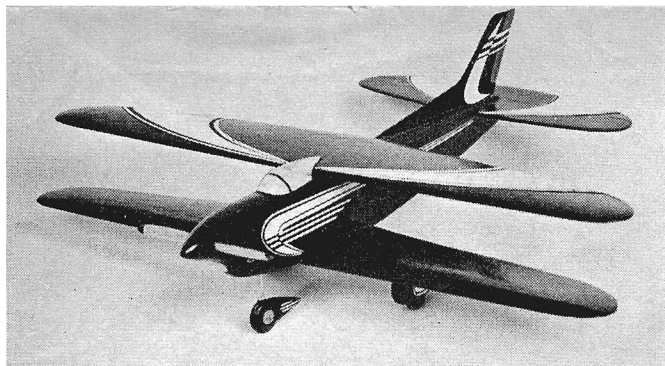
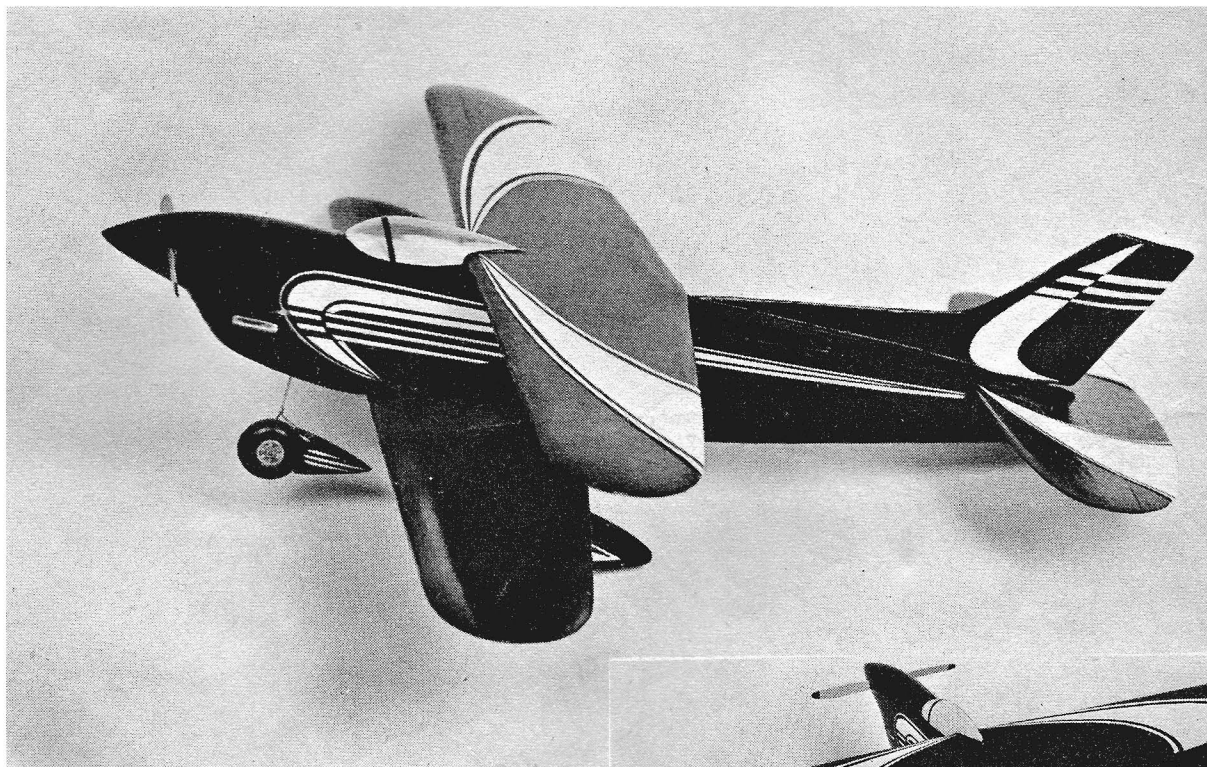




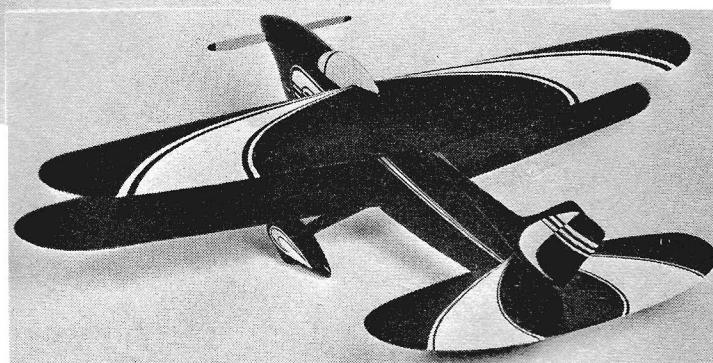
Editing by Hlsat.

