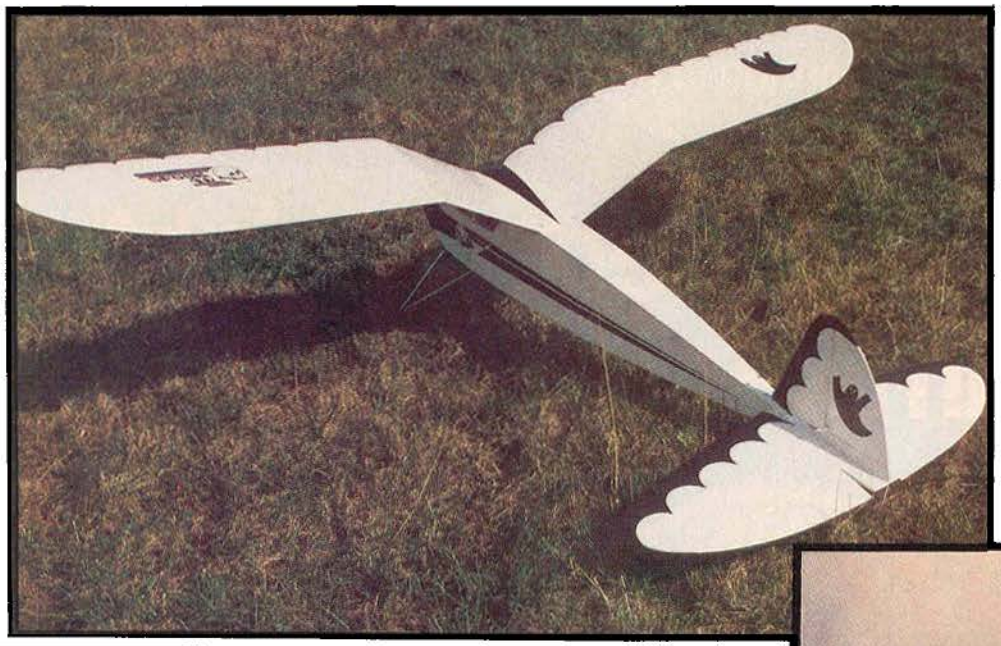
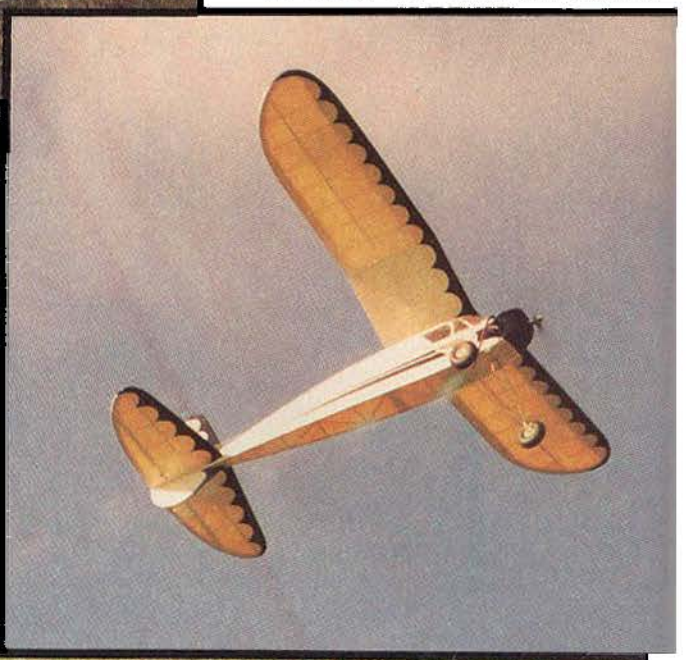


SPOOK

A beautiful twice size 1940 free flight design that is an ideal model to use as a first trainer.

