The Fournier RF4D powered sailplane is an ideal single channel sport machine for after work relaxation.

FOURNIER RF4D

A SINGLE CHANNEL, .020 POWERED SAILPLANE FOR RELAXED FLYING

BY BOB PECK

The Fournier model is a dream – it has clean flowing lines, cowled in engine, and flys as good as it looks. The model started a couple of years ago when I saw an article on the Fournier in *AOPA Pilot Magazine* and I wrote to Phil Paul of Aero Sport in Lanchester, California, who represents Sportavia, the German company that manufacturers the Fournier plane. Phil was able to obtain some 1/20 scale three view drawings of the Fournier RF4D, from the factory in Germany, which I used to make my 1/10 scale drawings.

The full size plane was designed in France and is built in Germany by Sportavia. It is a single seater with a single retractable main wheel and small outriggers on each wing. It is powered by a .40HP Volkswagen engine which gets her up where the fun begins.

The RF4D is stressed for aerobatics except for certain high speed manuevers and has a glide ratio of 20 to 1, which is good considering it is carrying the extra weight of an engine. Its cruise speed is 112 mph and stall speed is 40 mph.

It was in a Fournier RF4D that the Czech pilot, Mira Slovak, made the outstanding flight of 8500 miles from West Germany to California only to crash on his final landing in California where he was very nearly killed.

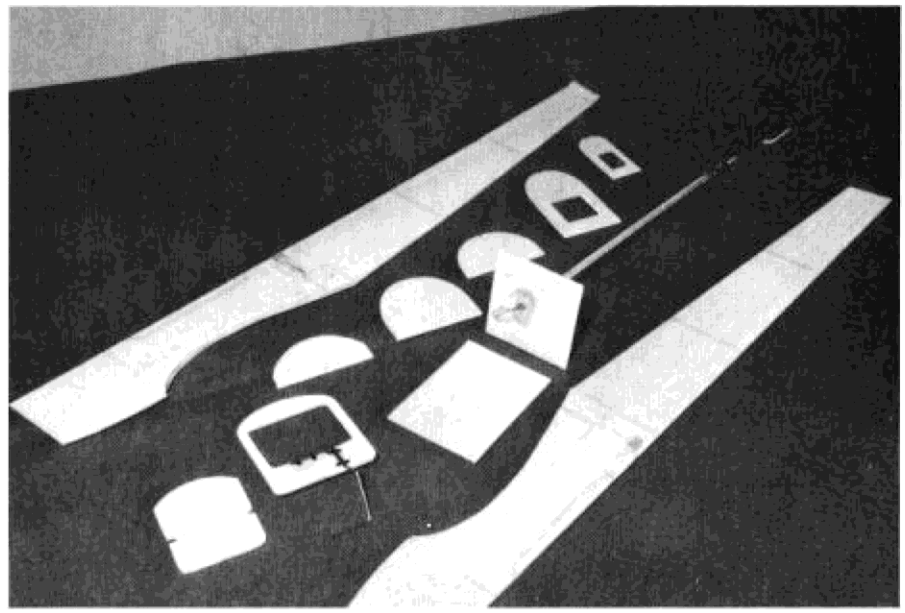
The model presented here is exact scale except for an enlarged stab and rudder, slightly increased dihedral, and balanced rudder design. I used the balanced rudder to reduce the load on the Baby Adams actuator. I also used the Ace Baby RO pulse radio system which weighs about 3 oz. The complete plane with Cox Tee Dee .020 weighs 10 oz. With 182 square inch wing area, this weight gives a fairly low wing loading for good soaring. Some readers may like to use a lightweight galloping ghost system such as the Ace Mini-GG actuator to have rudder and elevator control.