BI-LINER

**Ukie ships can get in a square wing rut
but here's a ship to change this trend**



Distinctive models are becoming a scarcity as designers move toward stagnant patterns which tend toward the early "wing on a string" concept. Slick lines, modelling, and the tendency toward aesthetic ships is fast becoming a lost lore. As the photos show, this model is made not to win contests, fly 100 plus or demolish 17 competitors in fast Combat. It's made for the model builder who likes smooth lines and doesn't mind spending a little time to do a fine construction job.



● "Bi-Liner" is an advanced stunt model, designed to perform with the best of them at contests, yet appeal to builders who want a design that is cute and different. "Bi-Liner" definitely is not in the familiar old rut. The use of two wings is an excellent way to utilize a lot of wing area for those square maneuvers and still have a model small enough to transport in the family car.

The wings are staggered, due mostly to nostalgia because we still have a soft spot in our hearts for the old stagger-wing Beechcraft. "Bi-Liner" is the answer to our attempt at capturing the performance and snappy appearance
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of the famous old "Bipes" in a modern up to date stunt design.

Although the span is not too great, due to the two wings, "Bi-Liner" is a big airplane and requires a good engine of at least .35 displacement with plenty of pep to perform a good pattern. A Fox "35" was used on the original. By beefing up the wings and front end through the use of hard balsa, "Bi-Liner" will take up to .49 displacement engines such as the Triumph.

You will notice that the new J. Roberts "Vari-Speed" engine control was used on the original model for greater versatility. This type of engine con-

trol was designed by Bob Smurthwaite, of Baker, Oregon, and has become very popular with the Oregonians. "Vari-Speed" allows complete variation of engine speed control. Engine speed range is unlimited and response is instantaneous. "Vari-Speed" operates with the very lightest touch of control. No springs or gadgetry is involved. "Vari-Speed" is an exhaust engine control. Full information for installation accompanies each unit. Any engine control may be installed, of course. If no engine control is used, install a regular Veco or similar control-line bellcrank.

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BI-LINER

(Continued from Page 13)

Enough talk. Let's start construction immediately by enlarging the plans, and this is not as difficult as it may look. First, get a piece of wrapping paper and enlarge the quarter-scale plans to full size. All ribs are shown full size. To get the complete templates for the ribs and bulkheads, the "fold and trace" method is used. Fold some tracing paper and place the fold on the centerline on the plan. Then, trace the outline of the ribs, cut out the traced outline, and unfold the paper. Easy, isn't it?

FUSELAGE: First, lay out two sides, using $\frac{3}{16}$ " square hard balsa. Fill in the sides with $\frac{3}{16}$ " sheet balsa to former No. 1. Then, connect the sides together with $\frac{3}{16}$ " square crosspieces, cement all bulkheads into position and then add the planking. Seven $\frac{1}{8}$ " stringers fair the top rear of the fuselage.

Cut the team-racer type rear gear from 24-ST aluminum, and bolt it to the $\frac{1}{8}$ " plywood anchor. The nose gear is formed from $\frac{1}{8}$ " piano wire and held to the firewall with "J" bolts or commercial clamps.

The 7" x $\frac{3}{8}$ " x $\frac{1}{2}$ " maple mounts are held in with Weld-wood glue, fibre-glass resin, or hot-fuel-proof cement.

The bottom of the cowl is carved and hollowed from a 2 $\frac{1}{2}$ " x 3" x 3" balsa block. The top of the cowl is carved from a 2 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 6" balsa block. Since the top of the cowl is to be taken off for engine and tank access, it is keyed with little blocks or dowels, and held in place with a small bolt. Solder the nut to $\frac{1}{32}$ " brass shim stock, bolted to the back of the engine. The cowl is faired into a 2" aluminum or plastic spinner ala team racer. The top-center of the fuselage is carved and hollowed from a 1 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x 2" balsa block. This block serves as a good rugged mount for the top wing.

The plastic canopy is cemented on top after covering. Rubber-tired wheels are attached to the rear gear with 6-40 bolts serving as axles. Use two 6-40 nuts as spacers between the aluminum gear and the wheels so that the wheel pants can be slipped over the wheels. A soldered washer holds the front wheel in place.

The wheel pants are optional. The two rear wheel pants may be removed with ease. Two 2-56 bolts through the gear hold the pants in place. Solder the nuts to brass shim stock, and hold the shim stock in place with cement and silk. The front wheel pant can be mounted permanently by the use of a piece of $\frac{1}{16}$ " piano wire. The wheel pants look very sharp for display, and work fine when flying from a smooth field. However, the rear ones should be removed when taking off from rough, grassy fields.

