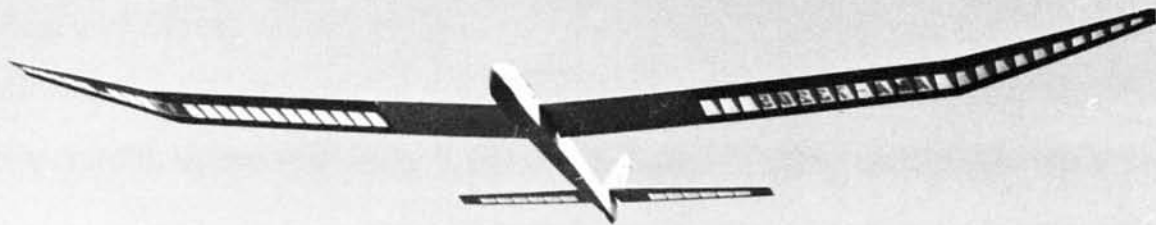


The Silent "Sabre Soar"

by Neil Liptak



In slow flight, the ship is majestic. If you've been turned on in pattern, you probably need a little rest cure. Try a soarer for your frayed nerves.

Thermals, risers, lift, topline and winch. Just a few of the new terms you'll become deeply involved with when you build an R/C model sailplane. Once you experience the boundless thrill of soaring, you'll hesitate to mess with fuel bulbs, props and chicken sticks again. Your heart will be with the quiet ships whose sole hope of altitude lies in the finding of the invisible columns of warm, rising air.

The "Sabre Soar" was made for warm spring days. It's for the Sunday flyer who wants to plop in a lounge chair, relax back and gently guide his soarer through the ocean of air above in quest of a thermal. And, once in a while he'll spot a hawk spiraling high overhead in lift. With a few brilliantly executed maneuvers, the whispering wings of the soarer will find the lift while the flyer below offers a laughing "thank you" to the best feathered thermal sensor a poor man's wallet can find.

The "Sabre Soar" was designed with an eye toward enabling the modeler to make the best of a day when lift is scarce. It can break away from one bit of lift as it drifts downwind and beat a path upwind in search of rising air. It can fly quite fast between the thermals. Just keep your eye on the wings, when one starts flapping at you, turn into it, there's lift there. After you've located the good air, ease back a bit on your trim and watch the "Sabre Soar" settle back to a creeping hover. Now make a nice, gentle 180° turn and head on back to where the wing bobbed. Find it? You're in business.

Once you're in the lift, just aim for nice, graceful 360° circles and watch the ship ascend. About an hour later, when you think you've had enough and the power guy on your frequency is biting you in the ankle to fly his pattern ship, just crank in some down trim and pray the thermal isn't too strong. After you've put your soarer down at the foot of your lounge chair, shut down your transmitter, face north and shout at the top of your voice, "With thee 'Sabre Soar,' I have conquered nature." Now put on the oxygen mask, lumps of lint in your ears and hand your friend his fuel can.

The Fuselage

As you can see, the fuselage is basically a box type structure, laminated with fragments of plywood here and there. Make a mental note that the top sheeting and the left side sheeting of the fuselage has been left off the drawing for reasons of clarity. When in place, the formers, wood edges, etc. would appear as dotted lines.

Start the construction by cutting two fuselage sides out of 3/32"x48" balsa. Don't forget that the fuselage is shown in fore-shortened form on the plans, so add the extra 10" as indicated. If you forget however, drop me a line and let me know how the super-short tail moment worked out. Now, laminate all the plywood pieces on and also laminate the vertical fin sheeting in place. This is the piece which the fibreglass tape overlaps on the butt splice. You will find that when you butt the 1/16" sheeting to the 3/32" balsa fuselage siding, there is a 1/32" difference in levels, so this is to be dressed up flush using a 1/32" balsa scrap, butted to the fuselage side on top of the fin section. This is then strengthened with a piece of fibreglass tape as shown.

After both the sides have dried, lay the one side on top of the other. Locate and drill the wing wire holes. Now, cut your fuselage formers. You can see that formers #4 and #5 must be laminated. Hobbyepoxy was used for the entire lamination process, including the gluing of the assembly to the fuselage sides.

Formers #1 through #6 are now glued in position and allowed to dry. Next, glue the balsa fin former in place. Get the proper taper of the tail beam from the width of #6 and #10 fin rib respectively. Secure at the tail and proceed to position the rest of the formers. Make sure that the alignment is true. Install the Nyrods at this point so that you won't have to worry about it later.

Once the fuselage structure has dried sufficiently, the bottom frontal section can be sheeted. Place the tow-hook mount and sheet the entire top, except for where the hatch goes.