CONSTRUCTION

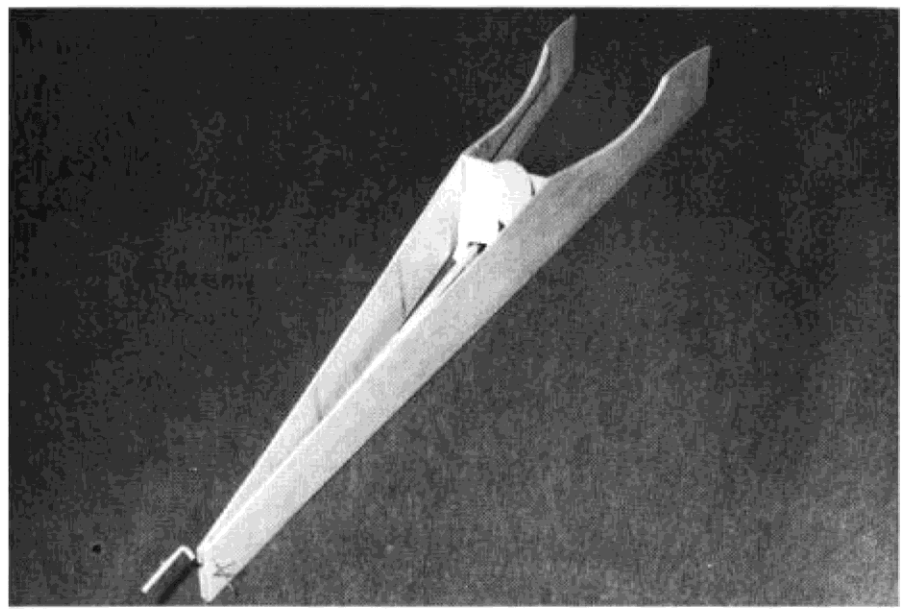
The wing is built in three sections:

Right, left and center. Cover the bottom of the center section with 1/32" sheet balsa at this time. Choose hard straight balsa for the wing spars and leading and trailing edges, so that you don't build in any warp problems. I like to install the antenna in the wing for a neater appearing finished model. When building the left wing, lay thin hookup wire in the notch for the top spar before installing the spar, itself, leaving about 6 inches hanging out the wing root to run through the center section and up to the radio. Solder a connector pin, removed from an old connector, to the end of the wire for the disconnect to the receiver. Cement the wings to the center section with 2½" dihedral under each wing. Gusset all spars at the dihedral breaks using plenty of glue and then sheet the top center section. Next, add the wing skids and epoxy in place. Cover the wing with light silkspan and apply four coats of thinned down clear dope and two coats of colored trim.

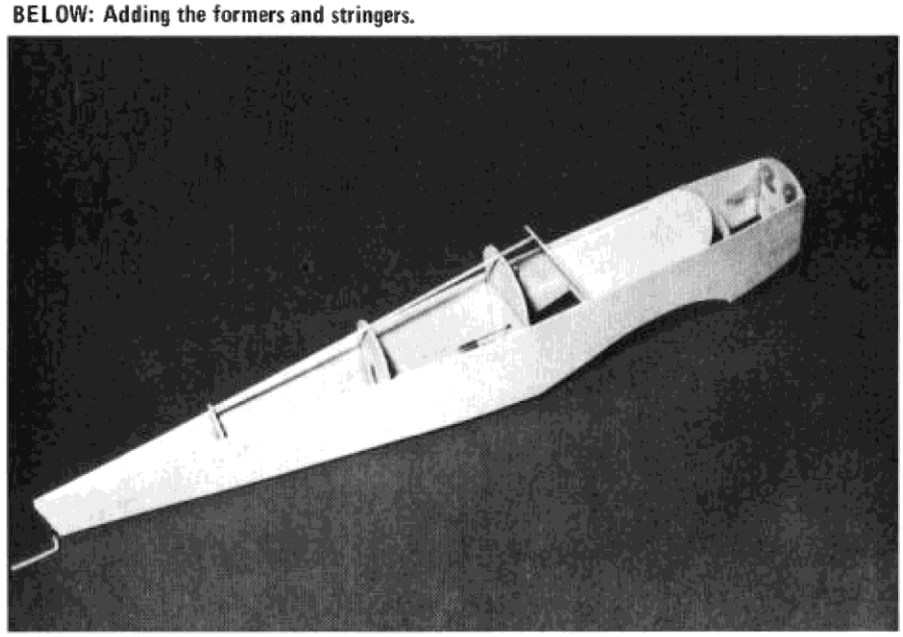
The stabilizer and rudder are made of 3/32" light but firm balsa. The stab will require splicing the trailing edge to the main section if 3" wide sheet is used. I use nylon hinges on the rudder as I believe they make the most reliable hinge when properly installed. It is important that the control linkage not have the least bit of binding and works freely but not sloppily. Before installing the hinges, drill a slightly oversized hole in the hinge half which has only one pin retainer on it. This will help to make the hinge work freely, especially if there is any misalignment during assembly. Cement the hinges and 0.030 music wire control linkage in place with epoxy. Build the fuselage from light firm balsa, first cutting out the fuselage sides. Choose the firewall outline to fit the engine you are going to use – F1-A for the Pee Wee .020 or F1-B for the Tee Dee .020. Trim the front of the right fuselage side 1/16" shorter than the left in order to have the proper right thrust built in. Mark the former positions on the inside of the sides and glue on F9 and F10. Before assembling the fuselage, build the 1/8" square hard balsa torque rod integrally with F3 as follows: Install the bearing in former F3 and insert the wire part through the bearing in F3 and bind it with thread to the torque rod. Also attach the wire part at the other end of the torque rod at this time. The idea is to build the torque rod in from the beginning of the fuselage construction. Building upside down, glue

