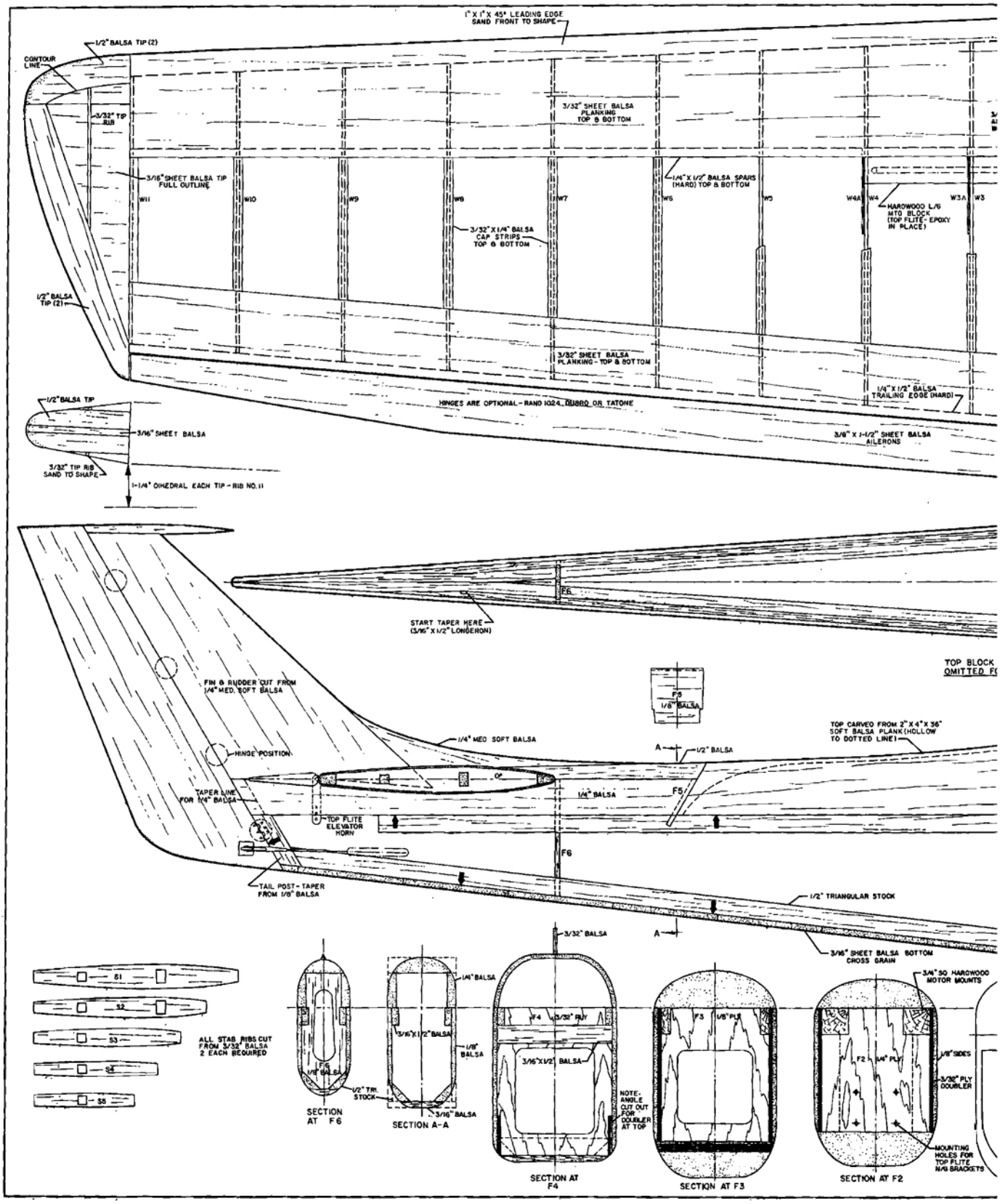
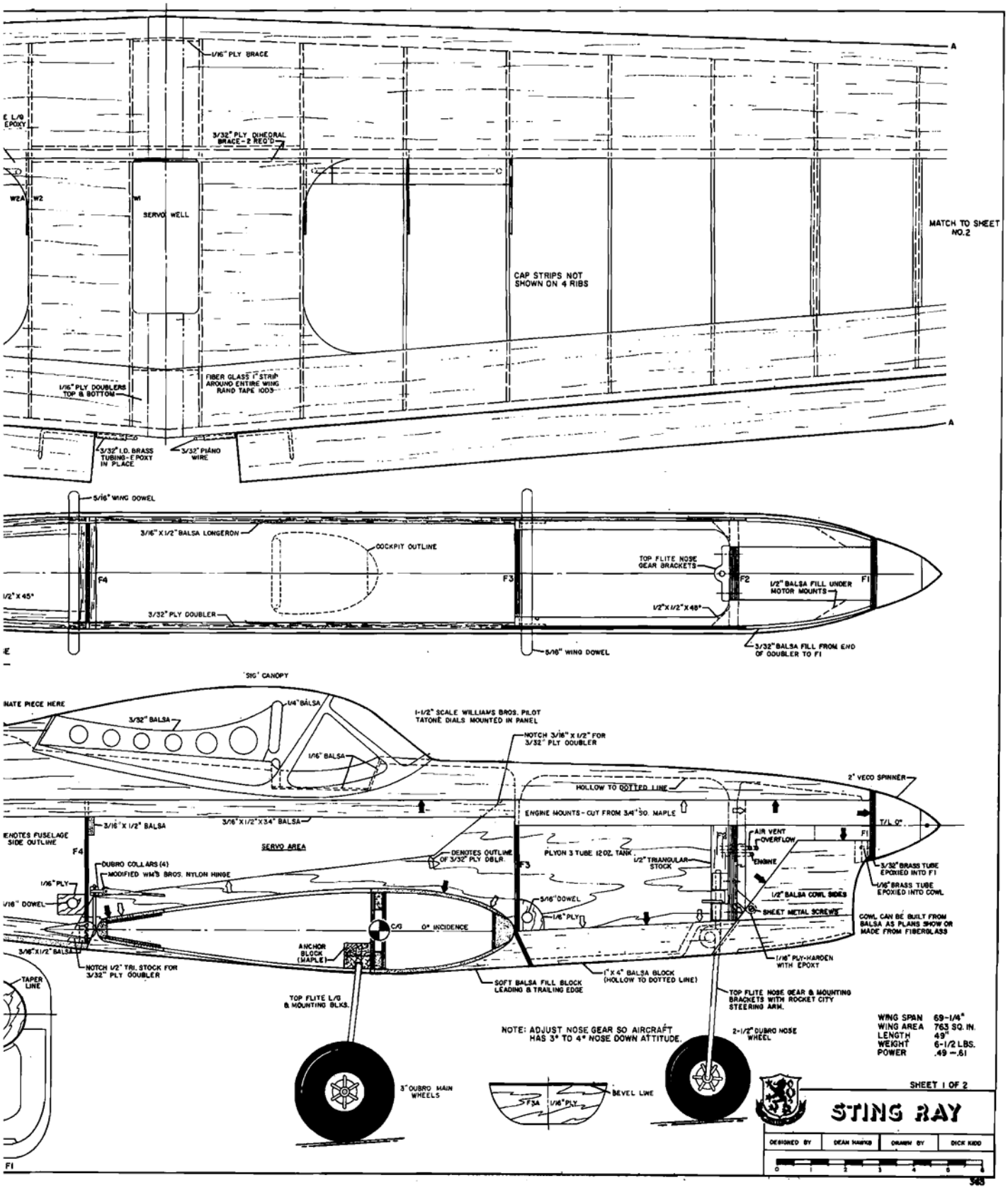