Install all fin ribs at this point. Once they

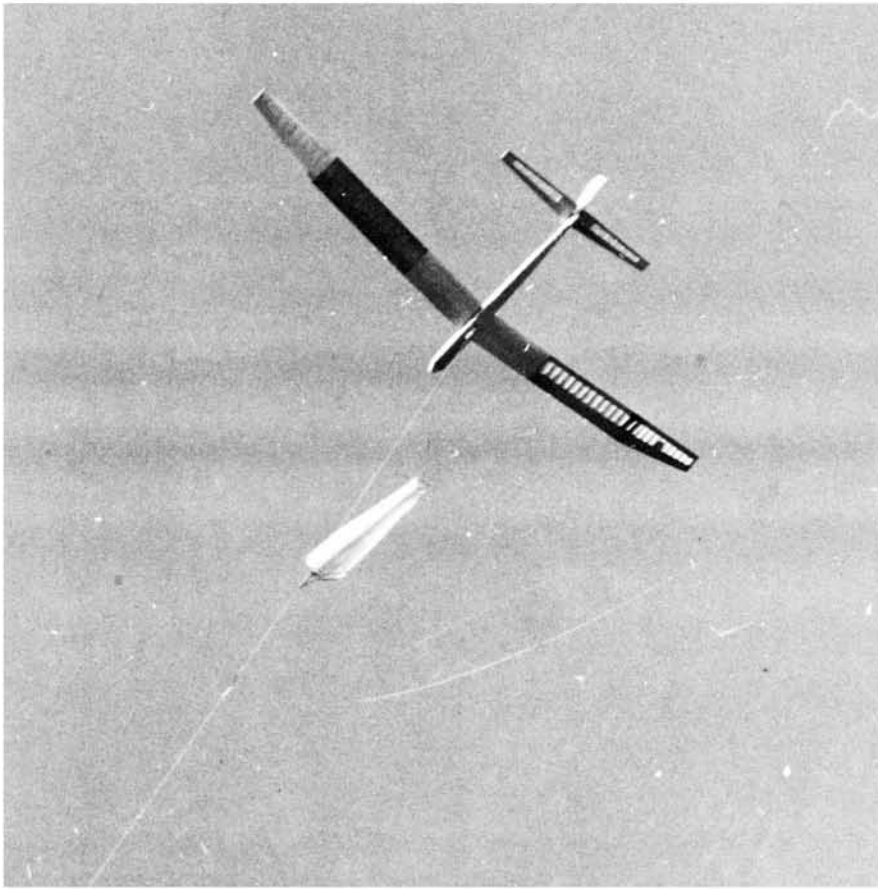
have dried, sheet one side of the fin. Now you're ready to install the flying stab horn. All that is required here is about an hour of patience. I think that the three dimensional view of this on the plans, along with Section A-A, should tell you what you need to know. This leaves you with the job of clipping on the Nyrod and sheeting the bottom of the fuselage. It would also be a wise move to place about a 1" square fibreglass patch over the pivot point of the flying stabilizer system, as indicated on Section A-A.

Glue the nose block in place and sand it neatly to shape. The hatch should be made of a piece of 5/16" balsa. A piece of the inner Nyrod material can be used as a guide and glued to the bottom of the hatch. I cut a slot in the hatch and mounted a small pin into the front of the hatch. Make certain the tubing is on the wire before you glue it to the hatch.

Wing Assembly

The center panels are as good a place as any to start. First, cut out a plywood pattern of rib #1. Use this pattern to cut all 44 inboard wing ribs individually. Don't throw the pattern away just yet, you'll need it to make the tip panel. Now that all your inboard ribs are cut, find two 1/8"x3/8" spruce spars. Cut a bunch, 52 to be exact, 3/16" sq. (approximately) rib spacers, to fit between the spars. Next, take one of the spars and lay it over the plans. Select a rib and glue it upside down, over the spar. Position a 3/16" sq. spacer and butt it up against the rib on the spar. Place another rib next to this, followed by another spacer, and continue in that order. Make certain that the ribs with the holes drilled in them are aligned with the tubing. Also make sure that the root rib is at a 90° angle with the spar in the plane of the wing. Glue the top spar in position and place the balsa webbing between the ribs.

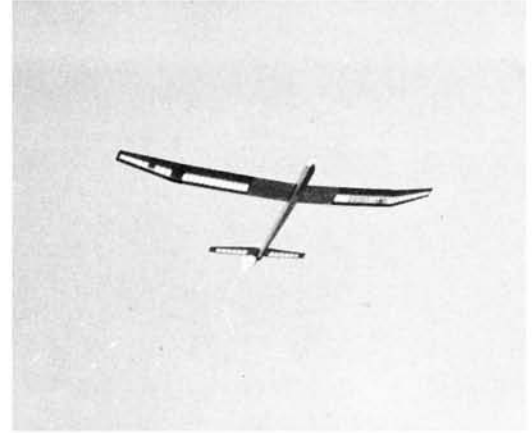
Now that this much of the panel has dried, the trailing edge sheeting can be applied. This process only involves a few simple steps. Cut the trailing edge sheeting to the width shown. Next, lay the sheeting over the plans. While the wing is in-



On the line. A 125" span pulls hard as the ship rises high. The R/C birds do well on a tow as you can correct on the way up. Hand tow, or winch it.

