



SUPER SPORTSTER 90/120

**The definitive sport plane
for 120 4-stroke power.**

Back in 1973, a fellow named Joe Bridi designed a slick little 19 size sport plane called the RCM Sportster. Originally published as a construction article in November 1973 in RCM magazine, the RCM Sportster (Plan #542) has a flat bottom airfoil and, although it's stable and fun to fly, its aerobatics are not what you'd call precise.

Then in 1981 along came Don Anderson and Great Planes Model Manufacturing Co., who purchased the rights to Bridi's kits (including the RCM Sportster). Don redesigned the Sportster as a 40 size airplane with a symmetrical airfoil, a full cowl and lots of little improvements here and there. Thus the Super Sportster was born, to be followed quickly by the Super Sportster 60, Sportster Bipe and Super Sportster 20. I don't have to tell you that the Great Plane's Sportsters are all outstanding fliers. They're so popular that I'm sure most modelers have seen at least one, and a lot of you have owned one.

Now, I happen to be a 4-stroke fan

and to me the 120's are the neatest thing since proportional radios. It annoyed me that the only kits I could find for the 120's were either big and slow or else originally designed for 2-stroke 60's. Dropping a 120 into a 60 size airplane is usually not very successful because there isn't enough wing area to carry the weight (including lots of tail weight) and propellers just aren't available that will put that much power to use in such a small airplane. Big and slow avoids these problems, but I like to hot-dog it once in a while. I also

By Jim Feldmann & Don Anderson



happen to like Super Sportsters, so there was never any doubt that I would build a 120 size Super Sportster. I did, and I love it. It performs like a Super Sportster 60 but it's easier to fly, and its size and sound impress everyone.

The story doesn't end here though. I had the pleasure of meeting Don Anderson a couple years ago when I put together the Super Sportster Twin (RCM plan #930). Don is one of the nice guys in this hobby and like most manufacturers, he is genuinely interested in the wants and needs of the average modeler.

I sent Don some pictures and told him how terrific the 120 Super Sportster is and suggested that he kit it. He was very complimentary but unconvinced. That's when the idea of publishing this article came up. But that isn't the end of the story either.

A couple of months later Don was in the area and I persuaded him to come over to our field and fly a little. One flight and Don was hooked. A short time later, the second prototype was flying in Illinois. It's now July, and the rush is on to complete the third prototype so we can get this article together and in print.

The point is: if you have a kit idea or a successful design, share it with your favorite manufacturer. At worst you'll get a nice letter back, and it's a tremendous kick if your idea/design winds up in worldwide distribution.

All right, enough of this — tell us about the airplane!

The Super Sportster 90/120 (that's 90 2-stroke/120 4-stroke) is big (6 feet), light (9 to 10 pounds) and sturdy (plywood and spruce used in high stress areas). It was designed specifically to duplicate the performance of the Super Sportster 60, but because of its size, it's smoother and easier to fly. If you have soloed anything beyond a basic trainer you can fly this airplane. With a regular 120 swinging a 14 x 8, the Super Sportster 90/120 will do the entire FAI pattern and it flies like it's on rails. With an O.S. 120 Surpass turning a 14 x 10, the SS 90/120 is faster than most 60's, and has almost unlimited vertical performance, yet it lands slower than the 60. And when it goes by in a low pass it gives you such a visceral feeling of power that it's almost addictive.

All right, let's assume you'd like to build one. You have some decisions to make up front. Before you do anything else, decide on an engine. The Super Sportster 90/120 will fly on a .75 to 1.08 2-stroke or a .90 to 1.60 4-stroke. That's a large range of power and the choice affects the way you should build the airplane.

Right thrust. 2-stroke engines

generally don't have the problem, but if you punch the throttle with a big 4-stroke the airplane will turn left. I recommend about 2° right thrust for the 4-strokes.

Lightening Holes. The lightening holes shown on the plans save about 4 to 6 ounces depending on the density of the wood you're using. This savings is

used one standard servo for each elevator and one for each aileron. This not only doubles the available servo power, it also increases your chances of saving the airplane if you lose a servo in flight. I used a Sanyo 800 mAhr battery to cover the increased current draw. The total set-up, including two extra servos, the extra elevator pushrod, and the larger battery, added 4 ozs. to the airplane, which I made up for by using the lightening holes. Our regular 120 powered prototypes have used a standard 4 servo set-up with no problems.

Made your choice? Okay, now send off for the canopy and wheel pants from Great Planes, plans from RCM, and wood from your favorite supplier, then sit back and daydream about being the center of attention at your field.

CONSTRUCTION

The Super Sportster 90/120 is not hard to build, but it's complex enough that some previous experience with either scratch-building or kit Sportsters will give you an edge. The 90/120 doesn't build exactly like the smaller Sportsters but it's close.

Tail:

Construction begins with the tail surfaces. These are built-up and sheeted rather than solid balsa, as in the smaller Sportsters. The built-up method takes longer, but it's less prone to warping, and much lighter.

Start by laminating two pieces of 1/8" lite ply for each of the control horn supports.

Build the outline framework of the stabilizer, elevators, fin and rudder over the plans using 1/4" x 3/4" balsa.

Install the 1/4" balsa sheet stab center and fin bottom, and the 1/8" x 1/4" balsa ribs.