By Lloyd Ressler

We have all noticed the growing trend for scale and sport modelers to have a vintage model in their hangar. The slow stable flying qualities make for a very relaxed flying session on a nice sunny day when one wants a

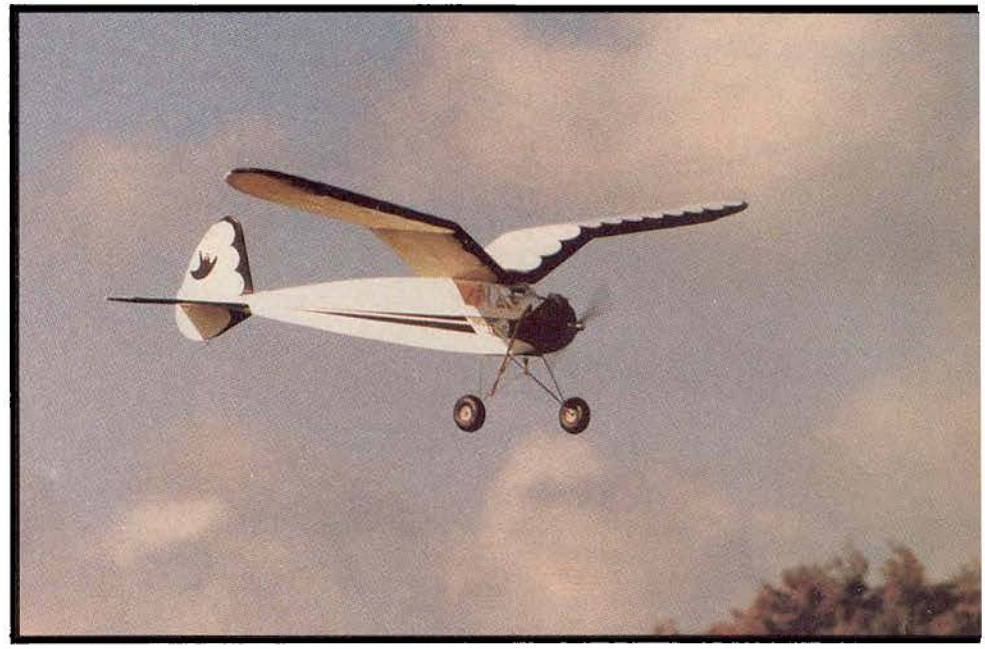


change from fast models that need to be controlled every second. To most of us, all vintage models look alike, as they are all basically the same. Therefore, when I first saw a picture of the Spook I was immediately taken by its graceful lines; the lovely shape of its fuselage and tail are extremely pleasing, but it is its gull wing that is so beautiful. It was different and I thought if it flies as well as it looks it would really be a model to own. Well, I needn't have worried, it really flies great, almost hands-off flying. Loops and touch and go's are easy, as is the landing --- the easiest model I have ever flown. Its large size and gull wing make it extremely stable, even on a windy day. It is an ideal model to use as a first trainer.

I knew I must build one, but the original (designed in 1940 by Barney Snyder and John Muir) was only a 48" wingspan model and designed as a free flight. It had to be very stable to fly on its own, hence its large size stabilizer and gull wing. I love large models, so I decided to redesign it so that it was suitable for radio control, and enlarge it to a 96" model. The wing is in two halves, the undercarriage comes off and the whole tail is detachable, so it will fit into a small car. It's 4' 4" long without its tail section.

Since I wanted the model to be as perfect as possible, I decided to incorporate many features that would improve the Spook and make it a pleasure to set up and fly.

(1) The wing halves are joined by three piano wire rods, and the whole wing hooks onto the front of the cabin and only two short nylon screws hold it all together. I don't like rubber bands on a model — too loose and the wing moves, too tight and it distorts the wing. Also, they get covered with oil and become sticky, and they break just when you have no spares.

