FOKKER D-VII

Now here's a model to grace your flying field. With its illustrious history, fine choice of colour schemes, delightful flying manners and interesting outlines, you can't fail to have fun with this ship.

Because she is such a sweet flier, it is really satisfying to put the D VII in the air just to listen to her putter around. I can't say I do that all the time though. In fact, just because of her lovely flying manners and amiable personality, I find I can't resist aerobatting her all through a flight, beginning with a hammerhead right after take-off and carrying on from there with all manner of things.

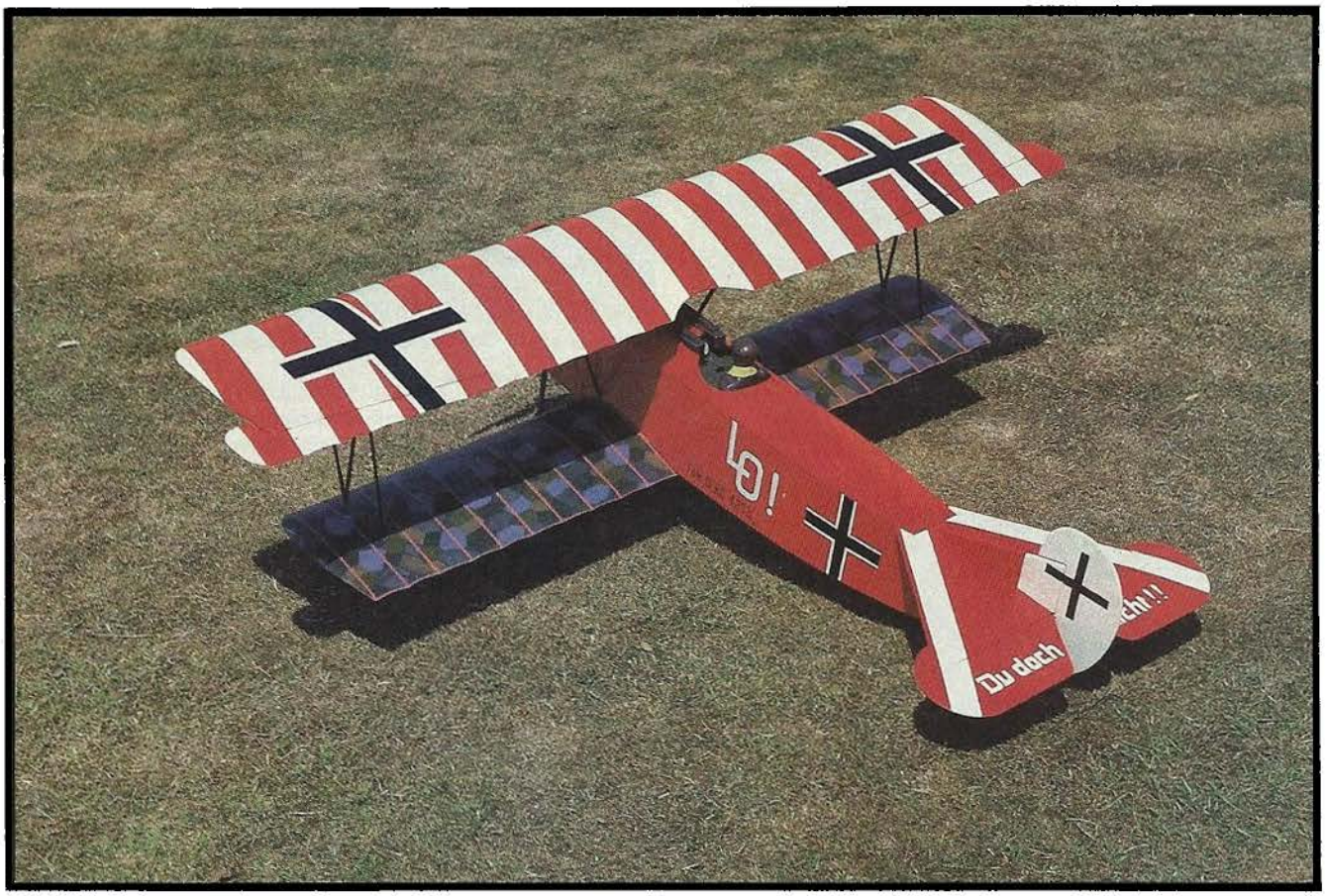
Before I go any further, I should make a comment about the lozenge pattern which is well nigh obligatory for a Fokker D VII. I've put lozenges on D VII's before, and the thought of going through "all that" again with a fine brush and lots of paint pots encouraged me to tackle the problem in a sensible way. After researching all the worthwhile sources of information I could discover, I decided that the most effective way to apply the pattern would be to prepare stencils and spray the lozenges, using my Badger 200 Air Brush. And, by gosh, the system worked. The method is not overly complicated, but its description is longer than can be accommodated here, so is the subject of a separate article.