Remove these assemblies from the board and sand to the proper outline.

Build the skins by joining 1/16" balsa sheets together as required. Make the skins about 1/4" bigger all around than the framework. Sand the outside of the skins smooth before you glue them on.

Use a flat surface to make sure you don't build in a warp; glue the skins to the framework. Round the leading edges of the stab and fin and the trailing edges of the elevators and rudder. Sand the leading edges of the rudder and elevators to a "V" as shown on the plans. Drill a 3/32" hole in the rudder and relieve the leading edge as required for the tail wheel strut.

Wing:

The landing gear blocks may be purchased, or fabricated from 3/16" plywood. In either case, cut two main blocks 7 1/2" long and two upright blocks 1 1/4" long. Glue the upright block to one end of the main blocks,

SUPER SPORTSTER 90/120

Designed By:

Jim Feldmann & Don Anderson

TYPE AIRCRAFT

1.2 4-stroke Sport/Pattern

WINGSPAN

72 Inches

WING CHORD

13 1/2 Inches

TOTAL WING AREA

950 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL (each tip)

1 1/2 Inches

OVERALL FUSELAGE LENGTH

60 Inches

RADIO COMPARTMENT SIZE

(L) 13 1/2" x (W) 4" x (H) 3"

STABILIZER SPAN

26 1/2 Inches

STABILIZER CHORD (incl. elev.)

8 Inches

STABILIZER AREA

190 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

8 1/2 Inches

VERTICAL FIN WIDTH (incl. rud.)

9 Inches

REC. ENGINE SIZE

.75-1.08 2-stroke

.90-1.60 4-stroke

FUEL TANK SIZE

13-16 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply
 Wing Balsa, Ply & Spruce
 Empennage Balsa & Ply
 Wt. Ready To Fly 144-160 Oz. (9-10 Lb.)
 Wing Loading 22-24 Oz./Sq. Ft.

more important for the smaller engines than the larger ones, but is not critical in any case. The choice is up to the builder.

Control System. When using the O.S. 120 Surpass, 160 4-stroke, or a 108 2-stroke, the air loads on the elevators and ailerons approach the limits of a single standard servo. I

BILL OF MATERIALS

Balsa

- 1 — 1/16 x 3 x 36 Shear Webs
- 5 — 1/16 x 4 x 36 Tail Sheeting
- 7 — 3/32 x 3/8 x 36 Cap Strips
- 4 — 3/32 x 1 x 36 T.E. Sheeting
- 2 — 3/32 x 3 x 36 Center Sheeting
- 4 — 3/32 x 4 x 36 L.E. Sheeting
- 4 — 3/32 x 4 x 48 Wing Ribs
- 1 — 1/8 x 3/8 x 36 Formers 4, 5, 6
- 2 — 1/8 x 4 x 36 Deck Base, Floor Hood Sheeting
- 4 — 1/8 x 1/4 x 48 Tail Ribs
- 2 — 3/16 x 4 x 48 Fuselage Sides
- 2 — 1/4 x 1/4 x 36 Hood Stringers
- 4 — 1/4 x 3/4 x 48 Tail Outlines
- 1 — 1/4 x 4 x 36 Wing Tips, Stab Center, Formers
- 2 — 3/8 x 1/2 x 36 Trailing Edges
- 2 — 3/8 x 1 x 36 Leading Edges
- 1 — 3/8 x 1 1/2 x 48 Hood Sides
- 1 — 5/8 x 3 x 48 Chin Block, Cowl, Tail Filler
- 1 — 3/8 x 3/8 x 36 Traingle Braces
- 1 — 3/8 x 3 x 36 Tapered Sheet* Center Rib
- 4 — 5/16 x 1 1/2 x 36 Aileron Stock, Ailerons

*Available from Lone Star Models or Great Planes Model Mfg. Co.
(see Advertisers Index).

Spruce (or Bass)

- 4 — 3/8 x 1/2 x 36 Spars
- 5 — 1/8 x 1/4 x 48 Deck Stringers

Lite Ply (Poplar)

- 1 — 1/8 x 12 x 48 Fuselage Doublers, Formers

Birch Ply

- 1 — 1/16 x 6 x 12 Rib Doublers, Spinner Rings
- 2 — 1/8 x 6 x 12 Firewall Formers, Dihedral Brace
- 1 — 3/16 x 6 x 12 Gear Blocks (or use gear blocks below)
- 1 — 1/4 x 6 x 12 Firewall, Wing Bolt Plate, Stab Supports

Other

- 1 — 5/16 x 36 Hardwood Dowel
- 2 — 3/8 x 3/4 x 12 (3/16) Gear Blocks (optional)
- 1 — 3/16 x 36 Music Wire
- Set — 1/8" Aileron Torque Rods (Goldberg #251)
- Set — Large Wheel Pants (Great Planes #WPNTS-003)
- 1 — SS90 Canopy (Great Planes #CANPY-037)
- 1 — 3/32 Tail Wheel Strut (Great Planes #WBNT-128)
- 1 — 3" Spinner
- 1 1/2 Sq. Ft. — Heavy (6 oz.) Fiberglass Cloth
- Set — SS 90/120 Plans (RCM #1006)

with the groove facing the other end. Drill a 3/16" hole through the main blocks, using the groove in the upright block as a guide.