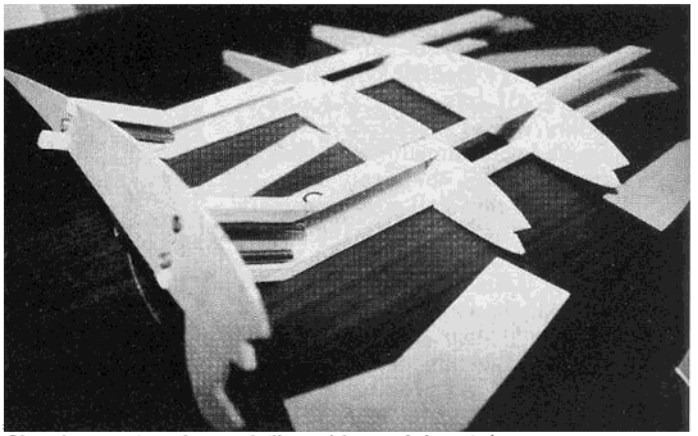


(2) The landing gear is removable and has a rubber band shock absorbing set-up, which will save continually bending the struts. The landing gear is shown on the plan in the "scale" position and in a forward position with larger wheels, which I prefer (no nose-overs for me!). You can take your pick.

(3) The detachable tail is secured by only three screws.

(4) Vintage designs that originally used spark ignition engines frequently had short noses — the Spook is no exception. Engines plus coil and batteries were relatively heavy and often concentrated in the nose area. With a modern 2-stroke engine, or even a 4-stroke design, you will almost certainly find that you have to fit quite a large lump of lead up front to achieve the correct balance. The nose is shown in two positions, the shorter one being the "scale" position. I had to add 13 ozs. of lead to the nose to balance the Spook in spite of using heavy wheels, a 4-stroke engine, and a heavy copper exhaust extension. I have, therefore, shown the nose in a second extended position, which I

Spook showing 4-stroke tank location, copper exhaust pipe, Laser 60 engine, and Spook insignia.

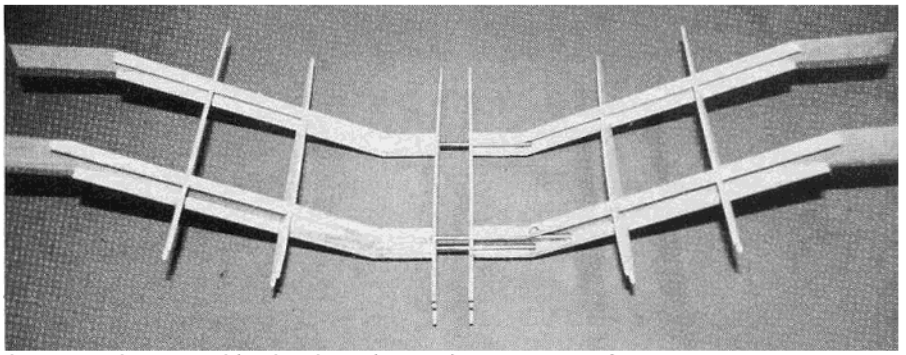


Showing center plywood rib and brass joiner tubes.

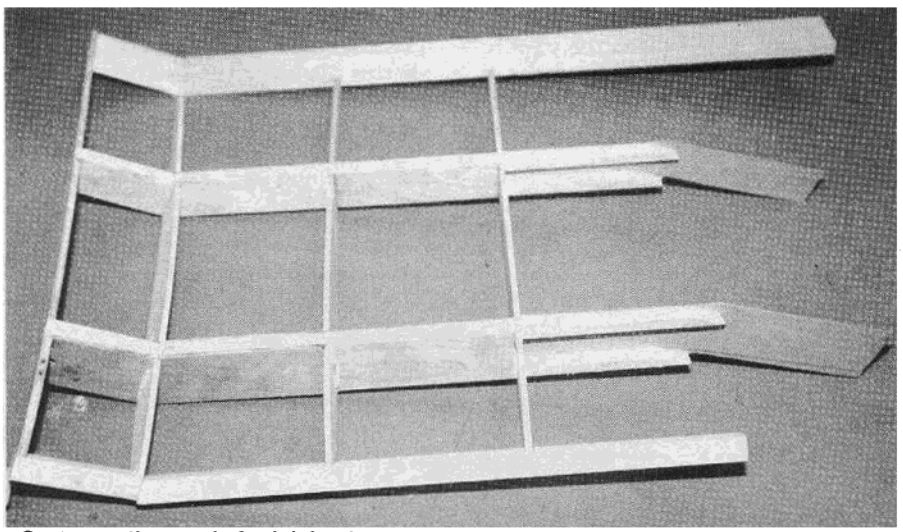
recommend, particularly if you are going to use a 2-stroke engine.

