By James R. Feldman

Color Photo by Peter Helm

SUPER SPORTSTER TWIN

Multi Engined R/C Aircraft have always seemed to me to be exotic and unnecessarily complex. After watching (and hearing) one fly though, you have to admit that there is an undeniable fascination to the sight and sound of a smooth flying twin.

Unfortunately, the twin kits on the market generally consist of beautiful but treacherous scale twins, or twin trainers with so many obvious concessions to flyability that they bear no real resemblance to airplanes. And then there are the horror stories . . . in the end the urge for a twin usually goes on the back burner.

It was a twin Kougar built by our club (The Glendale, California Skyhawks) for the local air show circuit last summer which finally got me directly involved. That Kougar was heavy, complex and sluggish to fly, but **impressive** in the air. It also proved that a well-mannered, aerobatic and reasonably attractive sport twin was indeed possible.

A smooth and forgiving sport twin, economical and highly aerobatic on two 25's.

My favorite sport plane is the "Super Sportster 40" by Great Planes. The SS40s built and flown by my son and I offer an unusual combination of performance, looks, and economy. The idea of the Super Sportster Twin was a natural. The initial sketches looked great, but just slapping a couple of engines on the wing of a great single does not get you a great twin. The extra weight needs to be supported by

extra wing area to keep the wing loading the same. Engine sizing should provide similar power loading. A longer, narrower wing and larger vertical stabilizer and rudder are needed to improve single engine performance. Finally, engine placement should be such that proper location of the Center of Gravity can be achieved without excessive deadweight added to nose or tail.

These requirements were met in the Super Sportster Twin by extending the wing one bay at each tip, enlarging the fin and rudder 20% and placing the engines 2/3 of the distance from the C.G. to the single engine position. Two 25s provide power loading nearly identical to a single 40.

Each of these changes was designed to minimize the complexity of construction and maximize the use of kit parts. Starting with the standard Super Sportster 40 kit, the fuselage requires only the addition of a second chin block on top, and a nose block in place of the spinner. A small hatch must be cut in the bottom for access to the nosewheel steering hardware. The larger fin and rudder are cut from 1/4" balsa sheet and installed per the kit instructions.

Spruce doublers are added to the top spar and leading edge of the wing to replace strength lost where the top sheeting is cut out for tank clearance. All center section sheeting is extended one bay, and spar webs are added to the inboard half of each wing. The extra bay is simply spliced on to each tip.

The nacelles go together just like the kit nose, and are designed around 8 oz. tanks. (Running out of fuel in a twin is not a recommended practice.) The engine throttles use flex cables to a single servo in the wing center.

The result is a nimble, attractive and economical sport twin with performance virtually identical with the Super Sportster 40. I am not an expert pilot, but I was so comfortable with this plane that I did stall turns, split S's, four point rolls and low passes at high and low speeds, all on the first flight. The Super Sportster Twin will fly hands off all the way across the field. It will do anything the single super Sportster will do, and its low speed performance is actually a little better. It's super!

MAKE A KIT

Start with one standard Great Planes Super Sportster 40 kit. Add the following additional parts and you will have one complete Super Sportster Twin kit:

Fuselage:

(1) Front top block — 5/8" x 3" x 9" balsa.
(1) Nose block — 2½" x 2½" x 2" balsa.
(1) Nose gear bracket — for 5/32" strut.

SUPER SPORTSTER TWIN

Designed By:
Jim Feldman
TYPE AIRCRAFT
Twin Engine Sport
WINGSPAN
62 Inches
WING CHORD
10¼ Inches
TOTAL WING AREA
610 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1⅛ Inches
O.A. FUSELAGE LENGTH
45 Inches
RADIO COMPARTMENT SIZE
(L) 10" x (W) 3" x (H) 3"
STABILIZER SPAN
21 Inches
STABILIZER CHORD (incl. elev.)
5¾" (Avg.)
STABILIZER AREA
120 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top Of Fuselage
VERTICAL FIN HEIGHT
7 Inches
VERTICAL FIN WIDTH (inc. rud.)
6¼" Avg.
REC. ENGINE SIZE
(2) .25-.28 Cu. In.
FUEL TANK SIZE
(2) 6-8 Oz.
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa, Spruce and Ply
Empennage	Balsa
Wt. Ready To Fly	**100 Oz.**
Wing Loading	**23.6 Oz./Sq. Ft.**

Fin and Rudder:
Cut from 1/4" Balsa Sheet:
Wing:

(2) Extra ribs — 3/32" balsa sheet.
(4) Leading edge sheeting extensions — 3/32" x 2½" x 4" balsa.
(4) Spar extensions — 3/8" x 3/8" x 4" balsa.
(2) Leading edge extensions — 1/4" x 3/4" x 4" balsa.
(4) Rib doublers — 1/4" x 2" x 3" balsa.
(10) Spar webs — 3/32" x 3" x 1⅜" balsa.
(2) Leading edge doublers — 1/8" x 1/4" x 9" spruce.
(2) Spar doublers — 1/8" x 1/4" x 9" spruce.
(2) Center trailing edges — 5/16" x 1⅛" x 9" trailing edge stock.
(8) Center sheeting — 3/32" x 3" x 10" balsa.
(1) Wing bolt plate — 1/16" x 3½" x 2½" ply.
(2) Aileron horns — 3/32" x 12" music wire.
(2) Aileron horn bushings — 7/64" I.D. x 8½" plastic or brass tubing.