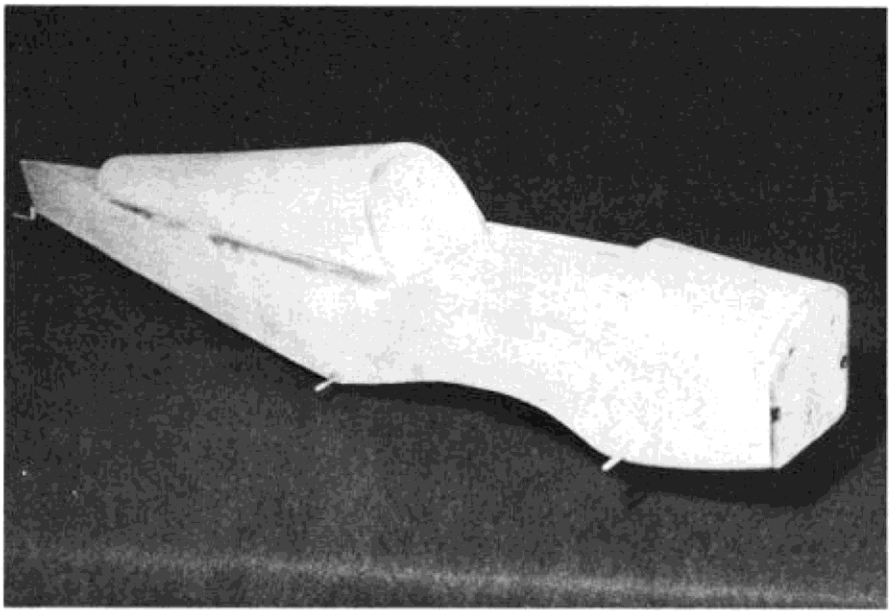


ABOVE: All of the fuselage parts ready for assembly. BELOW: Joining the sides.

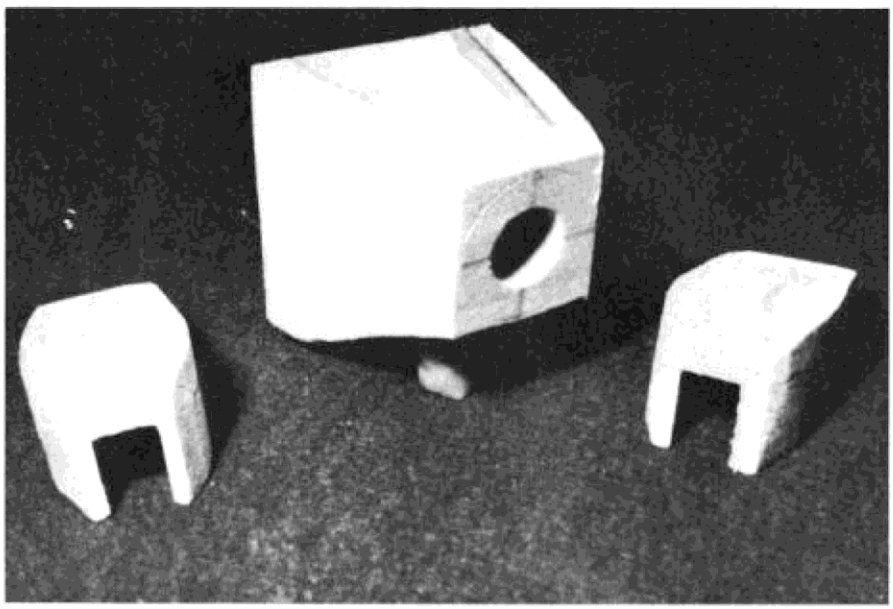


BELOW: Adding the formers and stringers.