Bend the gear struts from 3/16"

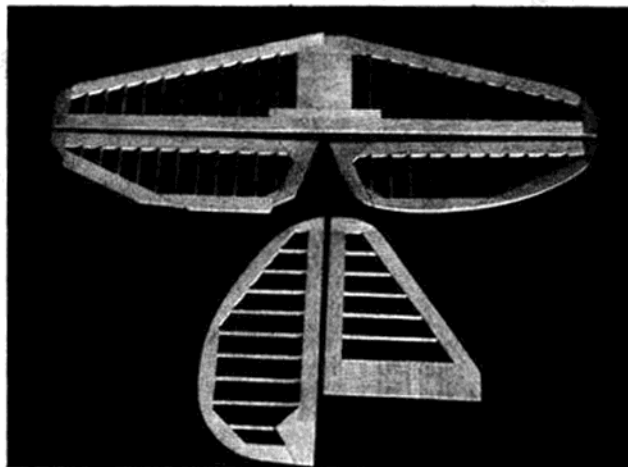
music wire and fit them into the gear blocks. Fill the unused part of the groove at both ends of the main block with scrap balsa.

Glue 1/16" plywood doublers to six

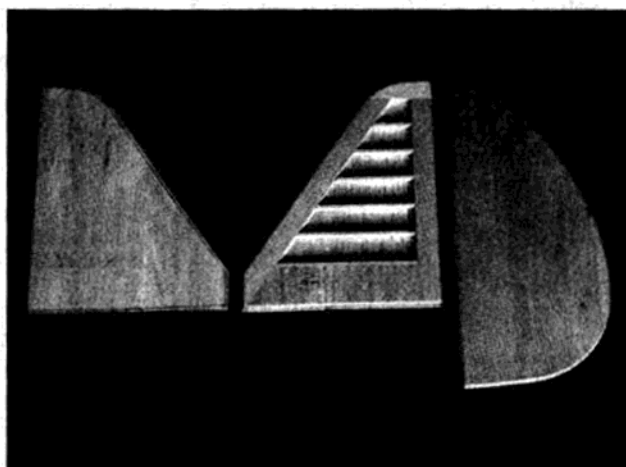
ribs (three left, and three right). Glue two ribs together to make each of the tip ribs.

Right Wing:

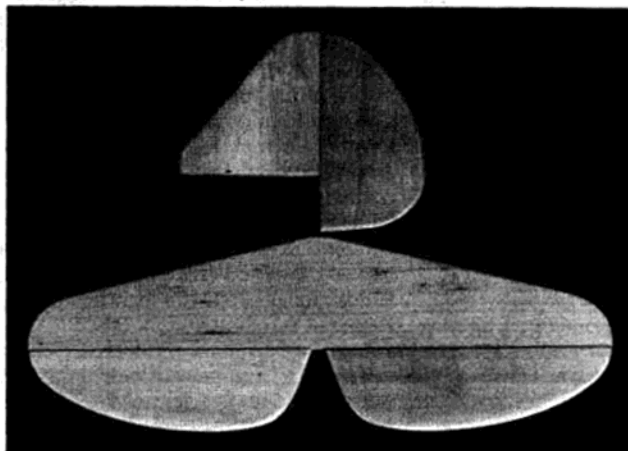
Make a trailing edge support 1 3/8"



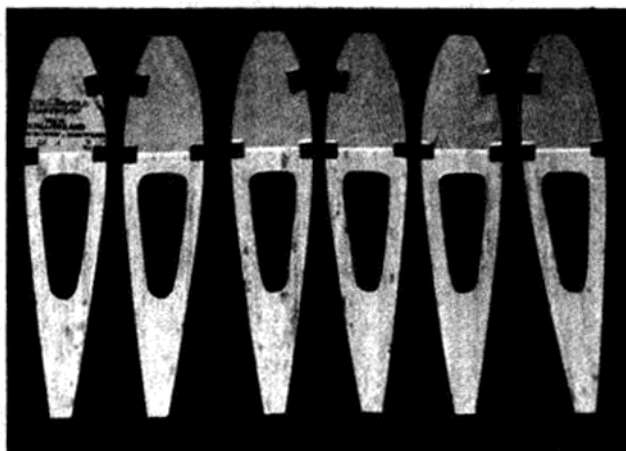
The tail surfaces are built up and sheeted. Here the left side has not been sanded to shape.



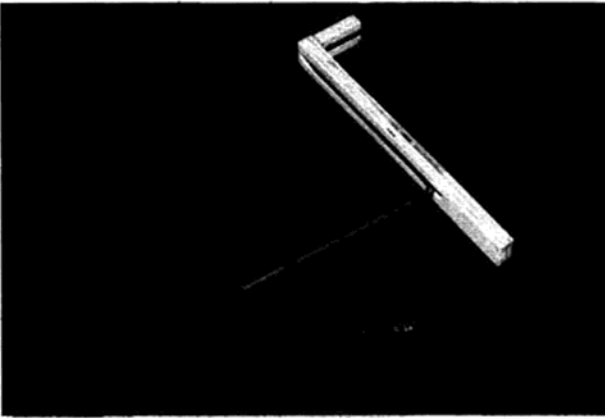
The rudder has been sheeted and the fin is ready for the second side.