Nacelles:

(4) Nacelle sides — 1/8" x 2¼" x 13" balsa.
(4) Nacelle side doublers — 1/8" x 2¼" x 7" light ply.
(2) Firewalls — 1/4" x 2¾" x 2⅜" heavy ply.
(2) Former N1 — 1/4" x 1-5/16" x 2½" balsa.
(2) Former N2 — 1/4" x 7/8" x 2" balsa.
(2) Tank floor — 1/8" x 2½" x 4⅝" light ply.
(2) Chin blocks — 1/2" x 3" x 8¼" balsa.
(2) Rear top blocks — 1/2" x 3" x 8¼" balsa.
(4) Side pieces — 1/4" x 3/4" x 8½" balsa.
(2) Top blocks — 3/8" x 2¾" x 5¾" balsa.
(4) Nose side blocks — 1/2" x 2⅛" x 3¼" balsa.
(2) Front filler blocks — 1/2" x 2⅛" x 2" balsa.
(2) Spinner rings — 1/16" x 2-3/16" x 2-3/16" ply.

CONSTRUCTION

Most of the construction of the Super Sportster Twin follows the kit instructions for the SS40. We will refer to those instructions by heading and number.

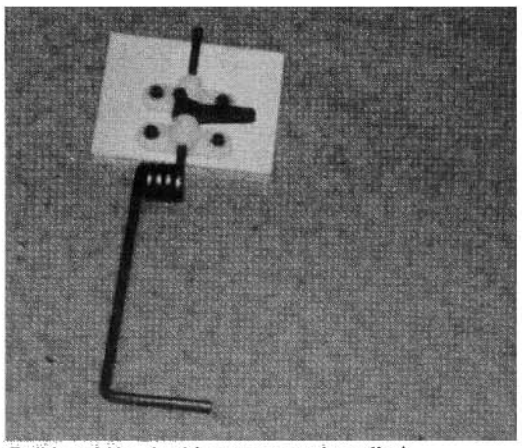
Building The Tail Section:

Complete kit instructions 1 through 7. Remember to discard the fin and rudder parts from the kit and use the new, larger twin parts.

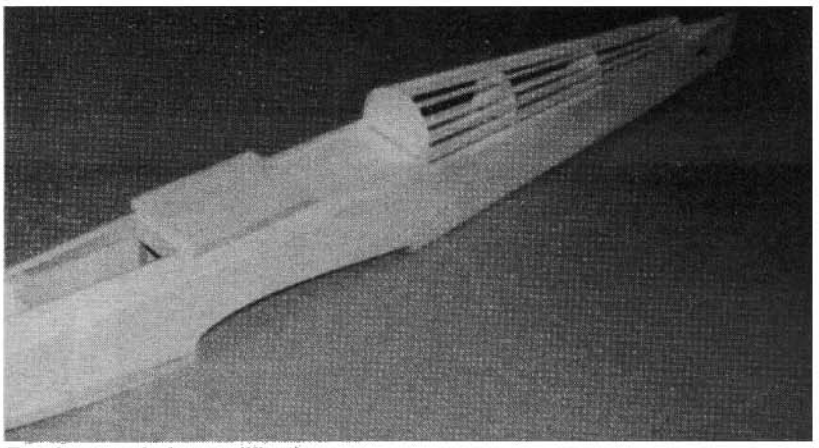
Building The Wing Panels:

Extend the leading edge sheeting and spars to 28½" long. Make a diagonal splice using aliphatic or epoxy. These simple splices are adequate since there is very little stress on a wing at the tip. Extend the leading edges to 29½" long.

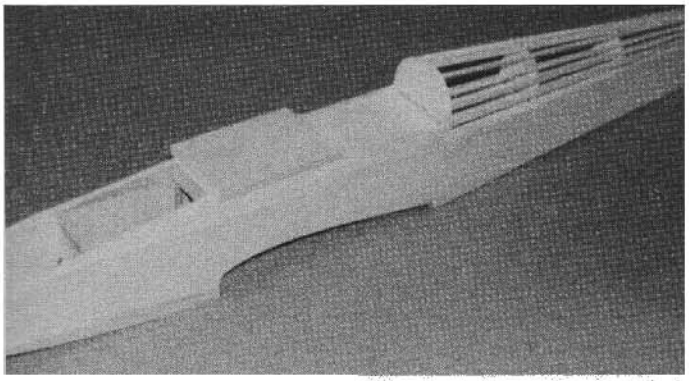
The trailing edges and trailing edge sheeting in the kit should be at least

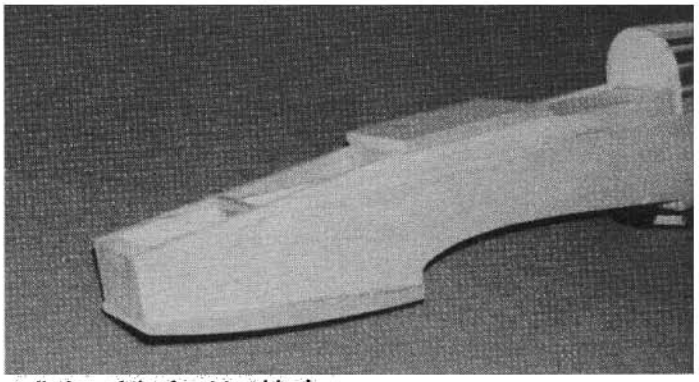


Bulkhead No. 1 with nose gear installed.