CONSTRUCTION

Fuselage:

Initially you need to make up a side frame by pinning down the spruce longerons and gluing the balsa nose sheeting in place, followed by the uprights and diagonal bracing strips. The diagonal bracing is set back from

By Gordon E. Whitehead



Anthony Fokker's remarkable WW I Bipe brought back to life for .40-.48 4-strokes. The ultimate in small scale satisfaction!

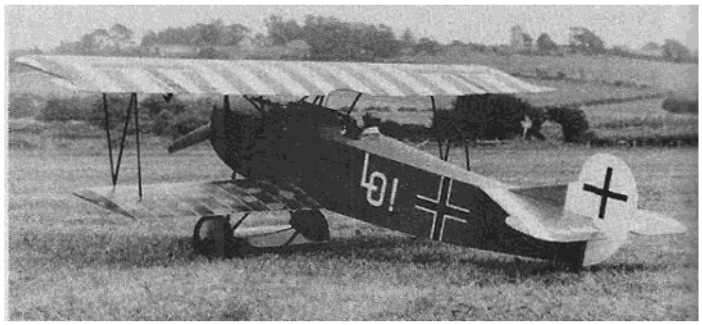
the "covering" side of the side frame, so that it won't show through when fabric is applied. Incidentally, it is scale for the uprights to show through the covering, so smooth them over with sandpaper. When the first side is complete, build the second one on top so that it is identical, remembering to "hand" the diagonal bracing.

When the glue is set, separate the two sides using a fine blade if necessary. Sand both sides of each frame flat, then glue the ply doublers in place followed by the beech engine bearers. Cut off the detachable cowl portions. Now join the fuselage sides using F2, F3, Z1 and F5, checking for squareness. When the glue has set, pull the tail end together and glue the stern posts, adding the rear cross braces subsequently. The ply cockpit plate (which carries the switch, charging socket and pilot on my model) and engine plate are added next.

There is plenty of wire bending to do now. I find that the best technique is to start at the middle of each piece of wire, and work out to the ends, completing corresponding "opposite" bends one after the other.

When you have bent all the centre section and landing gear struts, bind them to their respective formers, but don't glue them yet. Note that each S1 passes through a hole in the fuselage side and is screwed to the engine plate. Former Z2 has S4 and LG2 bound to it. Epoxy Z2 to the fuselage. Now bind all the wire joints with light copper or iron wire as shown on the plans. You can solder the landing gear leg and axle joint. Make up two support frames for the centre section top runners and pin them to the fuselage, one at the front and one at the back of each runner. Solder the wire joints. Now epoxy all the thread binding and add Z3.

Lean aggressive lines of DVII.



Another static view emphasizing the clean lines.

Now add F1, the 1/2" sheet cowling bottom and its triangular gussets, followed by the 1/16" ply and 3/16" balsa sheet in front of and behind the lower centre section cut-out. Bind and epoxy the tail skid to its ply plate, and epoxy the assembly in place. The wing bolt anchor can be added now, and also the remainder of the top sheeting.

The removable portion of the cowling is now made. Now tack glue the cowl sides previously cut away, back in position. Make up a front nose block using laminations of scrap balsa sheet if desired. Cut the nose block to the shape of the front view, then, in plan view, shape it to profile (1) shown on the plan. Then cut back the top section above the engine shaft hole to the shape of profile (2). Blend the two cross sections smoothly together, and ensure that the narrow centre portion is kept flat along with the shaft surround. Cut out the air hole for engine cooling, and recess the dummy radiator portion for the wire mesh. Cut the bottom of the cowl off, then tack glue the cowl front halves back together so that the whole lot can be glued on the front of the fuselage, not forgetting the 3/16" triangular corner gusset. Add the 3/32" dummy engine base plate, followed by C1 and the left and right hand top blocks. Now carve and sand these blocks, and the front block, to blend into each other. Also shape the bottom front block. However, before you do this operation, cut out the left and right hand aluminum side panels, and position them against the sides so that you can mark their bottom edges with pencil lines. Carve and sand the bottom cowling up to these lines. The side panels engage round the struts S1. The cut between hole and panel edge is scale.