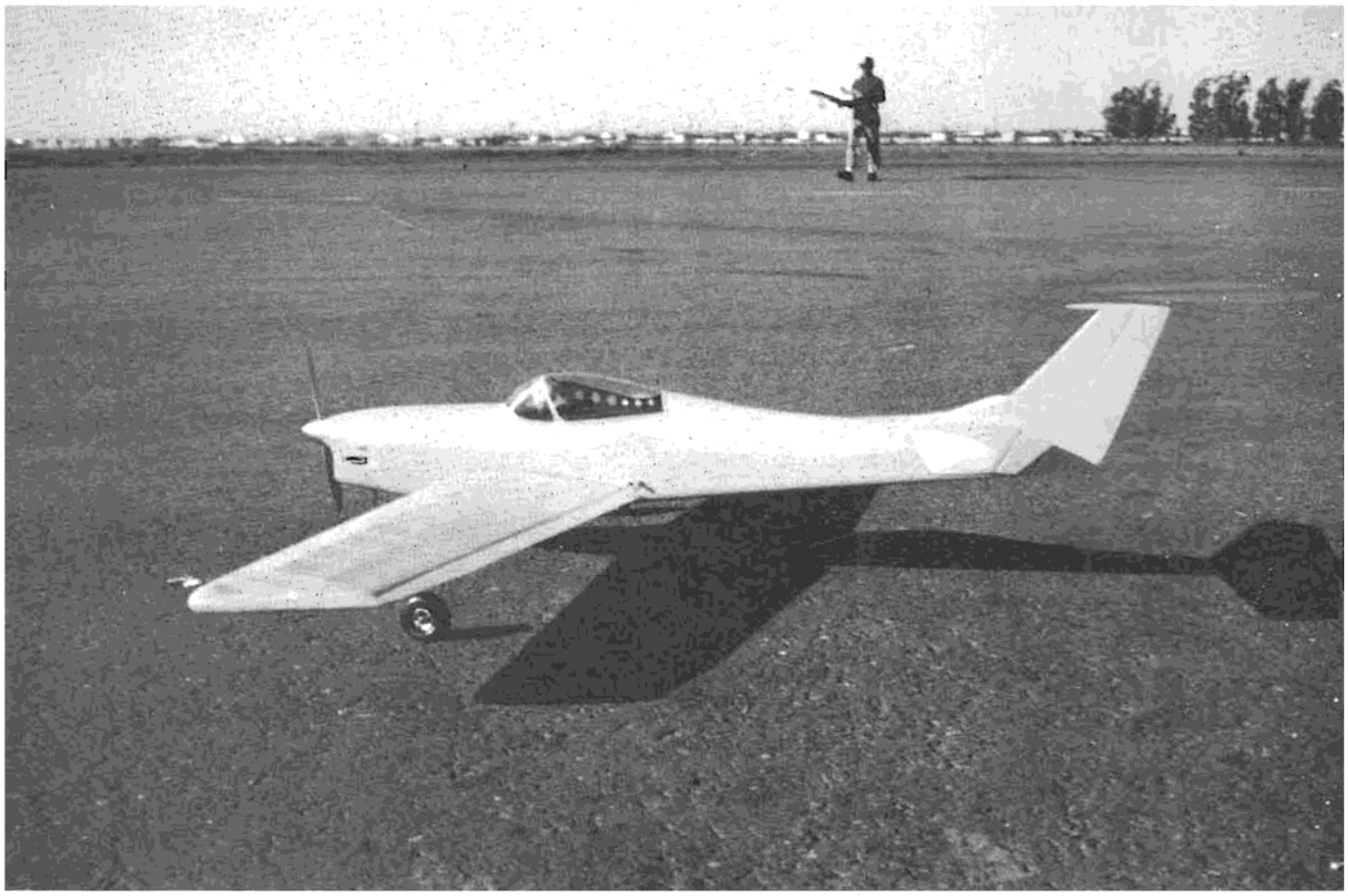
STING RAY