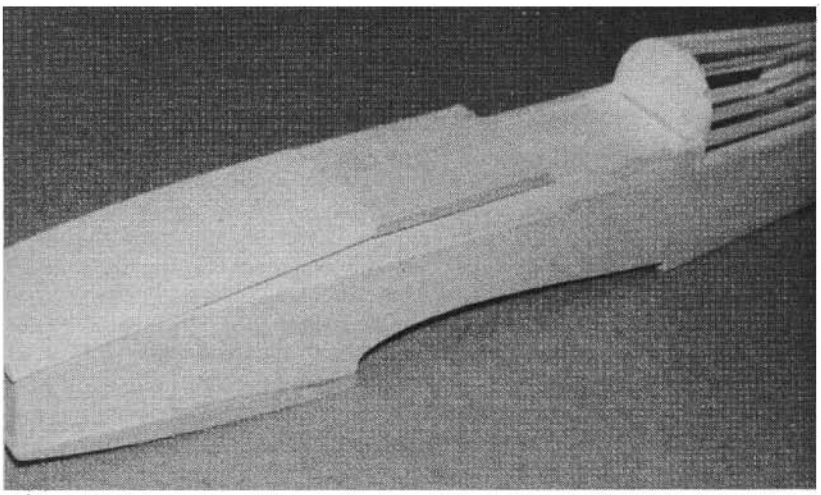


Fuselage ready for modifications.

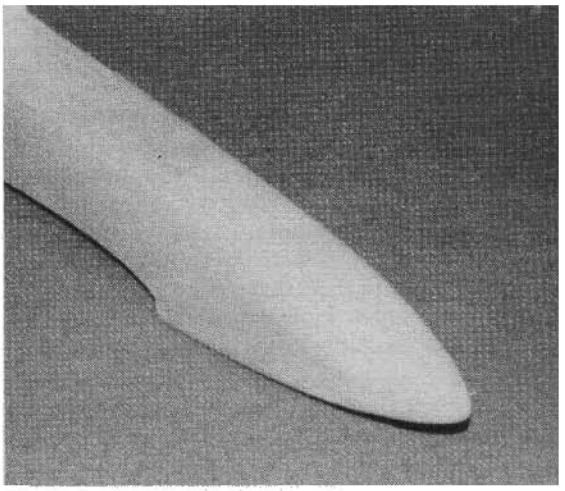




Side pieces tapered and ready for installation of the front top block.



Front top block installed.



Fuselage nose sanded to shape.

28½" long. If not, extend these as well.

Complete kit instructions 1 and 2. Build the tricycle gear option.

Glue 1/4" rib doublers to the front portion of ribs 3 and 4.

Be sure to make two lefts and two rights. The doublers are on the same side of rib 3 as the 1/16" ply landing gear braces.

Complete kit instructions 3 and 4, but do not install ribs 3 and 4 yet.

Important: Make sure all splices are at the tip end of the wing panels.

Trial fit the leading edge. Mark the location of ribs 2 and 5 on the back of the leading edge. Draw a line along the center of the leading edge between these marks. Glue the spruce leading edge doubler to the bottom half of the leading edge, along this line.

Complete kit instruction 5.

Notch the front of ribs 3 and 4 to fit over the leading edge doubler. Install ribs 3 and 4.

Glue the spruce spar doubler to the back of the top spar between the notches for ribs 2 and 5.

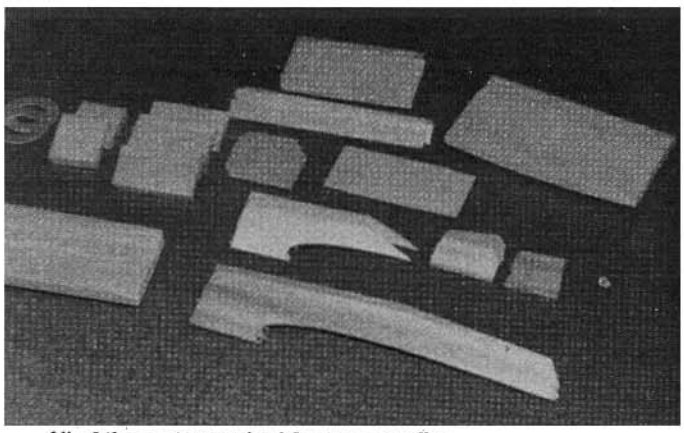
Enlarge the spar notches in ribs 3 and 4. Glue the top spar in place.

Glue the spar webs to the front of the spars. Spar webs are not needed outboard of rib 6. Glue the 1/8" x 1/4" tank floor support to the front of the spar web between ribs 3 and 4, 3/4" below the top of the top spar.

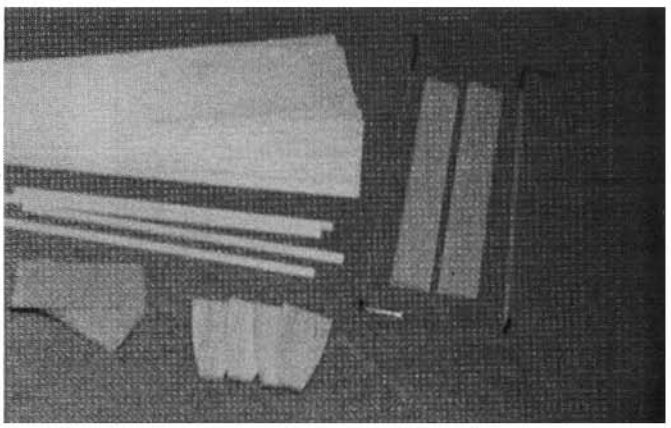
Complete kit instruction 6.

Cut out the **top** leading edge sheeting and the top half of the leading edge between ribs 3 and 4.