(5) The rudder and elevator are controlled by a pull-pull (closed loop) system. I use a 50 lb. test fishing line by Leeda made out of DuPont's polyester fiber. It does not stretch or act as an antenna and interfere with your radio, and it is very light in weight.

(6) Although mylar hinges are shown on the plans, I do not use them. I make my own hinge the whole length of the control surface out of Solartex or similar. It completely seals the gap and is very free moving. Most important, it is extremely strong and I use this system on all my large scale models (see Covering).



Center section assembly showing tubes and spar construction.



Center section ready for joining to spars.

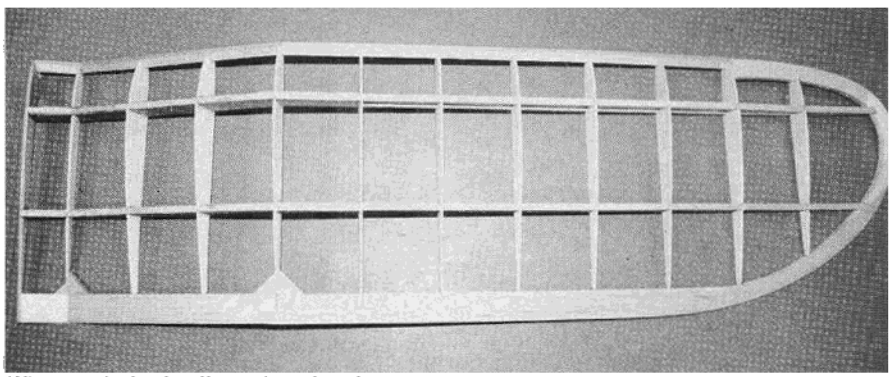
(7) You will note that the engine is mounted on a paxolin plate (aluminum will also do). If you wish to try another engine in the Spook you simply make another plate to fit the new engine.

(8) My Spook has a Laser 60 4-stroke engine, made in England, which is far too powerful for the model, as it flies around on 1/3 throttle, but climbs very steeply on full throttle. Any engine from a 40 to an old 60 2-stroke, or a 48 to 75 4-stroke, will be suitable for the Spook.

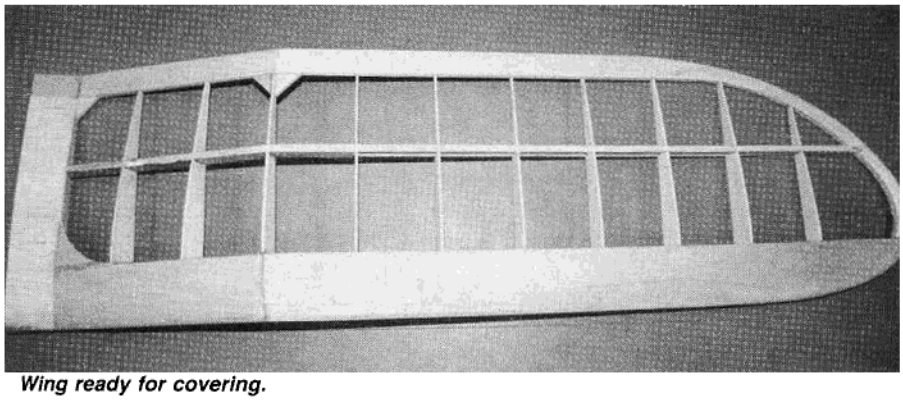
(9) You will see in the photos that I have made a copper exhaust pipe extension to carry away exhaust from the Spook. Also the oil drain from the bottom of the engine flows into the exhaust pipe, keeping the nose compartment clean.

(10) Float planes are becoming very popular and the Spook flies just as well with floats, so I have incorporated a 1/8" ply plate in the fuselage so that floats may be easily attached without modification at a later date.