1" X 1" X 45° LEADING EDGE SAND FRONT TO SHAPE
1/2" BALSA TIP (2)
CONTOUR LINE
3/32" TIP RIB
3/16" SHEET BALSA TIP FULL OUTLINE
3/32" SHEET BALSA PLANKING TOP & BOTTOM
1/4" X 1/2" BALSA SPARS (HARD) TOP & BOTTOM
W11
W10
W9
W8
W7
W6
W5
W4A
W4
W3A
W3
HARDWOOD L/G MTG BLOCK (TOP FLITE- EPOXY IN PLACE)
3/32" X 1/4" BALSA CAP STRIPS TOP & BOTTOM
1/2" BALSA TIP (2)
3/32" SHEET BALSA PLANKING - TOP & BOTTOM
1/4" X 1/2" BALSA TRAILING EDGE (HARD)
HINGES ARE OPTIONAL - RAND 1024, DU882 OR TATONE
1/2" BALSA TIP
3/16" SHEET BALSA
3/32" TIP RIB SAND TO SHAPE
1-1/4" DIHEDRAL EACH TIP - RIB NO. 11
3/8" X 1-1/2" SHEET BALSA AILERONS
F6
START TAPER HERE (3/16" X 1/2" LONGERON)
TOP BLOCK OMITTED F
FIN & RUDDER CUT FROM 1/4" MED. SOFT BALSA
F5
1/8" BALSA
TOP CARVED FROM 2" X 4" X 36" SOFT BALSA PLANK (HOLLOW TO DOTTED LINE)
1/4" MED SOFT BALSA
HINGE POSITION
A
1/2" BALSA
TAPER LINE FOR 1/4" BALSA
1/4" BALSA
F5
TOP FLITE ELEVATOR HORN
F6
TAIL POST - TAPER FROM 1/8" BALSA
1/2" TRIANGULAR STOCK
A
3/16" SHEET BALSA BOTTOM CROSS GRAIN
S1
S2
S3
S4
S5
ALL STAB RIBS CUT FROM 3/32" BALSA 2 EACH REQUIRED
3/32" BALSA
1/4" BALSA
F6
1/8" BALSA
1/2" TRI. STOCK
3/16" X 1/2" BALSA
1/8" BALSA
3/16" BALSA
SECTION AT F6
SECTION A-A
F4
3/32" PLY
3/16" X 1/2" BALSA
NOTE- ANGLE CUT OUT FOR DOUBLER AT TOP
SECTION AT F4
F3
1/8" PLY
SECTION AT F3
3/4" SQ HARDWOOD MOTOR MOUNTS
F2
1/4" PLY
1/8" SIDES
3/32" PLY DOUBLER
MOUNTING HOLES FOR TOP FLITE N/G BRACKETS
SECTION AT F2