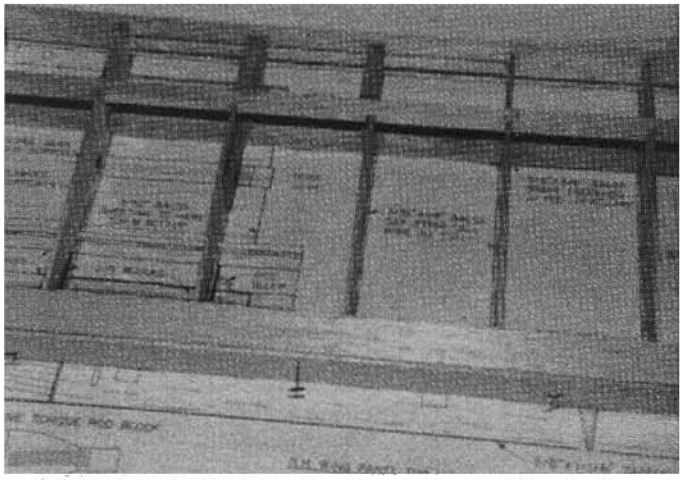
Install your throttle cable housing. Leave at least 4" beyond the leading edge of the wing. It will be necessary to



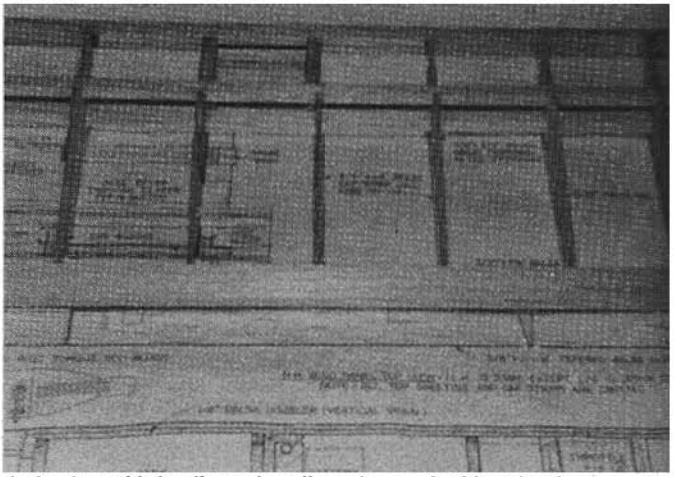
All of the parts required for two nacelles.



The parts needed to modify and extend the wings.



Right wing with leading edge rib and spar doublers in place.

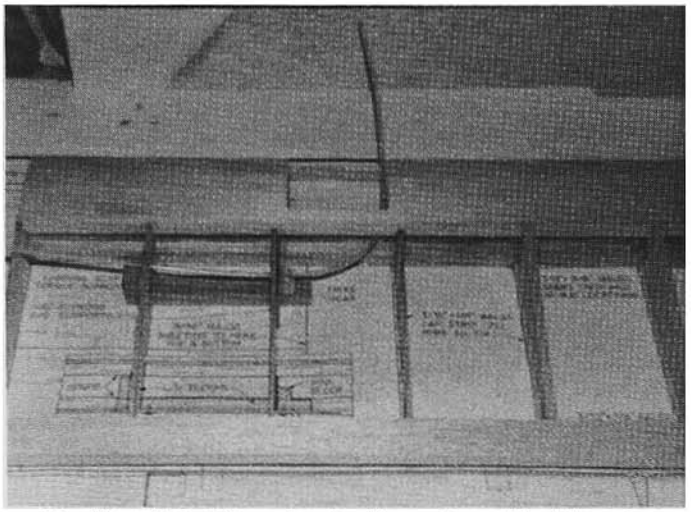


Left wing with leading edge rib and spar doublers in place.

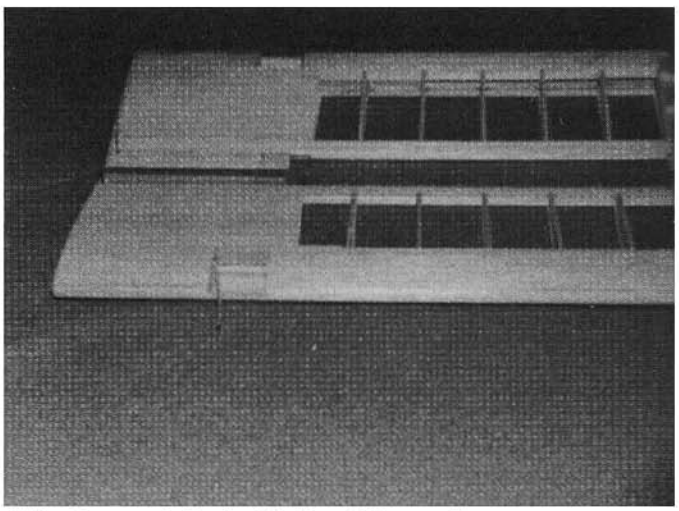
plan your wing servo installation at this time. Try to minimize the amount of center section sheeting which will need to be cut away. The use of a mini servo for the throttles greatly simplifies this task.

Complete kit instructions 7 through 14. Remember to use the longer center sheeting instead of that supplied in the kit.

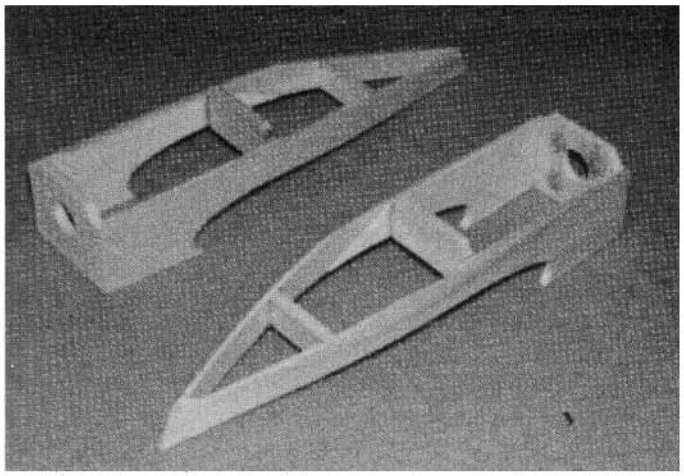
Build the left wing upside down over the plan. Start by gluing the spar doubler to one of the spars. This becomes the bottom spar for this wing because you are building it upside down. Be careful that the leading edge doubler, landing gear blocks and the cut-out in the leading edge sheeting are reversed from the other wing. It helps if you lay the completed wing upside down next to the one you are building. One final note: The throttle cable goes on the **outboard** side of the right wing and **inboard** side of the left