(11) Vintage (old time) models are notoriously difficult to turn while taxiing using rudder only, so I made the tail skid turn with the rudder, and now ground handling is much easier. I would have liked to have a tail wheel,



Wing ready for leading edge sheeting.



Wing ready for covering.

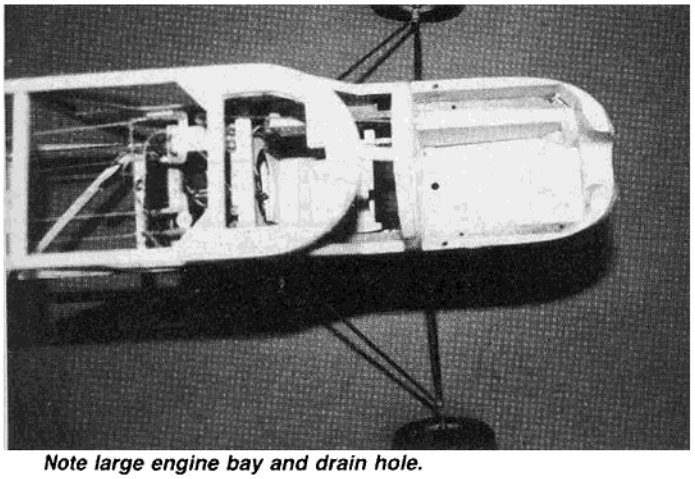
engine, and a good idea for all glow models.

Well then, now that you feel you must own and fly a Spook, let's get started. Most of the model is constructed from 5/16" sq. balsa. I bought 5/16" sheet and cut it into strips. The fuselage and tail are quite easy to build and should present no problems.

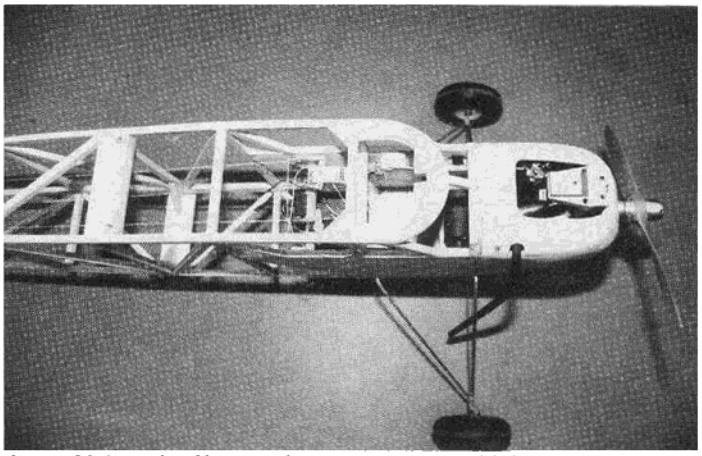
CONSTRUCTION

Wing:

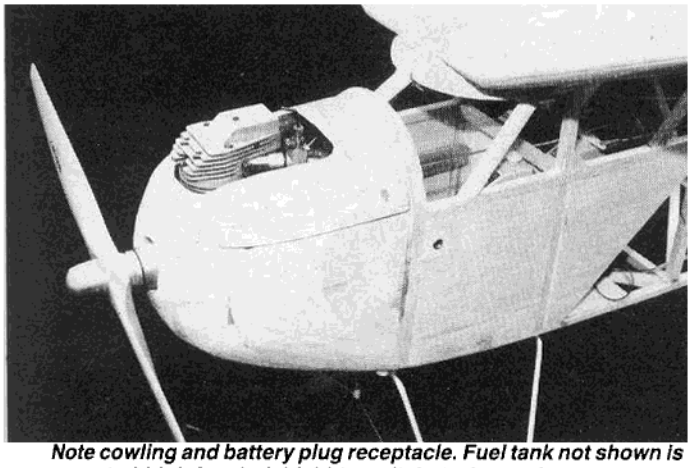
Oh! but the wing, you say, may be very difficult to build. No, I say, it's very easy if you use the wing ribs as