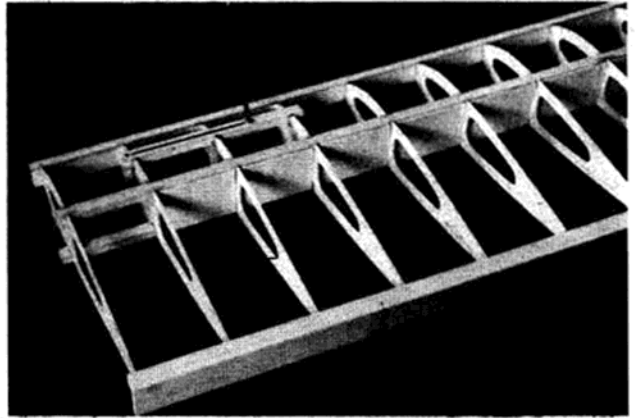
Completed tail surfaces are lighter and more warp resistant than solid balsa.



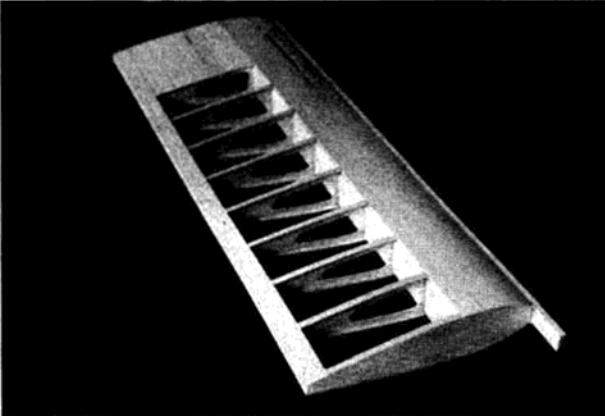
Ribs with plywood doublers and gear block notches. The lightening holes are optional.



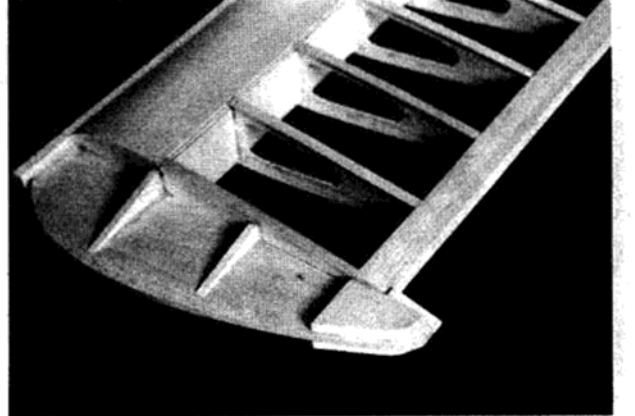
Plywood landing gear block and 3/16" music wire strut, ready to install in wing.



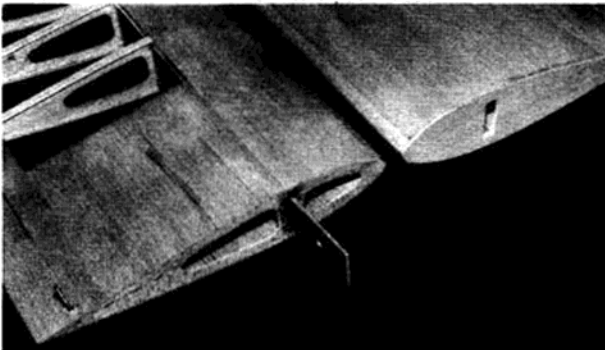
Plywood landing gear block and 3/16" music wire strut installed. Note temporary T.E. support.



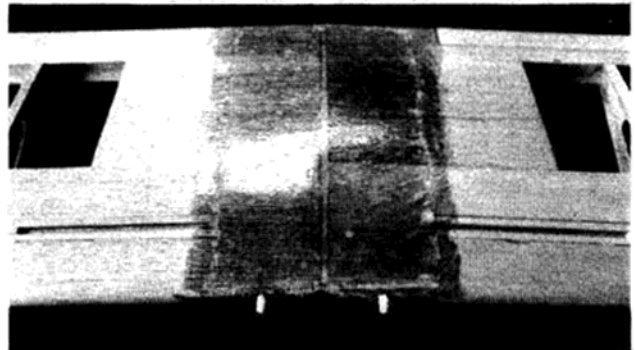
Sheeting and capstrips complete the wing panel. Note leading edge extension.



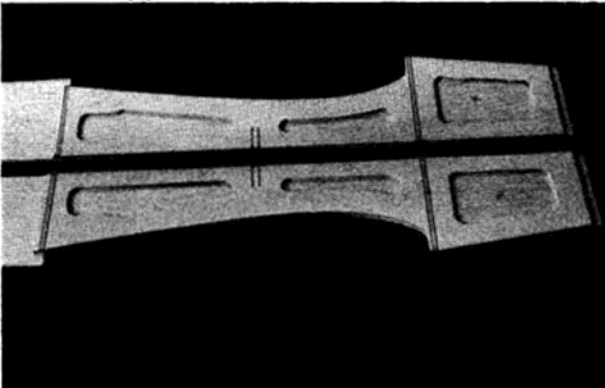
Wing tips and leading edge ready for sanding. Template was used to check leading edge contour.