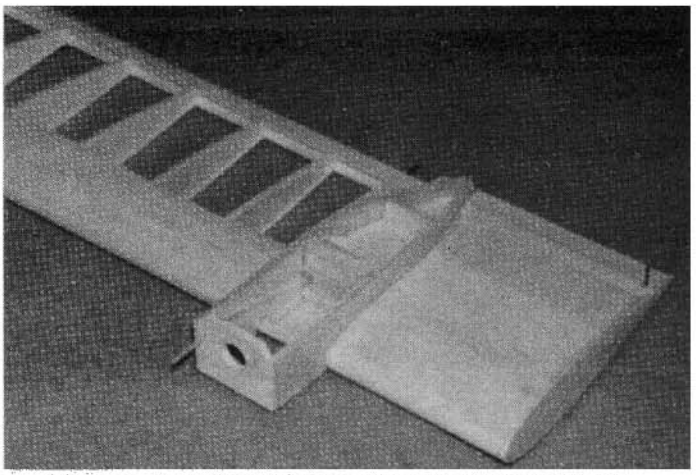
Throttle cable leading edge sheeting and gear block have been added.



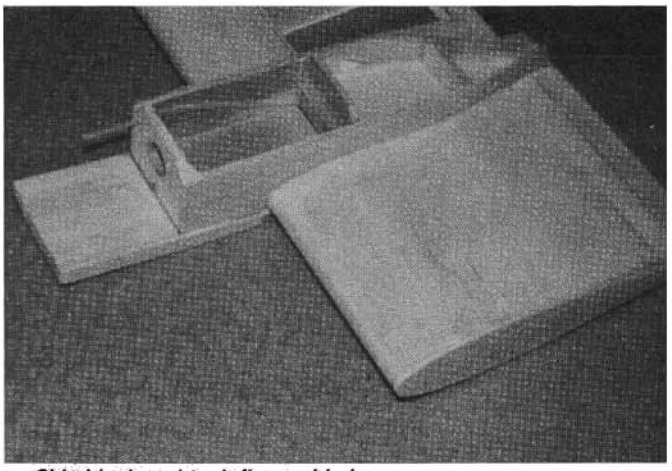
Both wings ready for installation of the nacelles.



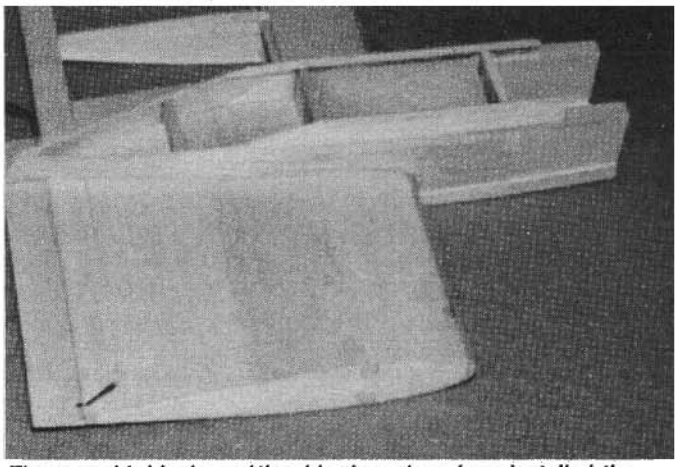
A pair of nacelles ready to be installed.



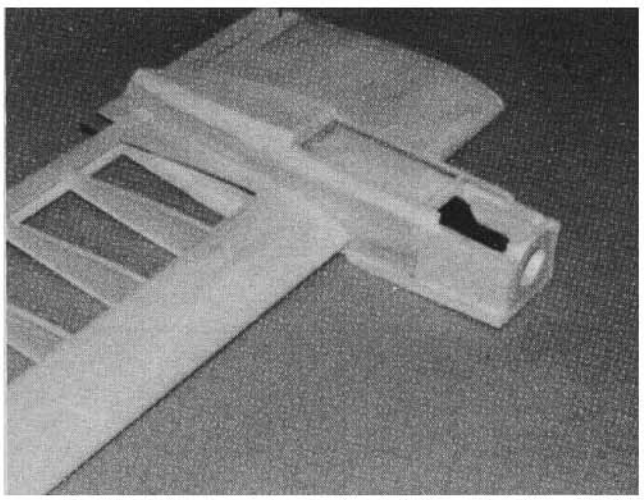
The right nacelle mounted on the wing. (Careful checking is required here to assure a straight flying airplane.)



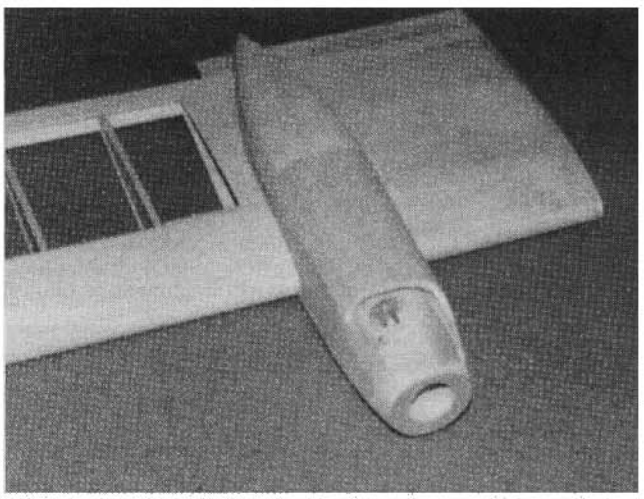
Chin block and tank floor added.