A 125" span silent type for drifting and dreaming in the warm Spring lift. Try your hand with this gentle R/C soarer. For a towline, winch or slope. The soaring boom is on and the contests are coming. An Eppler 385 airfoil section, takes two servos, rudder and elevator.

Photos by the Author



At thermal's end, the big bird comes home with a whisper. The transparent covering looks nice.

verted, locate it onto the trailing edge by placing a shim under the spar the full length of the wing, to attain the proper angular relationship between the trailing edge sheeting and the ribs. Let it dry, then sheet the bottom of the trailing edge.

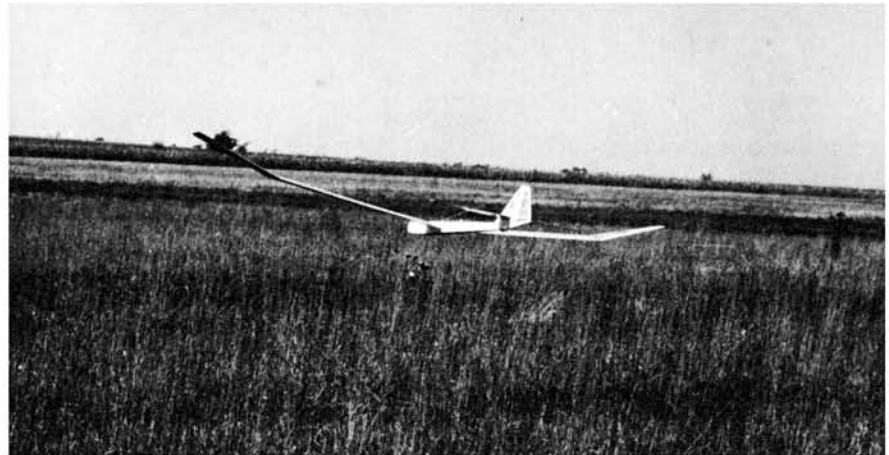
Glue the 1/4" sq. balsa leading edge on, while you're waiting for the trailing edge to dry. Also, you can Hobbypoxy the tubing into place. When this entire assembly has dried, the sheeting can be installed. Be careful that you don't make two left handed wing panels. If you do, you'll have to make two fuselages and all the rest.

To build the right wing panel, just place the root end at the tip end and follow the previous building process.

For the tip, the process I used is as follows: cut out 22 sheet rectangles and stack them in a neat pile. Make a plywood pattern of rib #11 as you did on rib #1. Place this #1 and #11 pattern in place, sandwiching the neat pile of balsa rectangles as shown on the plans. Now take two pieces of a smaller diameter music wire to hold the stack in position and file down, using the patterns as a guide. This method will make a more exact rib progression.

After the file is put away and the dust is swept up so you don't track it all over the house, separate the ribs from the root end. Number the ribs 1, 1A, 2, 2A, 3, 3A, etc. Using a plain numbered rib (1, 2, 3), then a number/letter rib (1A, 2A, 3A) for the next, proceed in this manner. To be more specific, one wing should be plotted as follows: 1, 2A, 3, 4A, 5, etc. Get it? In

FLYING MODELS



Coasting in low, looking for something hard to clobber. That's Murphy's Law. Sooner or later!

this way, you even out the progression of the taper, instead of having one set of tip ribs a hair shorter throughout the set.

Install the dihedral brace in the inboard section and proceed to actually build the tip onto the inboard section, using the same method of construction as on the inboard panel. To build onto the inboard section, it is necessary to lay the tip flat on the bench inverted and let the inboard panel extend over the edge of the bench. Using this method of constructing the wing half in a one-piece type deal insures the proper alignment of sheeting and spars at the dihedral break. As you approach the very tip, it becomes necessary to notch the spars. This creates an egg-crate type structure, since the ribs at the outer tips are