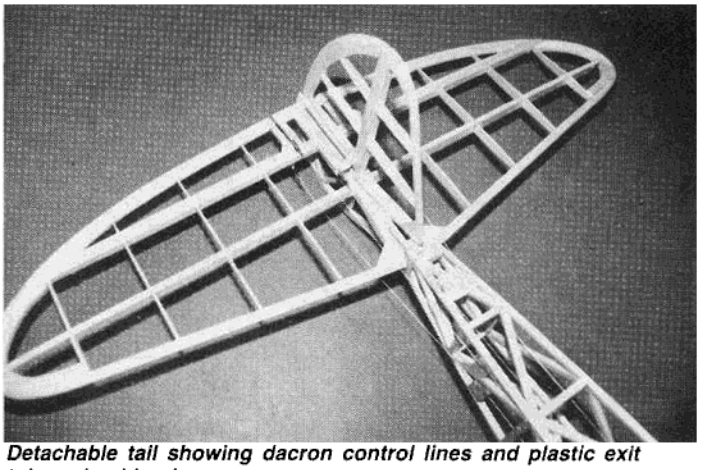
Note large engine bay and drain hole.



Laser 61 4-stroke. Note engine servo mounted high for 4-stroke carb.



Note cowling and battery plug receptacle. Fuel tank not shown is mounted high in windshield to suit 4-stroke engine.



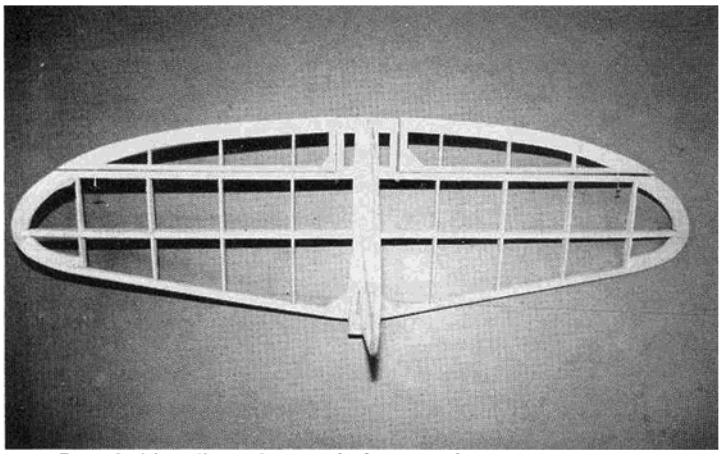
Detachable tail showing dacron control lines and plastic exit tubes glued in place.

but the original Spook had a tail skid, but you can put a wheel on if you so wish.

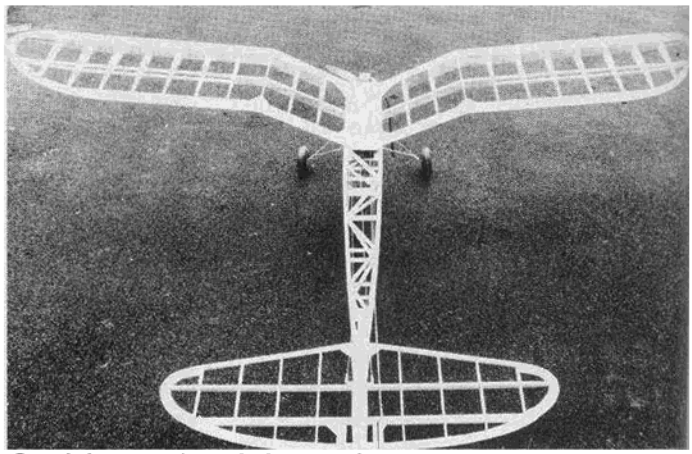
(12) I glue a long length of plastic snake tubing inside the fuselage and always push the receiver antenna down it. This keeps the antenna out of trouble, free from oil, and the model looks neat without it sticking out the top or hanging down.

(13) You will see in the photos that there is a battery plug receptacle to attach an external glow battery — this is necessary with engines that have the glow plug on the front of the

Model with control lines and glow plug jack.



Detachable tail section ready for covering.