The nose side blocks and the side pieces have been installed, the tank is being fitted.



The rear top block and front filler block glued in place.



With the front top block tacked in place, the nacelle is sanded to final shape.

wing.

Complete kit instructions 15 and 16.

Installing The Center Trailing Edge:

Complete kit instructions 1 and 2. Discard the pine torque rod blocks and short torque rods from the kit. Use 9" sections of balsa trailing edge stock and bend new torque rods 9¾" long from 3/32" music wire. (Be sure to make a right and a left.)

Nacelles:

Now it is time to build and install the nacelles. We will get back to the kit instructions after that is finished. I found it easiest to build both nacelles at once.

Mark and drill the firewall for the engine mount, throttle cable and tank neck. Install the blind nuts. Temporarily install the mount and cut off the mounting bolts flush with the back of the blind nuts.

Draw a line across the back of the firewall 3/8" above the bottom. This line will be used later as a guide for the tank floor.

Using the firewall as a spacer, glue the nacelle side doublers to the nacelle sides 1/4" behind the front edge. Be

sure to make a right and a left side for each nacelle.

Mark the position of bulkhead N-1 on both nacelle sides. Glue the firewall and bulkhead N-1 to the inside of one nacelle side. Make sure they are 90° to the nacelle side.

Align the nacelle sides/bulkhead assembly over the top view of the nacelle plan. Glue the firewall and bulkhead N-1 to the second side, being certain that both sides are flat on the building board.

Slightly relieve the inside of the nacelle sides at the rear for a better glue joint. Glue them together and add a 1/4" triangle balsa filler.

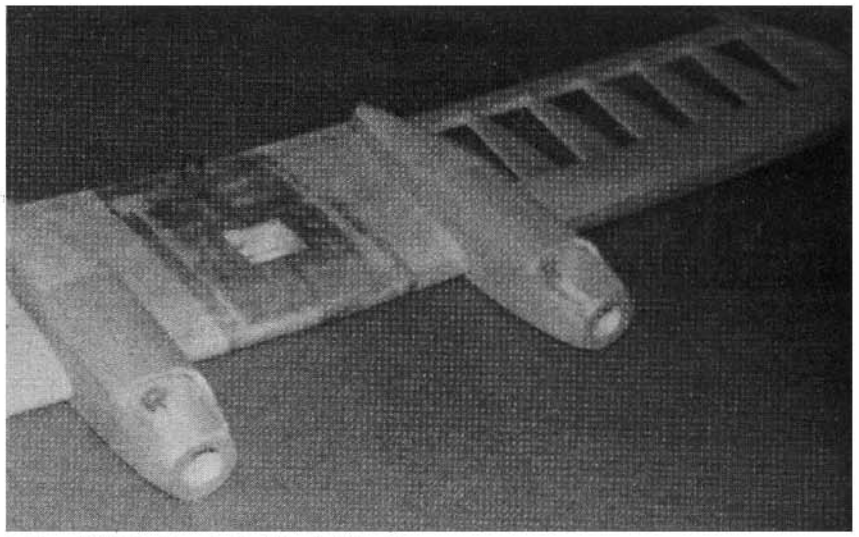
Sand the sides of bulkhead N-2 to fit the angle of the nacelle sides. The purpose of this bulkhead is to keep the sides from bowing out at the top. Its exact position is not critical. Put it wherever it fits best, but do make sure that it is installed parallel to N-1.

Custom fit the nacelle to the wing. **Important:** The top of the nacelle sides must be parallel to the center line of the wing. The rear end of the nacelle should be 7¾" from the wing center. One or two degrees out-thrust is okay. In-thrust is a no-no! Glue the nacelle to the wing.

Draw a line 3¼" from the front of the chin block. This line is for the front of the firewall. Using this line as a guide, custom fit the chin block to the bottom of the nacelle and front of the wing. Rough shape the outside of the chin block, and then glue it into place.

Install the light ply tank floor. The tank floor should meet the back of the firewall within 1/8" of the line drawn earlier. If not, recheck all alignments and adjust as required.

Drill a drain hole through the firewall from the bottom of the tank compartment to just above the chin block. Coat the inside of the tank compartment with resin or CA. These steps are not required, but will eliminate damage in the event of a tank leak.



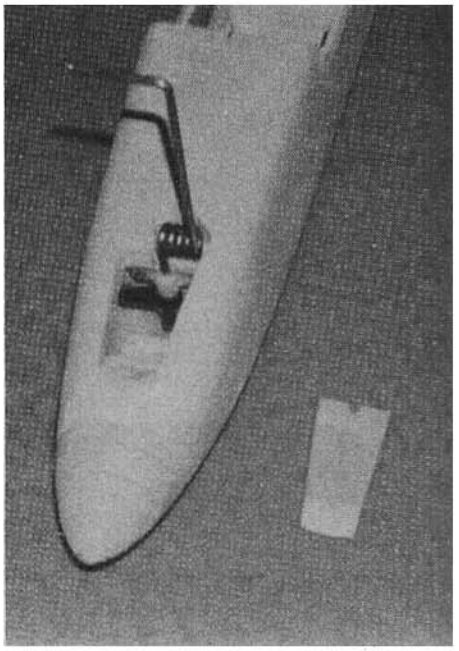
Left and right wings joined and glassed.

Install a 6 or 8 oz. Sullivan RST fuel tank. Use thin foam rubber padding all around it.