TAIL: First, cut the stab from $\frac{1}{4}$ " medium quarter-grain stock. Hinges are Ka-Pak, but any good commercial hinges will do fine. Fasten a Veco control horn on the outside, for convenient adjustment, with pushrod. The pushrod is made from $\frac{1}{16}$ " piano wire. Double the wire where it runs inside the fuselage, for stiffness.

The rudder is cut from $\frac{3}{16}$ " fairly soft quarter-grain sheet balsa. Don't forget the 1" rudder offset adjustment—this is very important!

WINGS: The "Bi-Liner," of course, has two wings. These two wings are identical except for a small cutout in the center-section of the low wing to allow mounting of the rear gear to the fuselage. First, cut the ribs from $\frac{3}{32}$ " quarter-grain sheet. For strength, do not hollow the ribs, except for spars. Cement the ribs to the $\frac{1}{4}$ " x $\frac{3}{4}$ " trailing edge and $\frac{3}{4}$ " x $\frac{1}{2}$ " leading edge. The tips are cut from $\frac{1}{4}$ " sheet balsa. Use $\frac{1}{4}$ " x $\frac{3}{16}$ " hard balsa for spars. The top wing is mounted at zero degrees incidence but it is important that the lower wing is mounted at $\frac{3}{8}$ " negative incidence. The stab is mounted at zero degrees. Be sure and cover the center-sections with $\frac{1}{16}$ " sheet. Build a 3 oz. lead sinker into one of the outside wingtips, this to help keep the model tight on the lines during maneuvers. Bolt Ka-Pak or similar line guides to the wing tips.

Mount the "Vari-Speed" or control-line bellcrank to a $\frac{1}{8}$ " plywood floor. Be sure that the bellcrank floor and crank are mounted firmly because centrifugal force is concentrated at this point. Connect the pushrod to the outside hole of the control horn. The pushrod is moved to the center or inside stab control horn after initial flight testing, for greater control. Adjust the controls so that maximum control is received at the elevator when the handle reaches a 30° angle each way. This is extremely important for positive but smooth control.

FINISHING AND TESTING: The original model was covered with silk for greater durability. For good, but cheap silk, you can purchase silk head scarves at your local dime store at about 70c per square yard, in white or colors. The original "Bi-Liner" was painted with six light coats of thin, clear Aero Gloss. Then colored dope was sprayed with an Aero Gloss areosol can.

Important! Before flying, double check to be sure that all controls work smoothly, all incidences are correct, and the center of gravity is located in proper position. Select a good calm day for initial test hops. From there on out, your success with the model will depend on the amount of flying you do in all kinds of weather.

BILL OF MATERIALS

(Balsa unless otherwise specified)

3— $\frac{1}{8}$ " x $\frac{1}{8}$ " x 36"	Fuselage stringers
8— $\frac{3}{16}$ " x $\frac{1}{4}$ " x 36" (hard)	Wing spars
10— $\frac{3}{16}$ " x $\frac{3}{16}$ " x 36" (hard)	Fuselage longerons, cross pieces
4— $\frac{1}{2}$ " x $\frac{3}{4}$ " x 36" (fairly hard)	Wing leading edges
4— $\frac{1}{4}$ " x $\frac{3}{4}$ " x 36"	Wing trailing edges
2— $\frac{3}{8}$ " x $\frac{1}{2}$ " x 7" (Maple)	Motor mounts
2— $\frac{1}{16}$ " x 3" x 36"	Wing planking
1— $\frac{1}{8}$ " x 3" x 36"	Fuselage planking, bulkheads
2— $\frac{3}{16}$ " x 3" x 36" (fairly soft)	Fuselage planking, fill in, rudder
1— $\frac{1}{4}$ " x 4" x 36"	Stabilizer, wheel pants
1— $\frac{1}{4}$ " x 3" x 36"	Elevator, wing tips

$\frac{1}{8}$ " plywood; balsa blocks; 2" spinner; eight 4-40 bolts and nuts; four 2-56 bolts and nuts; three 6-40 bolts and six 6-40 nuts; 24-ST aluminum sheet; one pair 2 $\frac{1}{4}$ " diameter rubber-tired wheel; one 2" diameter nose wheel; wedge tank; "Vari-Speed" or control-line bellcrank; control horn; 36" $\frac{1}{16}$ " diameter piano wire; $\frac{1}{32}$ " scrap shim stock; 7" plastic canopy; stranded lead-out wire; Ka-Pak, or similar, line guides; 2 $\frac{1}{2}$ yds. silk or Silkspan; cement; clear fuel-proof dope; colored fuel-proof dope, if desired; .35 to .49 engine; propeller.

