly the model on aileron and elevator only.

With the Cox Texaco under propped with a 6 x 3.5 Master prop the model is perfectly powered. It will climb steadily to sufficient height for three and a half minutes glide at least and yet it will do loops and rolls and Cuban Eights.

Once the model is trimmed, solo hand launches are easy, the model leaves the hand in a very smooth flat climb, no panic to get the launching hand to the transmitter stick. The launch only needs a gentle push, no running, no Tessa Sanderson imitations.

The ailerons are very effective, the 1/8th movement on low rate is almost too much for gentle soaring. The rudder is very powerful, the given throw of 1in each way could be drastically reduced and I don't use it. Elevators are smooth and powerful.

For an aerobatic flight select high rates for the ailerons. Remember that you are flying on the wing, not the power. The model will not loop right after a roll but you can loop and do a roll straight after that. Loops are straight and round and easy.

Rolls are not so easy. The roll rate is slow; put the model into a shallow dive, pull the nose up to a slight climb and hit the ailerons. Down must be fed in during the inverted part of the roll but take it off again or you finish the roll in a steep dive. OK to do a loop then.

The model has a fast, flat glide which can be made to slow up with about three clicks of up trim. All controls are still powerful on the glide and for soaring low rate should be selected for the aileron. Penetration is quite good.

The one area that needs to be watched is when flying in turbulent air, wind rolling over a hedge or wood. The model can change attitude very fast. I flew over a wood some distance away in a 10mph breeze and

had a worrying few minutes as the model pitched up and down or stood on a wing tip but I got it back safely.

Once you are used to the model you will find that tight turns near the ground can be made but you will need a lot of up elevator - this tends to flatten the turn. Practice at height! Landings are always greasers, it just slides in to a non-bouncing touchdown even on short but rough grass.

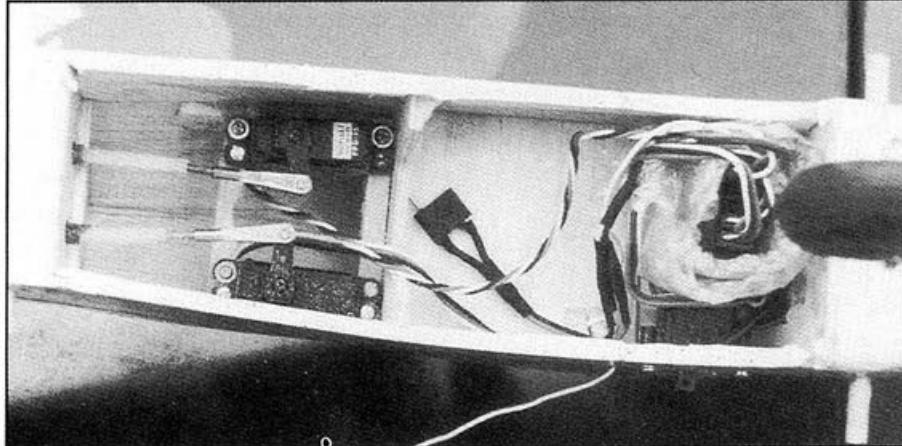
The Texaco starts very easily and the tank gives quite long runs - even under propped I was getting two or three minute runs and a larger prop would improve on this. I spent an afternoon just landing, tanking up and going again, not even switching the radio off - the big battery is worth its weight.

nose into a removable hatch. Any throttle runs should be planned now.

The cowling is made from three pieces of 1/2in sheet. The engine could be mounted sidewinder but I preferred the upright mounting because the needle valve and filler would still have required a hole in the top and any throttle connections would be simpler. Also the tank could be right up in the top of the nose, leaving more room for a battery underneath.

Do not make the applecheeks at this stage. These are made and fitted last of all because that is the only place to put any needed lead. I actually cast lead applecheeks, about 1.1/2 ounces each, and then glued some cut up wheel plants over them.

The canopy can be a commercial item. I



## Fuselage

The fuselage is very simple to build. Choose firm or even hard 1/16th sheet for the sides as there are no longerons. Fit the 1/32nd ply doublers; I use Thixofix contact adhesive as it does allow some repositioning.

Glue F-2a to F-2, mount the undercarriage leg with saddles or by sewing with thread, then join the sides with this former and F-3. Do make sure that everything is square at this stage.

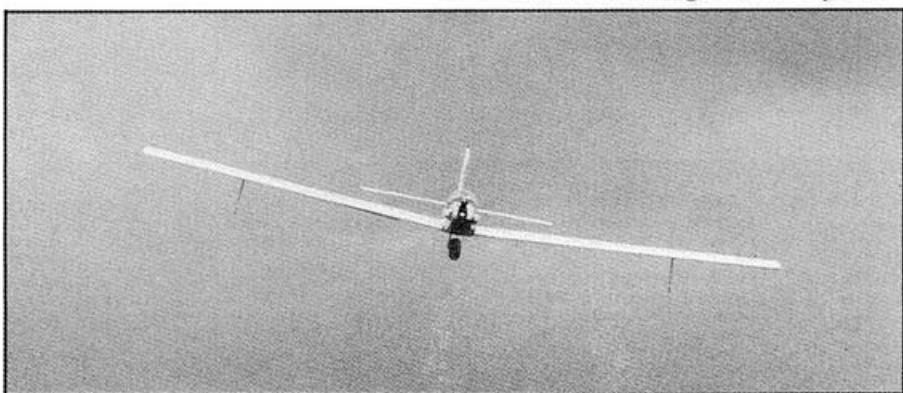
Join the fuselage at the rear and then fit the remaining formers. When these have set fit F-1 holding the nose together with elastic bands. Make sure that F-1 is square (you do not need any side thrust) then add triangular stock reinforcement behind F-1 and in front of F-2.