Spook framework ready for covering.

jigs and also use a simple wing jig block (see plan). First, make all the plywood dihedral pieces W-7 to W-12 accurately. Next, make 16 W-3 ribs, pin them all together and sand them exactly to the size shown on the plan. Cut the 1/4" slots so that the spars will be a snug fit. Cut out all the other wing parts and make the spars; use two of W-3 as a jig to accurately space the short spars at the center section (see photo). Glue spars to only one side of the ply parts W-7 and W-9. Next add ply rib W-1 and then add the brass wing joiner tubes (see photo). Fill in around the tubes with hard scrap balsa and epoxy. Now you can add the remaining W-7s and W-9s. Add short pieces of leading and trailing edges as shown in the photo, and add Rib W-2. For the long spars, place as many of ribs W-3 as necessary along the long spars to act as spacers and glue the spars to W-10 and W-12. Now add rib W-4. The rest is easy using the wing jig block as a rib spacer. With the center section overhanging the table, slide the ribs up against the wing jig block and, using thick CA, glue the ribs to the spars. The ribs can rapidly be glued in place, then add leading and trailing edges, the wing tips, and the vertical webbing. See the photo of the completed wing ready for covering, except for the 1/8" x 1/2" strip added to the bottom of the wing on both sides of W-4. Drill the holes for the two wing hold-down nylon bolts. There is no washout on the Spook wing, as it is not necessary. There is no need to worry about setting the dihedral angle of the wing as it is already set by the parts W-7 to W-12.

Fuselage:

Glue up two sides identical to each other, by first laying up and pinning the parts on the plan. Make the second side over the first, separating them with plastic wrap. Glue the sides together, using a small square to ensure that all is square. Ignore the removable tail part at this time and build it as a normal model. Install your engine and construct the nose section to suit, as per plan (see photos). See the photo of the top cowl made to fit the engine.

The 12 oz. fuel tank must be located as near to the engine as possible, against the former F1. The height of the tank is determined by the position of the carb on your engine. Read the engine manufacturer's instructions if in doubt. Once the tank is positioned, you can also mount the battery as far forward as possible.

Note: When assembling the forward cabin section, use epoxy cement and be sure that you have good glue joints at all locations. Before covering, temporarily connect the servos to the control lines to the rudder and elevator (control line or plastic coated fishing trace wire may also be used). Slip a piece of plastic tubing on each line. Note where the tubing exits from fuselage and glue it to some 1/8" sheet balsa which is also glued flush to the framework. Now you have neat exit tubes accurately placed for your control lines, and a base in which to attach your covering. When permanently installing the control lines, use standard metal clevises at the servo end, push the line through the threaded hole in the clevis and tie it to itself; a drop of CA secures it (see photos).

At the control horn end, adjustment may be necessary, so drill a small hole in the threaded coupler or solder a hook into the coupler and tie the line to the hook. Use lock nuts on the coupler and the largest servo arms you have. Tie lines with a little tension and CA all knots.

Landing Gear:

The landing gear is conventional except for a cup hook screwed into the plywood plate mounting. Wrap several rubber bands around the spreader bar and hook onto the cup hook. The wheels should toe-in slightly.

Tail Section:

The tail is easy and straightforward to construct as per the plan. The tail is large and you should endeavor to make it as light as possible to avoid having to place too much weight in the nose when balancing the Spook.

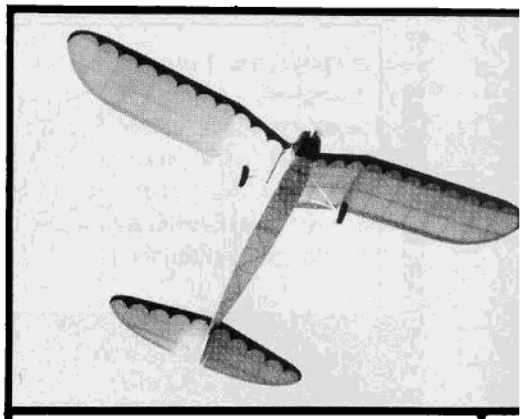
Glue up the stabilizer using the packing strips as shown on the plan. Taper the spars, and sand the ribs and the leading and trailing edges to a streamlined section. You can now glue the stabilizer and fin to the fuselage, making sure of course that all is square and true. Once this is done, you can carefully cut off the tail section with a fine saw.