The dummy Mercedes engine is fairly self-explanatory. Use grain filler on each component, sanded smooth, before finally gluing the lot together. The rear set valve gear on the Enya limits you to four dummy cylinders. However, the O.S. and Saito front mounted valves may allow five dummies to be employed.

The cowling is held in place with dress snaps and pegs, which can be fitted at this stage. The radiator is simulated with aluminum expanded mesh, of the type used for auto body fibreglass repairs.

The axle fairing, louvred side panels and guns can be made now, but not permanently fitted. Sufficient detail is on the plan concerning these items.

For added realism, after covering and doping the fuselage (but before painting), you can panel the turtledeck between C1 and F6 in litho plate or plasticard, which is bent down over the top longeron for about 1/8".

Gliding in for a dead stick landing.

FOKKER D-VII

Designed By:
Gordon Whitehead
TYPE AIRCRAFT
Scale Biplane (WWI)
WINGSPAN
52½ Inches
WING CHORD
Upper 9½", Lower 7¼"
TOTAL WING AREA
716 Sq. In.
WING LOCATION
Biplane
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
None
O.A. FUSELAGE LENGTH
41 Inches
RADIO COMPARTMENT SIZE
(L) 5½" x (W) 3½" x (H) 4"
STABILIZER SPAN
17½ Inches
STABILIZER CHORD (incl. elev.)
7½ Inches (Avg.)
STABILIZER AREA
131 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8 Inches
VERTICAL FIN WIDTH (incl. rud.)
10½ Inches (Max.)
REC. ENGINE SIZE
.40-.46 4-stroke
FUEL TANK SIZE
4 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply & Spruce
Wing	Balsa & Spruce
Empennage	Balsa
Wt. Ready To Fly	**80 Oz.**
Wing Loading	**16 Oz./Sq. Ft.**

Tail Group:

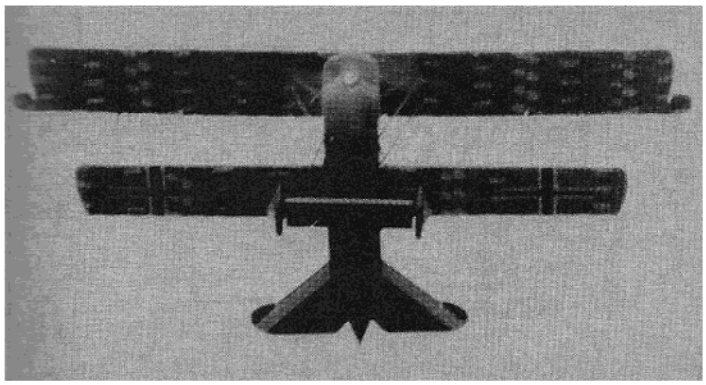
The tail components use a central 1/32" balsa sheet substrate cut to the full outline, which is ribbed and edged on both sides with 1/8" balsa. With this plane I made the fin separately from the rudder, but made the stab and elevators in one piece, separating after sanding to shape.

Initially, join 1/32" sheet, edge to edge, using Scotch Tape. Hinge the joint open and smear a light coating of glue along the edge. Pin down the sheet to dry. Then remove the tape and cut out the sheet to the outlines of the respective surfaces. Glue the requisite 1/8" sheet and strip on one side, pinning down to dry. When set, sand the exposed surfaces smooth, turn over the assembly, and build the opposite side. You can curve the strip round the tips by wetting it and feeding it between thumb and forefinger while nicking the inside of the bend with your thumb nail. Note the cross sections, particularly how the elevators and rudder thin towards their trailing edges. Also note the cross section of the leading edge of the stab.