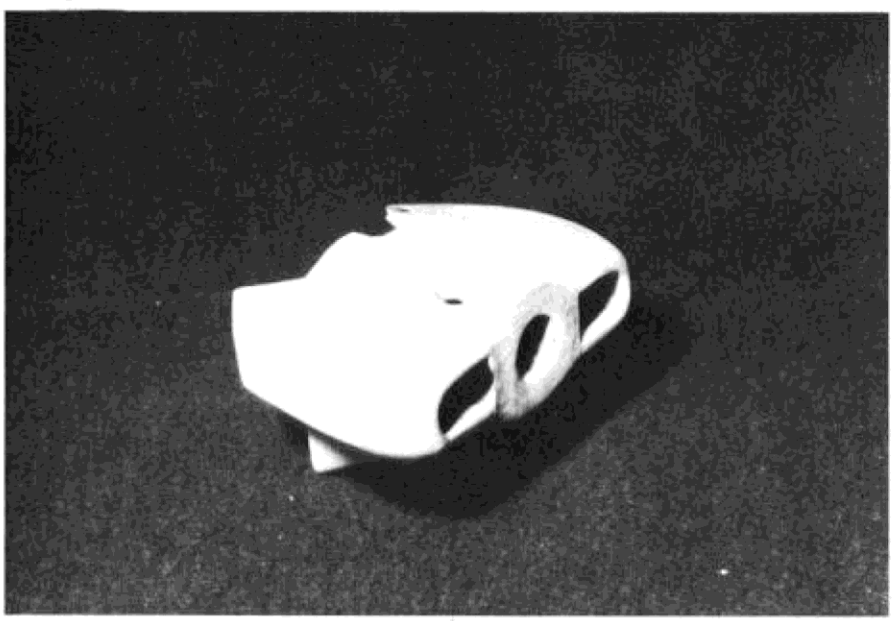




ABOVE: Cowl and turtledeck sheeting in place.



ABOVE: Rough shaped cowl and cheek blocks. BELOW: Assembled cowl ready for final sanding.



the back edges of the fuselage sides together with the torque rod in place and F4 and F5 strung loosely on the rod. Cement the bottom section of F3 in place. Check that the rod moves freely and that all parts are lined up; then let dry. Now add the rest of the formers and sheet the top and bottom. Cement formers F1 and F2 with epoxy and also epoxy in pieces of fuel line for the cowl attachments. Epoxy the 2-56 nuts on the back side of F1 for the motor mounting screws.

Be sure not to glue the actuator mount F10 since it is designed to be removable. Attach the Baby Adams actuator to F10 with thread and glue. Cover the actuator arm with shrink, or teflon, tubing so as not to have any metal to metal contact in the control linkage. Also, cover the arm with tubing at the rear of the torque rod for the same reason.

Glue on the rudder and stab and fair in the rudder to the fuselage with soft balsa blocks. Also glue on the canopy now, feathering the edges to blend in with the fuselage. Mask the canopy to protect it during the finishing process. Apply two coats of sanding sealer, sanding between coats, then spray two coats of color and two coats of trim.

In order to start the engine with the cowling in place, mount a small two-pin connector at the bottom of F1. Make glow plug clips from .025 music wire and wire to the two pin connector.