AN RCM CONSTRUCTION FEATURE

BY DEAN HAWKS





FIRST of all, I am not going to sit here and write—"I spent ten years in the development of the Sting Ray"—and insult your intelligence! Actually, I simply didn't care for what I saw on the flying fields so I decided to do something about it. Being a former ukie stunt flier, I wanted to see beauty and grace in my aircraft.

R/C Class III designs are in a drastic rut insofar as being conventional is concerned. I feel that, for me at least, the Sting Ray is a step in the right direction. A lot of fliers will scoff at the cowled inverted engine, but they can stay in their rut. You and I will step forward and, at least, try to improve, beautify, and put realism into our aircraft. After all, that is why we fly radio control.

The first prototype of the Sting Ray flew 'right off the drawing board." The only modification I had to make was to the landing gear, which was too far apart. I recommend a twenty-four inch wheel width for this particular design. The Top Flite "Taurus" nose gear tiller arm proved to be too sensitive, and I subsequently found that a tiller one inch in length was quite satisfactory.

Insofar as the general acceptance of the Sting Ray is concerned, it has been overwhelming. The very fact that well known R/C'ers have shown a definite interest in this ship has confirmed my own idea that R/C'ers, in general, are looking for more modern and realistic designs.

Okay, so much for the sales pitch. You guys who will be spending your money to build the Sting Ray (or stealing your wife's grocery loot) will want to know how she performs. In one word—beautifully! I use a Super Tigre .56 and a Rev-Up 12/5 prop. With this combination she is a sweet, docile aircraft. With an 11/8¼", she becomes a hot contest stunt ship. If a bumble thumb like me can fly this airplane, anyone can fly it. Even a beginner!

In sofar as the construction of the Sting Ray is concerned, it is quite simple, and anyone with a moderate amount of building knowhow will find little difficulty in putting this bird together. If you should have a problem, or a question, drop me a line c/o Dean Hawks, 2950 West Lynrose Drive, Apt. R2, Anaheim, California.