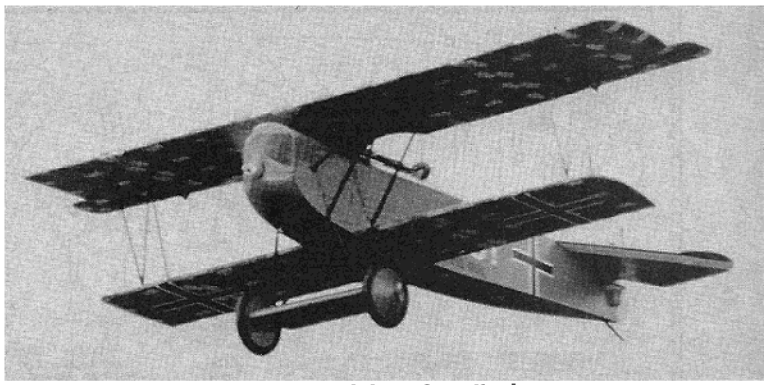
Take your time and get it right. I spent a couple of hours in the R.A.F. Museum at Hendon noting such details as these cross sections, the shapes of the cowling panels, and not least the fact that it is scale for the rear turtledeck to sag between formers. I noted lots of other things such as cowling fasteners, etc., but, frankly, on a small sport job I'm not convinced that such detail is essential.

Lower Wings:

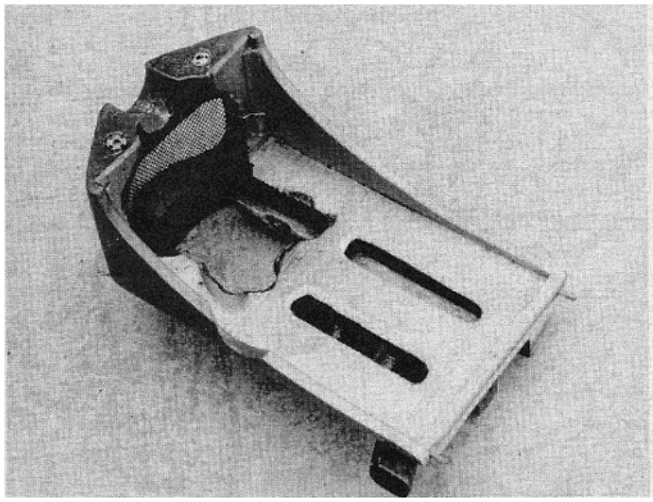
First prepare the T.E. by cutting out



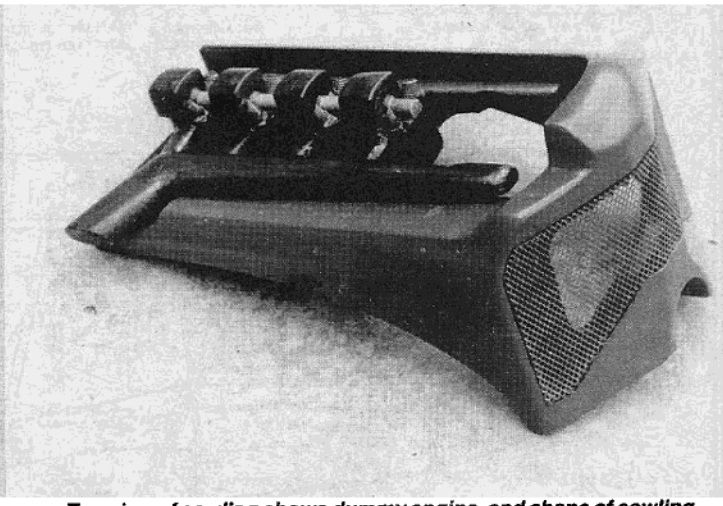
The unique Fokker planform shows up well in this view and shows its ability to prop-hang.



Your club field really needs one of these beauties!



Detachable cowling showing snap fasteners and cooling slots.