The cowl is built in three pieces: The center and the two side nacelles, all built up from 5/16" sheet balsa. Start by making the cowl attachment wires and pressing them into the fuel line at F1. Now glue together the pieces for the rough center section and carve the inside to fit the cowl. Attach the wires, and tack glue to the wires still in place at F1 and let dry. Now carefully remove the cowl from the fuselage and thoroughly epoxy the wires in place. After they are dry, fit the cowl back on the front of the plane and trim to fit with F1. Next the nacelles, each of which is made from three pieces of 5/16" and glued to the center section. Now finish the outside shape, then hollow the inside as necessary to fit the engine and to provide good air flow. Finish with two coats of fiberglass resin to help strengthen it for those rough landings. Sand and paint with two coats of colored dope and trim. After all trimming is complete, paint the fuselage

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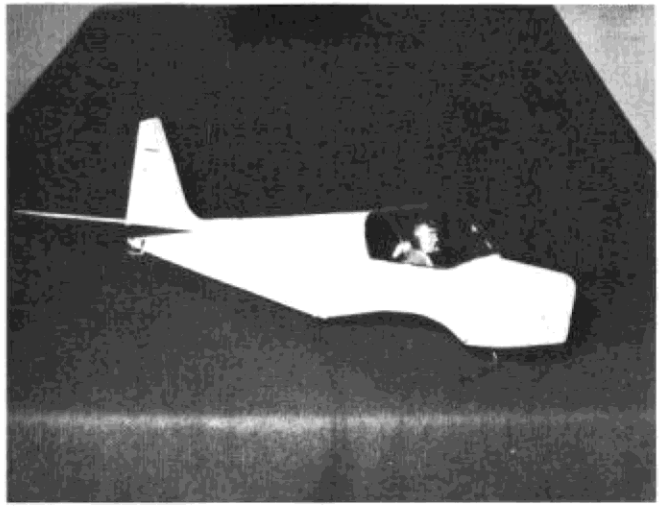
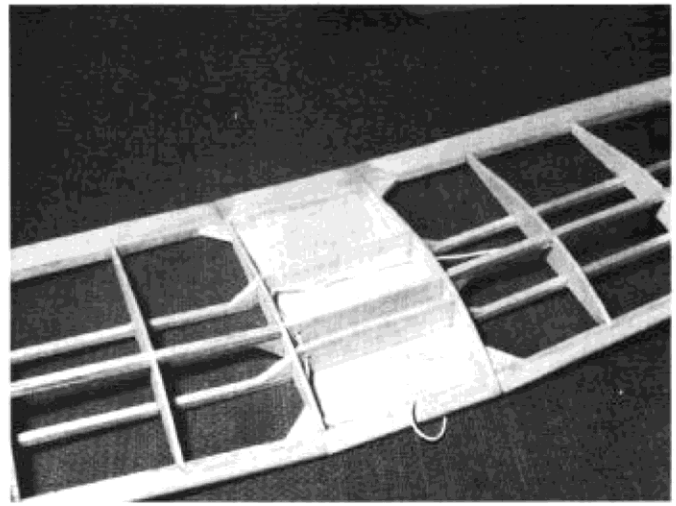
and cowl with a single coat of clear dope.

Install the radio as shown on the drawings with the 225 mah nickel cadmium batteries surrounded in foam rubber and stuffed up behind the firewall. You may still have to add some weight to the nose to obtain the proper balance.

Be sure to rotate the gas tank 90 degrees before mounting the engine. You may have to do a little looking to find a 1" diameter spinner as there does not seem to be anyone manufacturing the smaller size spinners at the present time – there are a few still around at the model shops, though. I hope some manufacturer will take note of this and come up with some spinners for the .010 to .049 size engines as the trend is towards more R/C planes in this size. If necessary you can make a spinner out of balsa or use the Cox 5728 rubber spinner.



Completely assembled fuselage (less cowl).



Center section of wing showing internal antenna.

Before flying, check the plane to see that all the flying surfaces are properly aligned and free of warps. If there are any warps, steam them out or apply another coat of dope and pin the wing with a little opposite warp while it dries to straighten it out. Check to see that the control linkages work freely with no binding and your Baby Adams will work like a charm. Test glide your Fournier with the radio working and adjust for a smooth straight glide.

Okay, let's see what she will do! Note, if you're using the Cox Tee Dee, put the 4½-2 prop on backwards (I didn't the first flight and she climbed nearly out of sight even with a lot of turning to keep her down). Putting the prop on backwards makes a surprisingly big difference in thrust. You will probably want to experiment with various fuels and props to fit your plane.

Flying should be easy as the Fournier is very stable and forgiving to any mistakes. I would be interested in hearing about your model or if you have any questions write me: Bob Peck, 6274 Lake Arago, San Diego, California 92119. □