Fit the 3/16th square stringer down the spine and cover the rear top fuselage with soft 1/16th sheet and the nose with soft 3/32nd sheet. Add the tailplane platform and 3/32nd sheet treblers at the wing seat, also the cockpit floor but do not extend this right to the front of the cockpit, or you will not be able to get the battery into the hole in F-2 at a later stage.

At this point fit the snake outers for the tail controls. I use a length of sharpened tube to make the holes in the formers but go gently or you could crack them. The fuselage rear bottom sheet can now be fitted and then the tailplane and fin can be glued on. Small fairing blocks are added each side of the fin.

If one of the Cox engines with integral tank is going to be fitted, now is the time to drill the pilot holes. If another engine is to be used then the mount can be fitted now. Provision for a tank has to be made in the front bay and this may mean fitting a flat battery pack and making the bottom of the

Prototype used Fleet micro R/C but standard size gear for aileron/elevator would be fine.



cut up a Co-op 2 litre lemonade bottle as my favourite soft drink (7-UP) bottle was not the right shape! This is cheaper than a canopy anyway. Then, when I was looking for a pilot in my scrapheap, I found a perfect canopy from some ancient wreck. The fuselage is now ready for covering.

## Wings

The wings have a modified Clark Y section and are very straightforward to build. The ribs are laid out on the plan so that they can be photocopied and then either stuck down to the wood or the lines transferred by taking a dark copy and placing it copy down on the wood and ironing it down with a hot iron. Cut the ribs a little oversize to allow for any distortion in the copying process.

The lower L.E. (leading edge) sheeting is pinned down to the plan and the 3/16th square spar is glued to it. Glue all the ribs to the spar and L.E. sheet and then glue the

1/8 x 1/4 L.E. to the sheet and the ribs. Add the top spar.

Glue the 1/8th sheet T.E. (trailing edge) to the rear of the ribs and when this has dried glue the top L.E. sheet down. At this stage the small hardwood blocks can be glued in to take the outriggers.

The wing can now be taken from the board and any surplus L.E. sheet trimmed back. Fit the centre section sheet and the 1/8th L.E. capstrip and the 1/4 sheet tip.

Build the second wing in the same way. Trim and sand both roots smooth and check that they fit with little or no gap. Fit the wings together accurately at the root and join with sticky tape along the bottom of the join. Make certain that you have a perfect match. Fold the wings down and coat both root ribs with five minute epoxy and fold the wings back up until the ribs are together. Prop up at the correct dihedral angle. **MAKE CERTAIN THAT THE ROOT RIBS ARE STILL MATCHED.**

When the epoxy has set cut out the servo bay and fit a servo rail against the spar. With the covering, this joint is quite adequate if properly made.

The short lengths of T.E. can be fitted at the root. The ailerons are top hinged and so the torque rods are fitted flush with the top surface of the wing. The ailerons are 3/4 x 1/4 T.E. stock; choose medium to soft material. Chamfer the front to allow for the downward movement of the aileron. Now cut a groove in the top of the aileron to take the torque rod and cover this groove with a piece of 1/32nd ply. If the edges are chamfered it is hardly noticeable. When the aileron is fitted this arrangement will allow for the slight clearance needed at the torque rod as the aileron moves.

Check that the wings are not warped at

*Looks convincing, doesn't she! Liberties taken with true scale outline hardly notice in flight...*

this stage; slight washout is acceptable as this will be induced at the covering stage anyway.

## Tail surfaces

Tail surfaces are cut from soft 1/8 sheet and if this is very soft it should be edged with hard 1/8th square. The elevators have plates of 1/64th ply glued to them where the joiner goes which also act as reinforcement for the horn. Similar plates are glued to the bottom of the rudder.

## Covering

I covered the model with Solarfilm; one could use Fibafilm for the wings and Litespan for the rest of the model. I used Solartrim for the decoration and added trim lines from car trim tape which was left over

from my 'Yuppy Love' design. I put two strips along the L.E. to act as turbulator strips but I don't know if they worked because I have not flown the model without them!

It is at this stage that it is possible to induce slight washout on both wings, about 3/16th of an inch at each tip. The model was not designed to have washout but one wing had some so I added it to the other. All good scientific stuff here!

### Installation

I used Fleet micro radio and fitted rudder, elevator and aileron control; it would have been quite easy to add throttle if I had needed it. The model will fly very nicely on aileron and elevator control so a two channel set would be fine. The aileron servo goes in the usual place, the other servos fit up



behind F-3 to clear the aileron control runs.

With two channel radio the elevator servo could be fitted across the fuselage against the rear of F-3. The Rx goes against the rear of F-2 and the battery, as has been mentioned, goes in the nose bay.

With all the radio fitted and the engine installed, check the balance. It should be on the main spar. Now add lead to the nose until the model balances in the correct place. Make the applecheeks, either from balsa or

from the Chart Micro Mold items, glue the lead inside them and glue them in turn to the nose of the model.

Drill the holes for the outriggers; these are made from snake inner cables which can be of the thinner variety as they only have to support the model and need to flex on grass.

Charge the batteries and you are now ready to go flying!

### The last word

This model has all the character and performance of the full-size aircraft; it looks pretty in the air and the flying gives one the choice of quiet soaring or some more lively flying. All this from a model that is cheap to build, easy to transport, economical to operate and very pleasant and easy to fly. I know that mine is really going to rack up the hours!