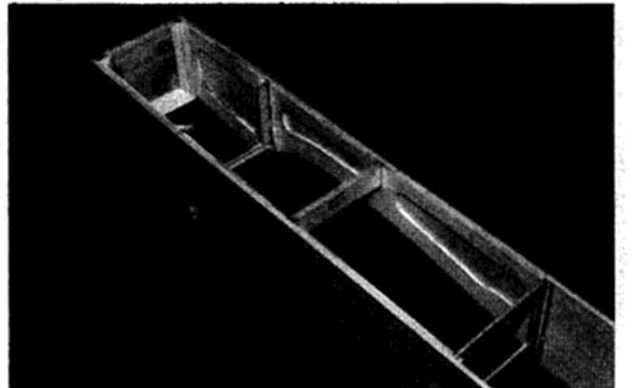
Root end of wing panels with alleron torque rods, tapered center rib, and 1/8" ply dihedral brace.



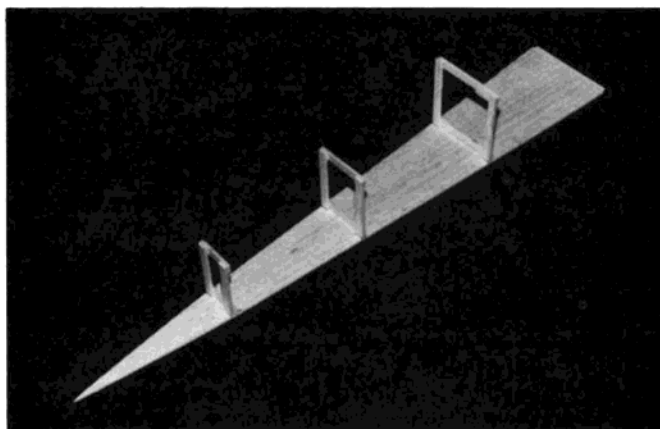
The wings have been joined and the center reinforced with 6 oz. fiberglass cloth and resin.



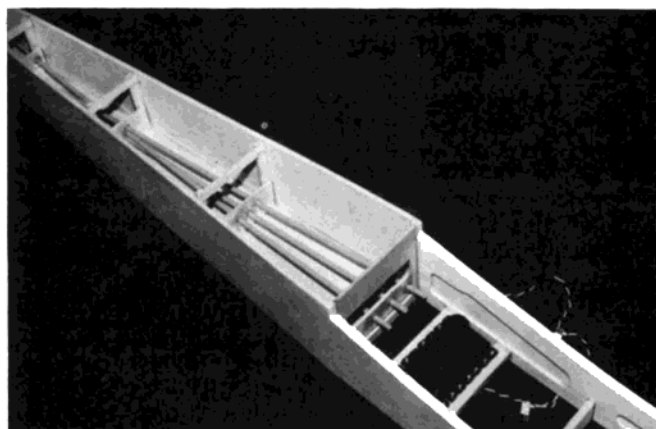
3/16" balsa fuselage sides and 1/8 light ply doublers (with optional lightening holes).



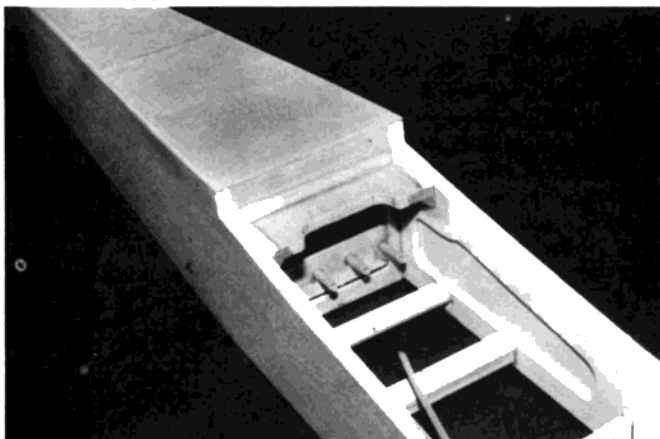
Assembly of the fuselage starts with the center formers and the firewall.



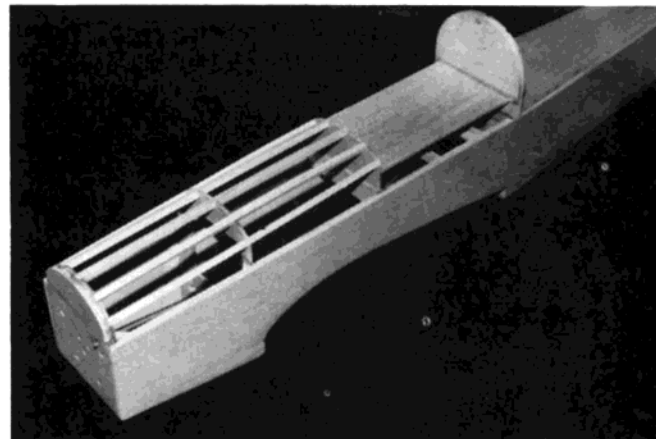
Formers 4, 5, and 6 are built up and glued to the rear deck base before being glued into the fuselage.