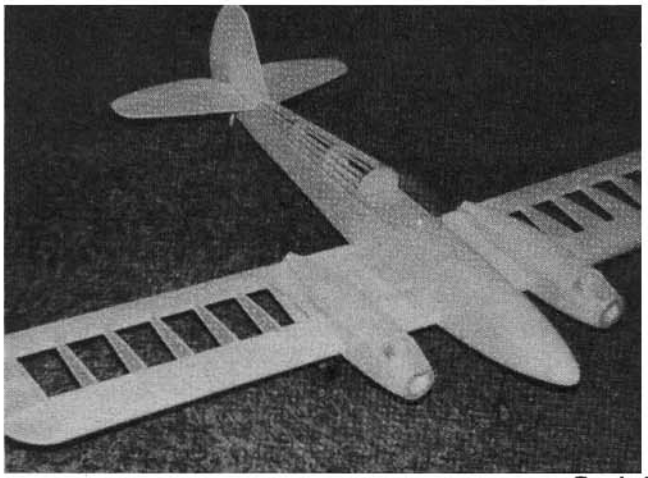
Sand the bottom of the 1/4" balsa side pieces so they mate squarely with the nacelle sides. Glue the side pieces in place, curving the rear end in slightly to follow the nacelle side shape. Sand the top of the side pieces flush with the top of the firewall and bulkhead N-1. Then taper the rear of the side pieces from N-1 to the nacelle sides at the rear.

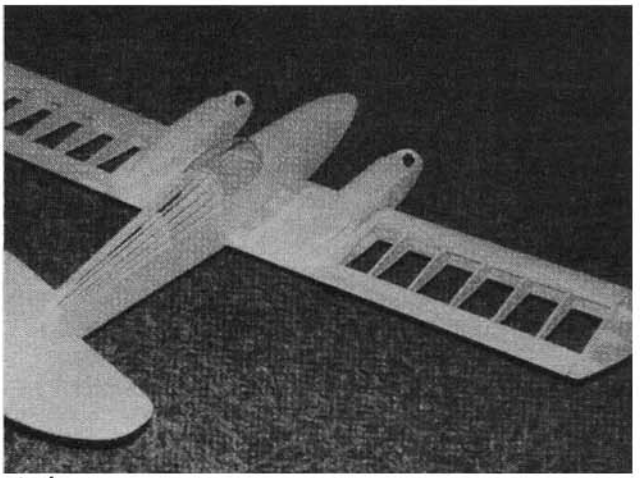
Rough shape the front and rear top blocks and glue them on. Sand top blocks to final shape.

Groove the inside of the right nose side block for throttle linkage clearance. Glue the nose side blocks in

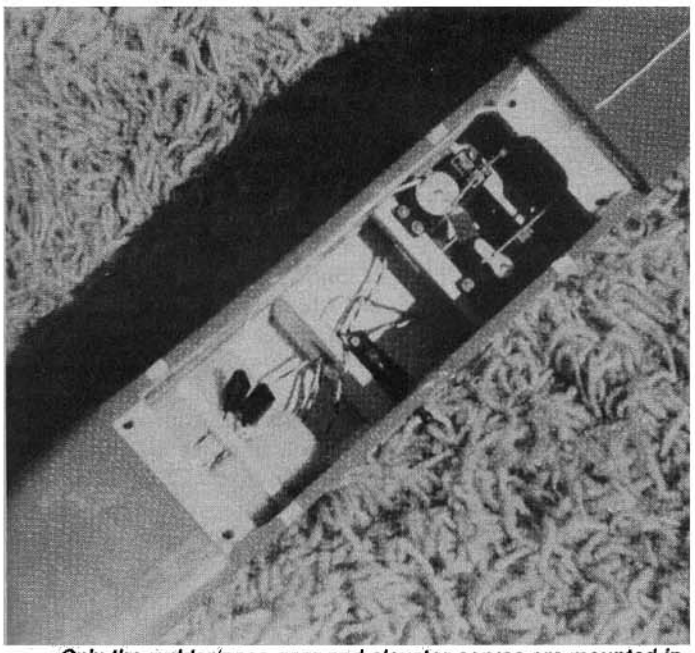


Bottom of fuselage nose with view of nose gear.

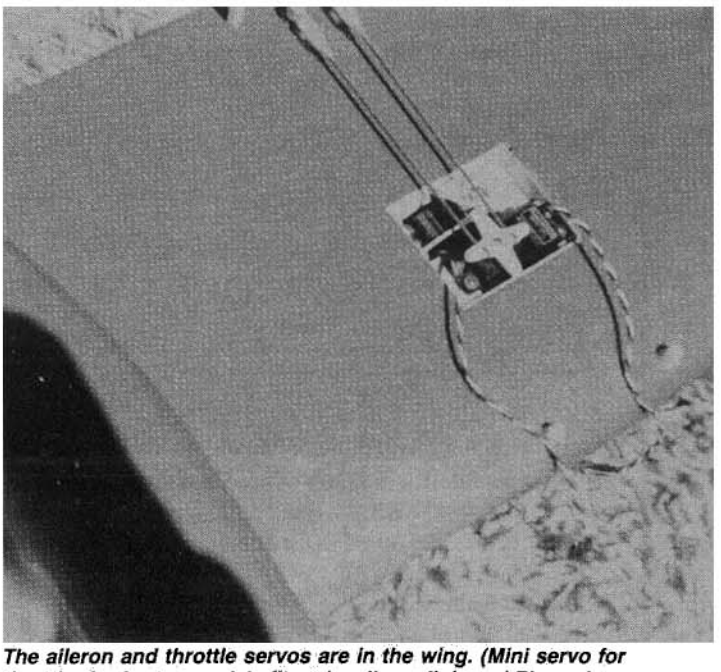




Ready for covering.



Only the rudder/nose gear and elevator servos are mounted in the fuselage (nose is to the right).



The aileron and throttle servos are in the wing. (Mini servo for throttles is short enough to fit under aileron linkage.) Plans show an alternate installation.

place.