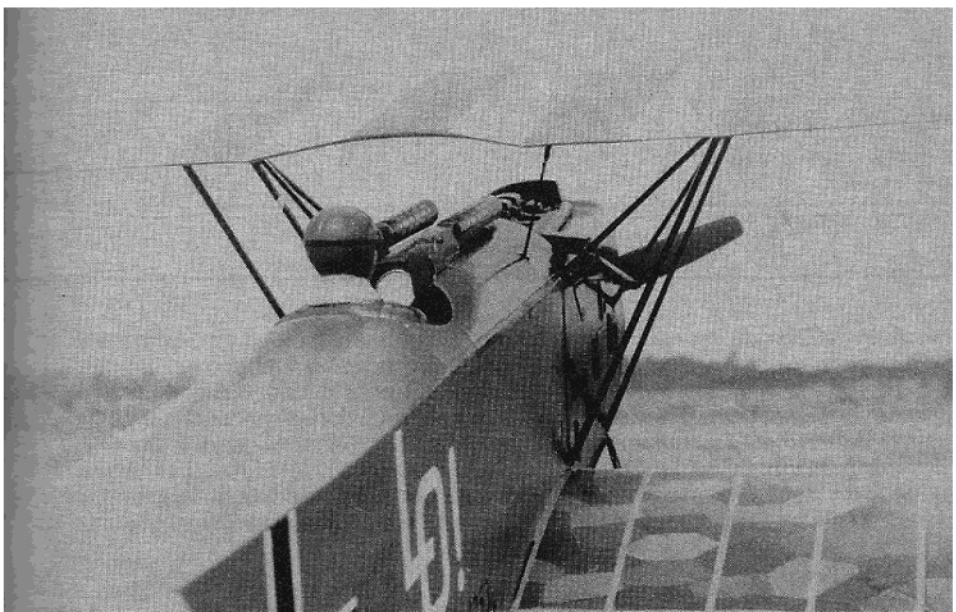


Top view of cowling shows dummy engine, and shape of cowling on exhaust side.

a 3/4" wide strip of spruce from a sheet. Then cut out the scallops round an 8" diameter object such as a sandwich plate. Pin down the bottom spars and the T.E. on the plan and glue the ribs in place followed by the 1/8" sheet false L.E. and top spars. Add the top spar doublers for the interplane strut fastenings; you could beef up the underside of these areas as well with a 1/16" ply plate, as you are going to recess the dress snaps into the spars. Make the opposite wing and then join both panels with the centre section, propping up the tips until the top surface of the wings has zero dihedral. Then add the L.E. sheet, L.E. strip, tips, and T.E. capping strip. Sand the L.E. and tips to shape. Then carve and sand the lower surface of the T.E. to meet the scallops, and gently sand the T.E. capping strip to section. Although the T.E. undersurface becomes slightly reflexed, when the wings are covered and doped, this feature is not noticeable, and the T.E. looks like a genuine stretched wire one.

The dress snaps are epoxied into recesses in the top spars before covering the wings, taking care not to epoxy up the retaining springs.

This could be you. Build one!



Top Wings:

The top wing panels and centre section are built and joined in the same manner as for the lower wing. The ailerons are built separately. You will have to dampen the centre section under sheeting to make it more pliable, as it has to arch upwards to conform to the bottom profile of ribs U1A.

Once you have a complete wing, add the front centre section mounting plate to which the tubes have been bound and epoxied, and the rear plates as yet undrilled. Place the top wing on its centre section mounting, and check its alignment before marking the positions of the bolt holes in the rear mounting plates using the "P" clip holes as a guide. Drill the plates and fit the captive nuts.

Now fit the ailerons and the three bell cranks and linkage wires.

Position the aileron servo in the fuselage and bolt the top wing in place. Centralize the ailerons and the servo, and make up the servo link with a soldered clevis at one end and a screw-on one at the other to allow for adjustment. This initial setting up can be achieved before covering, and before the aileron hinges are epoxied.

The interplane strut dress snaps are now recessed into the lower spars, and epoxied in place. Then you can make up the interplane struts themselves.

Covering & Finishing:

My prototype was covered with Solartex iron-on fabric. A coat of clear dope was then brushed on to provide a base for the colour. After covering, the fuselage nose block and sheeting were sealed with doped-on tissue followed by sanding sealer. Then the louvred side panels and metal top front decking are glued in place, using contact adhesive. Next comes the strut fairings which are epoxied to the wire and wrapped in tissue which is doped in place. The colour scheme was sprayed on using cellulose. The fuel proofer was egg shell polyurethane.

Installation:

The exhaust exits through an extended non-scale pipe as you will note from the photos. If you opt for a scale exhaust manifold, take care not to let the exhaust pipe touch any part of the model or it will burn the wood — 4-stroke exhaust is **hot**.

In the photos, the throttle servo is shown alongside the tank compartment. However, I have relocated this servo back on the 3-servo mount and also moved the receiver and batteries rearwards as I wanted to shift the balance point towards the rear. The C.G. shown on the plan is a very safe position and the model will stand it being up to 1/4" further rearwards. But for first flights use the plan location.