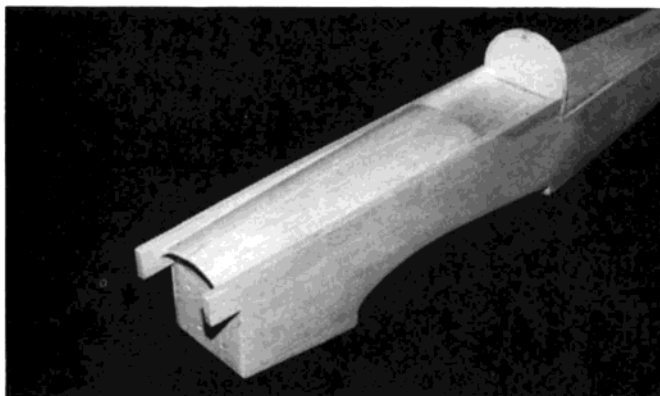
Servos and pushrods are installed while there is still plenty of room to work.



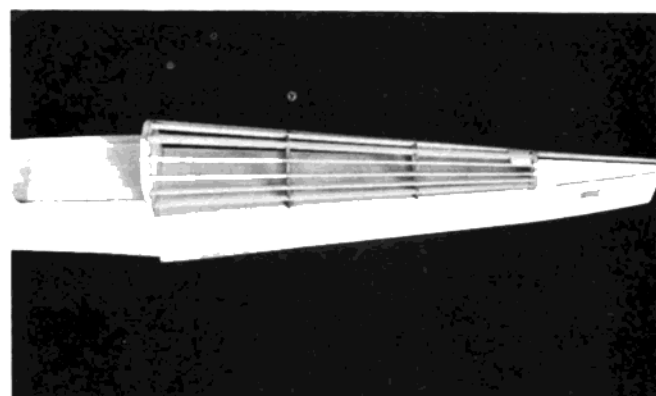
Cross-grain sheeting and a triangle reinforced 1/4" ply wing bolt plate completes the fuselage bottom.



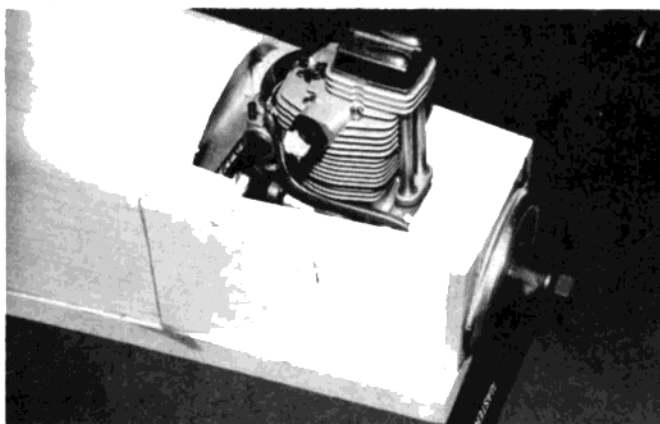
The front hood is framed with light ply formers and 1/4 square balsa.



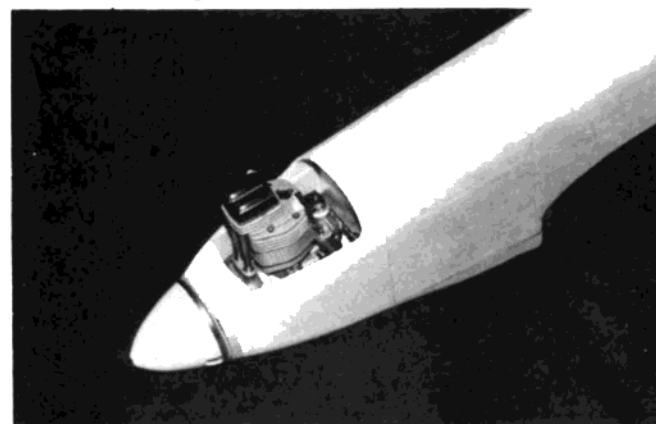
Balsa sheeting and straight corner pieces make hood shaping easy.



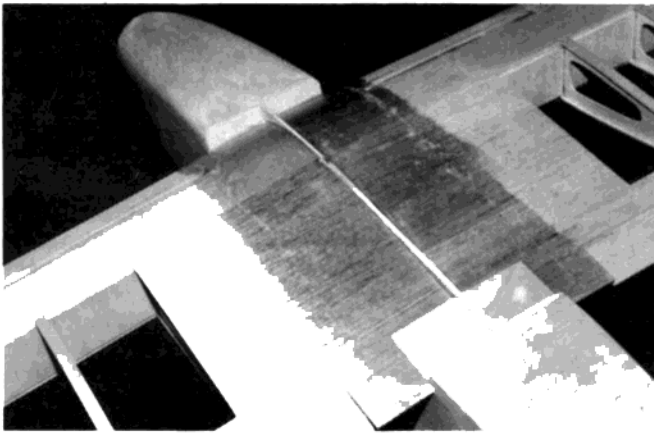
The turtledeck was light ply formers and hardwood stringers for resistance to hangar rash.