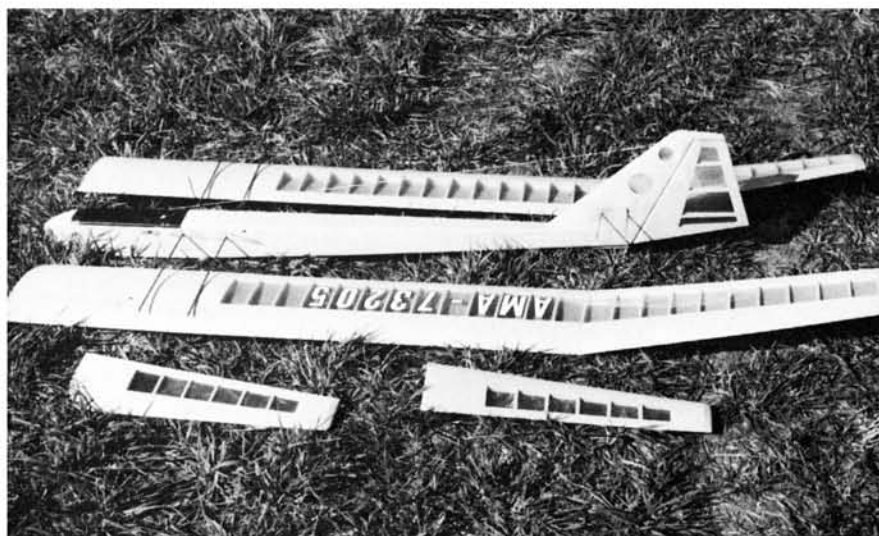
not wide enough to contain both top and bottom spars.

Capstrip the entire wing at this point, both top and bottom and, while at it, install the wingtips. Washout is deemed necessary and I attained it very easily since the original was covered with TopCote, a mylar-type heat shrinking, clear covering. All that has to be done to get washout is to twist the tip panel at the wingtip block, making sure that the root end of the tip panel is firmly secured on a flat, rigid surface. Take your iron and heat the TopCote, holding the twist until it cools, then release. Repeat this process until the trailing edge at the tip block is approximately 3/8" higher than the leading edge at the tip.



Neil and his "Sabre Soar." The design performs extremely well, responding to commands. Wings have to take it to escape clutches of strong thermals.

Since they do this on their own once in a while, might as well build them in a semi-wrecked condition. Plug-in wing panels, plug-in flying stab and a lean and simple fuselage. It adds up to a ship that transports easily.



The main idea behind the wing structure was to proportionally reduce the strength of the wing as the tip was approached. This was done by first using the spars for strength, then carrying the inboard sheeting out farther than usual and finally, sheeting between the ribs at the length shown on the plans. The dihedral braces were designed so that if you landed on a wingtip, the panel tends to break off more squarely, instead of tearing up an expanse of the wing.

The Rudder

Cut out all the ribs, saving the scraps. You'll need these fragments to shim up under each rib, so keep them in order. Lay out the leading edge sheeting over the plans and glue the rudder beam to this. Now position the ribs on the sheeting, butting up against the beam. Here's where those shims come in. Under each rib place the shim trimmed from itself, in order. This will help insure the proper alignment of the rudder. Sheet the top of the rudder and add the capstrips at this point, then turn over and cap the bottom side. Cut a "V" form in the leading edge and cover.

Stabilizer Assembly

The same method of cutting ribs incorporated on the tip panels of the wing was used to make the stab ribs. After you have your ribs all fabricated, lay the bottom leading edge and trailing edge sheeting over the plans. Glue the notched spar in position and drop the ribs into a corresponding notch. Place the 3/16" square balsa leading edge in place and let it dry. Now mount the aluminum tubing, using wires on the fin to attain the exact position. Glue tubes in with Hobbypoxy and finish sheeting the top of the stab. Capstrip it top and bottom, install the wingtips and sand it down. This construction creates an unbelievably strong stab.

Flying the Sabre Soar

The original is flying with the C.G. at the position shown on the plans. You may, however, want to experiment around with the position of the C.G. by adding or subtracting ballast from the nose and by playing with the neutral setting on the stabilizer.

Going up on the towline is no problem, just keep your eyes on the flex of the wings to regulate the amount of backstick you need. The "Sabre Soar" has flown off a winch, but in my opinion, you just can't beat a hand tow, unless you use an engine. The design has also experienced a slope. Just balance it a little nose-heavy and pitch it over the side. Note with that huge rudder you won't need an awful lot of throw, so don't get carried away.

The actual flying of the ship is quite enjoyable. There is enough stick-work to make it interesting, yet it does not demand constant attention. After the "Sabre Soar" is off the towline, I found I could set the transmitter on the ground, get my sun glasses out of the car, come back and resume flying. (If I could find it.)

The landings are smooth and majestic. Once lined up with the runway, just settle back and watch the glider swoosh past you. The model handles well in the wind, up to about 12 mph. However, it loses the fun aspect if the winds get any harder. So, build yourself a "Sabre Soar" and go take a glider to launch. (Oooh!)