Flying:

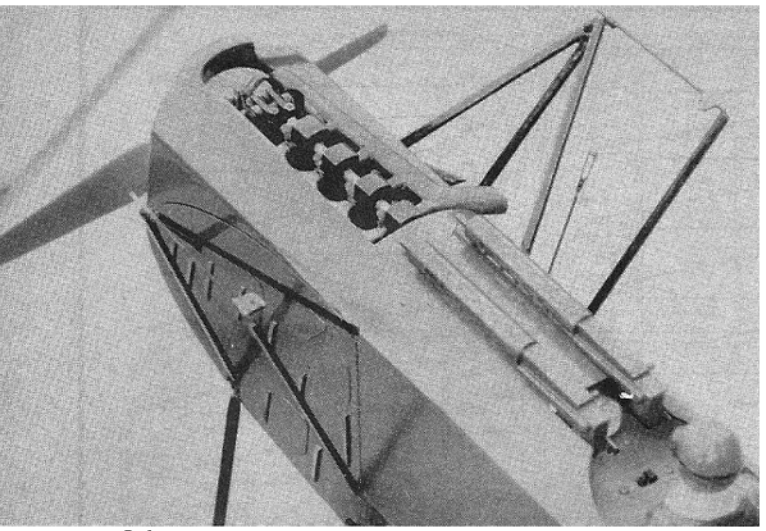
The normal flying trim with my D VII is a touch of right aileron with slight down trim. In the upper speed range, she is quite responsive to the controls, while at the lower end, control response reduces and coarser stick movements can be necessary. The model is positively stable in the looping plane, and will extract itself from a dive. However, the ship is pretty well neutrally stable about the rolling axis and will remain banked after an initial aileron input. So if she gets into a spiral dive, then she'll stay in it.

There is a slight amount of adverse yaw with aileron, especially to the right when torque helps aileron drag to resist the turn; so you need to be prepared to assist a banked turn with rudder. In fact, you can actually steer with rudder, just using ailerons to maintain bank angle.

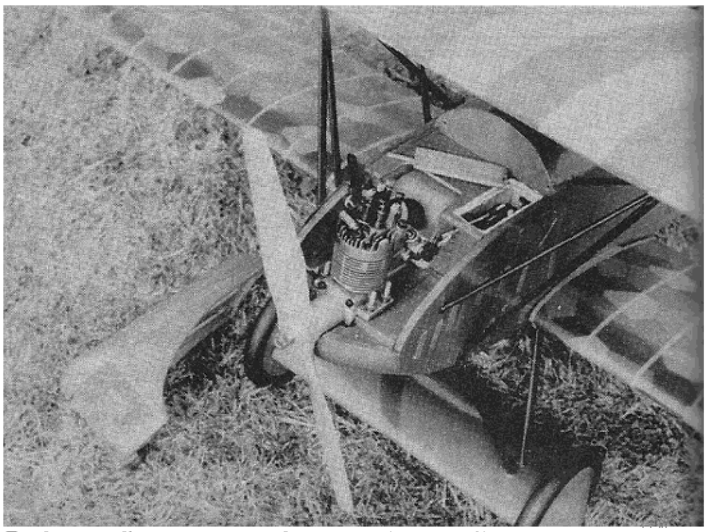
She is quite a slow flier, and is a real floater. Using full power at take-off, she reaches flying speed in three to four yards, and at this stage will break ground and get airborne for no reason at all, without you having to make any real effort. However, although the machine is easy to get off the ground, this does not mean that you can point the nose up and bore into the heavens. This is the kind of plane you fly up there. You select a reasonable climb angle, and wait for her to attain the height you want. This is great, because while she's motoring on up you can admire her.

Too staid, huh? Right! So immediately after take-off, and at about six feet altitude, hold her level for about twenty yards at full throttle. Then nose her up gently vertical. When she's almost stopped, throw

From RCModeler July 1987



Cabane struts and geared nose detail.



Engine cowling separates along a scale panel line to give first class access. Motor servo has since been moved back into main fuselage compartment.

over the rudder for a hammerhead, holding full throttle on the way down. Having pulled her out of the hammerhead, raise the nose slightly and heave her over in a roll. That should wake the others up! Now you can putter her gently upstairs with a hidden smirk on your face and admire her in her element.