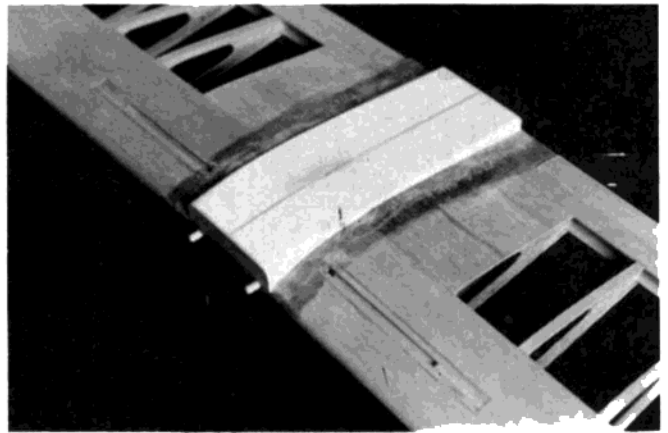
A new O.S. 120 Surpass sits comfortably within the untrimmed cowl blocks.



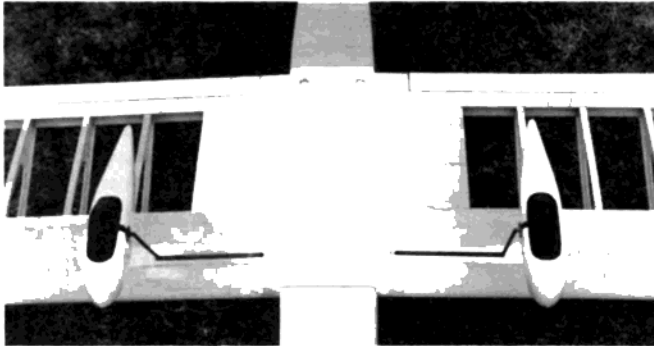
The cowl has been rough sanded to shape. Note easy access to carburetor and mounting bolts.



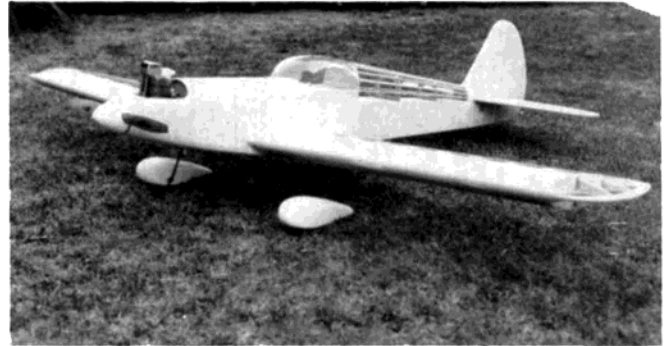
Formers and spine are used to guide the shaping of the wing fairings.



Wing fairing is complete and very easy to do using this method.



Completed, including wheel pants. Ready for your favorite covering material.



Ready to cover. Performance with the O.S. 120 Surpass is spectacular!

high and the length of the wing from scrap balsa, and tack glue the 3/8" x 1/2" balsa trailing edge to it.

Pin the lower spar over the plans, then, using several ribs as a positioning guide, pin the trailing edge support to the board. Now glue all of the ribs in place making sure the doublers face the correct way.

Glue the leading edge to the ribs with its top 1/8" above the top of the ribs. (Note: The leading edge should extend 2" past the tip rib.) Install the top spar, then glue 3/8" balsa triangle reinforcements to the front of the gear block ribs as shown on the plans.

Glue the 1/8" plywood dowel plates to the back of the leading edge in the center bay, and glue 1/16" balsa sheer webs to the back of the spars in all bays except the center.

Support the leading edge with scrap balsa. Sand an angle on the front edge of the 3/32" x 4" balsa leading edge sheet to fit the back of the leading edge, then glue the sheet in place.

Now remove the wing from the board and detach the trailing edge support. Sand the trailing edge to match the airfoil. Working on a flat surface, glue the 3/32" x 1" balsa trailing edge sheeting on top of the trailing edge.

Add the 3/32" balsa center sheeting and the 3/32" x 3/8" balsa cap strips. This will be easier if you support the trailing edge with some scrap balsa.

Turn the wing over and sand off any

glue drips. Install the gear block. Note: the main block extends 3/32" above the ribs so that it will be flush with the sheeting, and the upright block goes toward the root end of the wing. Glue a piece of 3/8" balsa triangle stock under the outboard end of the main block.

Now add the bottom leading edge, trailing edge and center sheeting, and the cap strips, cutting the leading edge sheeting to fit around the gear block.

Cut the spars, trailing edge and sheeting flush with the tip rib. Do not cut the leading edge. Glue the wing tip in place, centered on the tip rib and centered on the back of the leading edge. Add the four tip braces, the aileron filler, and the aft tip filler pieces.