Temporarily install your engine. Trim the nose side blocks as required for needle valve and muffler clearance. Trim the front filler block to clear the crankshaft, carburetor and throttle linkage. The top block and front filler block will have to be trimmed so that the engine can be easily removed. Glue the front filler block in place.

Using your spinner as a guide, glue the spinner ring to the front of the nacelle. Remove the engine and add 3/8 triangle along the bottom sides of the engine compartment. Sand the nose to the shape of the spinner ring.

Drill a drain hole through the chin block at the base of the firewall. Coat the inside of the engine compartment with epoxy or resin.

Now it's back to the kit instructions.

Joining The Wing Panels:

Complete kit instructions 1 and 2.

Join the wing panels right side up. Place a 1" block under the #9 rib of each wing. Sand the center rib for a good fit. Hold the leading and trailing edges in alignment and drip thin CA into the center joint. Fill any gaps with thick CA.

Glass the center section, using 6 oz. fiberglass cloth at least 6" wide. **Important:** Do **not** omit this step. This is what holds the wings together.

Cut out the servo well in the top of the wing. Install your throttle and aileron servos.

Score and crack the 1/16 plywood wing bolt plate across the middle. Glue this plate to the bottom rear of the wing to prevent the rear bolt from crushing the balsa trailing edges.

Preparing The Ailerons:

Complete kit instructions 1 and 2.

Building The Fuselage:

Complete kit instruction 1.

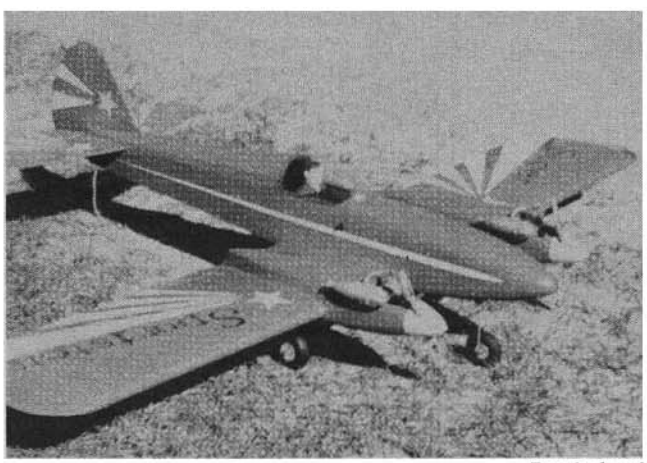
Prepare Bulkhead #1. Mark the top, front of the bulkhead. Mark and drill the holes for the nose wheel bracket and install the blind nuts. Mark and drill the steering linkage hole.

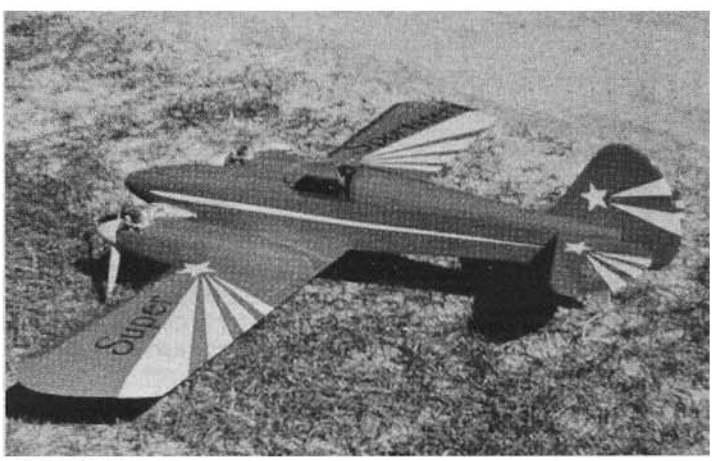
Complete kit instructions 3 through 30.

Cut the top block down to 5½" long. Draw a line along the center of the top of former 2A. The shortened top block goes behind this line.

Complete kit instructions 31 through 35.

Install the elevator and rudder/nose wheel servo mounts and servos.





Ready for the maiden flight.

Install the nose wheel pushrod now. Drill a hole in the chin block for the nose wheel strut.

Cut the 1/4" side pieces off flush with bulkhead #1. Add a piece of 1/2" balsa scrap to the top of each nose side block to make it 3/8" higher. Glue the nose side blocks in place.

Cut the front block down to 2" x 2¼". Sand an angle on the bottom of this block to fit the chin block. Sand a matching angle on the top of the front filler block and then glue it in place.

Draw a line along the outside of the nose side block and the side pieces from the top of the front filler block to the base of the top block at Former 2A. Cut along this line and sand so that the front top block will fit flat.

Glue 3/8" triangle along the back sides of the front filler block and 1" back along the bottom and top of the nose side blocks. Now glue the front top block on.

Sand the front of the nose flat and draw a 2½" circle in the center. This circle is a sanding guide. Carve and sand the nose to the shape of the circle.

Rough shape the nose block. Glue it on and sand the entire nose to its final shape.

Using a new #11 X-Acto blade, carefully cut out the nosegear access hatch in the bottom of the nose. Install a 1/16" ply screw plate at the front, and 1/8" balsa tongue at the rear to hold the hatch in place. Relieve the chin block for nosegear spring clearance.

Complete kit instructions 41 through 48.

Installation Of The Radio And Linkages:

Complete kit instructions 49 through 53.

Flight Trim:

Engine, wing and stabilizer incidences are all 0°.

Control travel should be as called for in the kit.

Engines should be well broken in and carefully syncronized at idle and full throttle.

The Super Sportster Twin **will** fly on one engine, but the best advice is --- if you lose an engine, chop the throttle and land it. Better safe than sorry.

Flying Cautions:

There aren't any — go out and have a ball! □

From RCModeler Jan. 1985