When you start to wring her out, you'll find that although the controls are fairly powerful you need to be firm and patient as she's really quite a veteran. Normal slow rolls need coordinated rudder and elevator to maintain a horizontal attitude, but with practice you will find the 4-point hesitation rolls are really satisfying. Even more fun are 8-point and 16-point rolls. Immelman and Split "S" maneuvres are pretty impressive, both needing coordinated rudder for the roll portion. In the Immelman, don't apply the coordinated rudder until at least 60° of roll from inverted has occurred, otherwise you will find that she will stay inverted and keep you guessing as to what you need to do next.

She doesn't gain much height when pulled up for a hammerhead because of the fairly low power used. So you need to be fairly smart with the sticks. You can get a half vertical roll out of her on the way up, and still have time for a neat stall turn off the top, followed by a half roll on the way down. The last mentioned maneuvre is a nice party piece, but I wouldn't recommend you try it straight from take-off!

The stall is pretty innocuous, and tip stall is totally absent. To enter a spin from the stall, you need to give a burst of full throttle just as you input the control surface commands, to send a blast of slip stream over the rudder and elevators and force her into autorotation. The spin ceases as soon as you release the stick.

Landings are straightforward, and 3-pointers are a regular occurrence with the prototype. When there's a breeze blowing you need to land her dead into wind to avoid a potential ground loop, just like the full size at Rhinebeck. Another thing about landings — you need the slowest tick-over possible. The D VII is as buoyant as an airship and really loves to fly. The difference between landing and missing Mother Earth entirely can be a matter of a few hundred revs, especially if your landing strip slopes like ours does. My father, and clubmate Tom Jackson, were of great assistance with their photographic skills, and the flying shots bear this out. Thanks guys!

You know, no model flying field should be without its Fokker D VII. It's the complete aeroplane, with both charm and aggressive aerobatic potential. Build one!

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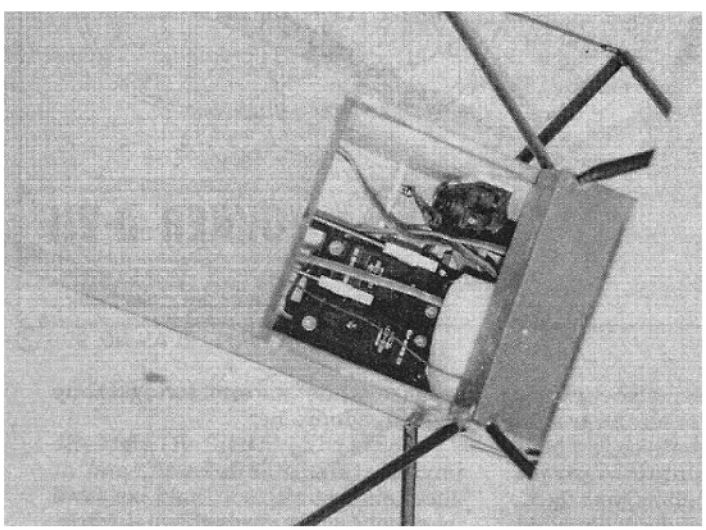
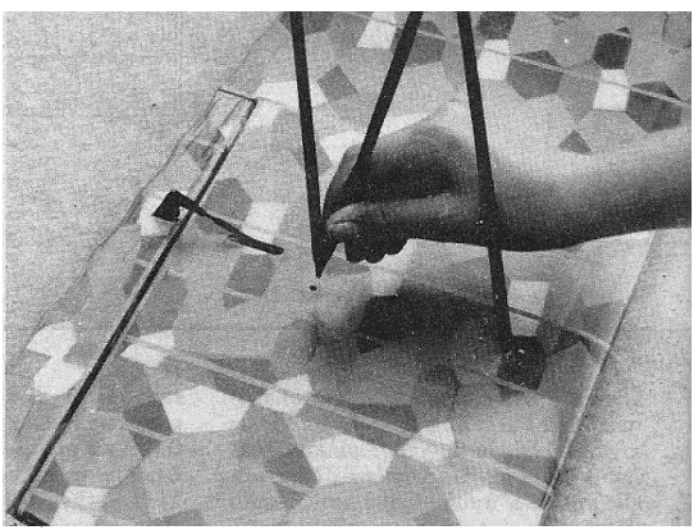


Looking up into radio compartment. Note aileron servo position. White sponge plastic contains Rx.



Neat interplane strut mixing uses dress snaps.