Glue in the plywood, fuselage, and tail plates and make sure the parts fit together snugly (see photo). Drill the holes for the three screws and add the captive nuts that secure the tail section to the fuselage. Now you can place the wing on the cabin and, using some light cord pinned to one wing tip, measure to the center spar at the stabilizer tip. Do the same for the other side and, when the cord is equal, the wing is in the correct position — nice and square to the stabilizer (which you glued on accurately before, remember!) and the fuselage. Drill the holes through the wing into the plywood plate and attach the wing bolts and the captive nuts.

Covering:

I used Solartex, but any similar woven covering will do. When covering the wing, cover the bottom first and iron onto the bottom of the ribs. I flowed thin CA against the ribs to secure the fabric to the undercamber of the ribs before covering the top of the wing.

To use Solartex as hinges, I cut 1" wide strips the length of each control surface. The hard part is to get someone with a sewing machine to sew the strips together using a polyester thread and a fine stitch. They must be sewn together with the adhesive sides of the fabric facing each other. After



SPOOK 96"
Designed By:
Lloyd Ressler for R/C
Original design by
Barney Snyder & John Muir (1940
TYPE AIRCRAFT
Vintage
WINGSPAN
96 Inches
WING CHORD
14 Inches
TOTAL WING AREA
1288 Sq. In.
WING LOCATION
High Wing
AIRFOIL
Original undercambered
WING PLANFORM
Constant Chord/Gull
DIHEDRAL EACH TIP
10 Inches
O.A. FUSELAGE LENGTH
62 Inches
RADIO COMPARTMENT SIZE
(L) 9" x (W) 4¼" x (H) 5½"
STABILIZER SPAN
42 Inches
STABILIZER CHORD (incl. elev.)
10 Inches (Avg.)
STABILIZER AREA
420 Sq. In.
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
10½ Inches
VERTICAL FIN WIDTH (incl. rud.)
9 Inches (Avg.)
REC. ENGINE SIZE
.40-.60 2-stroke
.48-.78 4-stroke
FUEL TANK SIZE
12 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Spruce & Ply
Empennage ..... Balsa & Ply
Wt. Ready To Fly ... 138 Oz. (8 Lbs. 10 Oz.)
Wing Loading ..... 15½ Oz./Sq. Ft.

all the covering is complete, the Solartex hinge is then applied to the rudder and elevator, and care taken to keep the seam straight and tight as it is heated and shrunk in place. The rudder and elevator are then attached to the stabilizer and fin in the same way. They should move freely but be attached firmly.

Before ironing on the rudder, the tail skid should be inserted into its brass bearings which have to be CA'd into position. The wire is then bent to accept the rudder. Drill a fine hole in the bottom of the rudder and press the tail skid wire into it; the rudder may now be ironed on. All should turn freely.

Cover the model with an iron set at medium heat. After covering, raise the iron to a high heat (set iron temperature using a scrap piece of Solartex and test so that it will not melt the fabric) and reshrink the fabric. Now give it one coat of shrinking dope and then you can decorate it with your favorite paint and fuelproofer as required.

The drawing of the Spook insignia I designed is to complement the original Spook skeleton head insignia; both are shown on the plans and picture.

Flying:

The model weighed 8 lbs. 10 oz. using heavy wheels and a 4-stroke engine, and 13 ozs. of lead in the nose. If you use a 2-stroke engine and light wheels, you will have to put weight in the nose to balance the model, even with the longer nose. Don't worry about the ballast, the wing loading at 15½ oz./sq. ft. is very light for this size model and the extra weight won't be noticed.

If you balance the model as indicated on the plans and set the rudder and elevator throws correctly, the model will fly beautifully right from the start. Point the Spook into the wind and open the throttle slowly, the model should take off in 10 yards or so. Too much throttle will make it climb too steeply and is not advised on the first flight.

Good luck and safe flying. □

From RCModeler May 1990