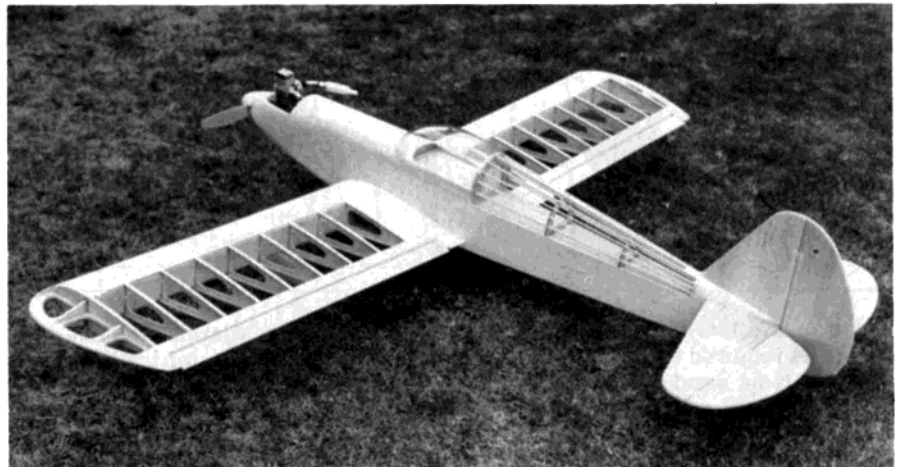
Left Wing:

The left wing is built over the same plan, using the same sequence **EXCEPT** that you are building this wing upside down so the notches for the gear blocks go on top and the gear block is installed before the top leading edge sheeting.

Finishing The Wings:

Sand the leading edges to shape using a template made from the plans to check your progress. The shape of the leading edge is very important to the way an airplane flies, so take your time on this step.

Glue two pieces of aileron stock together to make each aileron 5/8" thick at the leading edge. Sand the trailing edge of the ailerons to 3/32" thick. Tack glue the ailerons to the



the floor position on the front of 3A and the back of the dash.

Glue formers 1A, 2A, 3A, the dash and the floor in position. Add the 1/4" x 1/4" balsa hood stringers. Sheet the hood with 1/8" balsa sheet, extending 1" in front of the firewall and 1" behind the dash. (Note: The sheeting ends at the outboard edge of the outboard stringer on each side.)

Sand the edges of the sheeting to match the formers and then glue the 3/8" x 1 3/4" balsa hood sides in place. (Note: The hood sides run from former 3A to 1 1/2" in front of the firewall.) Sand the hood sides and cockpit area to shape as shown on the plans.

Glue the former 6B to the back of 6A. Using the vertical fin as a guide, glue former 6A to the deck base.

Glue two 1/8" x 1/4" spruce stringers together to make the 1/4" x 1/4" top stringer for the turtle deck. Glue this in place. Add formers 4A and 5A and then the rest of the stringers.

Using the horizontal stab as a guide, glue a 3/8" balsa spacer to the deck base behind former 6B. Pin (but don't glue) the fin and stab in place. Using 5/8" balsa scrap, make two stab filler blocks and cut them roughly to shape. Glue these blocks to former 6B and the spacer. **Do not glue the blocks to the fin and stab.** Remove the fin and stab immediately to be sure they don't get stuck in place.

Temporarily replace the fin and stab with 3/8" spacers and sand the filler blocks to match the fuselage shape. Make the dorsal fin from 3/8" scrap, glue it to the vertical fin and sand to shape.

Cowl:

After fitting the tank and fuelproofing the tank compartment, glue the 5/8" balsa chin block in place. Tack glue 1/16" plywood scrap spacers to the back of your spinner and then tack glue the 1/16" plywood spinner ring to the back of the spacers, lined up with the spinner.

Install your engine on the engine mount and the mount on the firewall. Now sand the front of the chin block until it just touches the back of the spinner ring when the spinner is mounted on the engine. Glue the spinner ring to the chin block.

Fit the cowl sides between the firewall and spinner ring and glue in place. (Relieve the inside of the cowl sides as necessary to clear your mount.) Glue the cowl top block between the cowl sides.

Remove your engine, then carve and sand the cowl and chin block to shape. If any gaps appear between blocks behind the spinner ring, add 3/8" triangle to the inside corners. Drill a drain hole through the chin block just in front of the firewall.

Final Assembly:

Bolt the wing onto the fuselage. The wing fairings may be made from shaped balsa blocks or filler. To use filler follow these steps: Make front and rear formers from scrap 1/8" lite ply and glue to the wing. Join the formers with a 1/8" lite ply spine. Sand the formers to match the fuselage shape and the spine to match the plan side view. Make the fairings with "light spackle" type filler, using the formers and the spine to guide the shape. Careful shaping will minimize the final sanding necessary. Remember to give these fairings a coat of Balsarite to make the covering adhere properly.

Cut clearance holes for the wing bolts down to the plywood. (If you used filler, harden the edge of the holes with thin CA.)

Temporarily slip the fin and stab in their slots and draw a line along the edge of the filler blocks. The area inside these lines is the gluing area and should not be covered.

The next step is to cover everything. Use the iron-on film of your choice.

Install hinges and control horns and the tail wheel strut. Bolt the wing to the fuselage and then glue the tail surfaces in place, making sure that they are parallel to the wing and perpendicular to the fuselage.

Install your pilot, trim and install the canopy. Build the wheel pants and install the landing gear.

Install the engine, tank and radio. Use the control surface travels and balance point that are shown on the plans.

Flying:

Like any new airplane, treat the Super Sportster 90/120 with respect until you get to know it.

Best of luck, and have a ball!



**From
RCModeler
Dec. 1987**