Construction

I normally begin construction with the fuselage. Take a sheet of 1/8" x 4" x 48" medium soft balsa and mark the location and dimension points of bulkheads, wing centerline, and engine mount bearer, on the wood itself. Then, with a ball point pen, draw the fuselage outline on a balsa.

Cut out the fuselage side, then trace this on a similar sheet of matched wood for the other side. Make absolutely certain your wing cradle will give you a 0 degree incidence and is absolutely true to the airfoil curve.

Next, cut your spinner bulkhead, firewall, and next two bulkheads. The firewall is cut from ¼" plywood. Now cut two 3/32" plywood doublers and glue them in place with Titebond or epoxy. While these are drying, mark the holes in the firewall for the nosegear mount, throttle control linkage, and fuel draw and air vent tubing. Drill these accurately. Now epoxy the firewall in place, following up immediately with the next bulkhead. Cut a large lightening hole in this one, leaving a half inch width from the outside of the bulkhead itself, to the perimeter of the lightening hole.

Flip the fuselage upside down and line up the two bulkheads and sides over the plans. Let the epoxy completely cure before you handle it again.

While this assembly is drying, you can cut out the fin and rudder. Sand the rudder to a symmetrical shape. Next, prepare the mounting pieces that go under the stabilizer. Again, make certain that you maintain a 0 degree incidence. Place a 1/16" balsa doubler (grain vertical) inside the fuselage, reinforcing the seam where the stab mount butts against the fuselage sides. This balsa doubler should run from the tail post up to the bulkhead that connects to the fuselage top. Glue in place with Titebond. Now join the sides together at the tail, leaving the entire fuselage assembly on the plans to assure a true shape without any misalignment.

Now you can drill and mount the blind nuts for the engine. Next, tack glue the soft balsa top decking in place. This can be laminated from 1" x 4" x 36". I used an X-Acto wood plane to carve the top and also to blend it into the fuselage contour. After carving and sanding to the desired shape, build the cockpit. Take your time—this sort of detail really sets off one ship from another. Now, pop off the top of the fuselage and put in the cockpit floor and instrument panel.

After this step, you can start hollowing out the fuselage to a 1/8" thickness. Do a good job here, making sure to sand carefully when you have finished.

Lay the fuselage upside down and sheet the bottom. Use a square or a 30/60-45/90 degree triangle to make sure the sides are vertical, then glue the top on, again using Titebond.

Now build the stabilizer and elevator as shown on the plans. The stab is sheeted with 1/16" medium soft sheet and silkspan covered.

The cowling on this ship is very easy to build, **but** you have to be careful in carving the outside shape. The first step is to mount the engine, removing the exhaust baffle before so doing. Use 1/2" thick sheet blocks for the sides; a 1 1/2" block for the bottom; and a 1 1/2" x 1" block to join the sides. Cut a glow plug access hole before glueing the bottom to the sides.

Lay the sides against the head of the engine. Now rough carve the shape of the cowling. Now pop off the cowling, replace the exhaust baffle, and carefully carve the inside of the cowling to clear the exhaust and carburetor. Now epoxy a 1/16" plywood plate to the cowling where it butts up against the plywood spinner plate. An opening has to be cut for the nose gear—this also serve as a hot air outlet, so carve accordingly.

A 1/16" plywood plate is epoxied to the rear of the cowling nose gear opening. A 4-40 or 6-32 blind nut is epoxied into the balsa block behind the cowling to serve as a hold-down.

At last we come to the wing. Believe it or not, it's a snap to build. Simply trace the full size ribs on to very thin tracing paper. Now cut the paper into rectangles, then glue them to 3/32" sheet balsa. (I prefer to dope these patterns on to the wood—your choice.) Now cut out the ribs and peel off the paper templates.

Mount the 1/4" x 1/2" spars in place but do not glue as yet. Pin the leading and trailing edges in position. Now find the exact center of the L. E. and T. E. Block with scrap and pin firmly. Go ahead and start glueing the spars, leading and trailing edges, in place. Sheet the trailing edge with 3/32" sheet. The wing gets 1 1/2" dihedral—don't give it any more than that!

The spars are joined together in matrimony with 1/16" plywood, both front and rear. The sheeted trailing edge centers are supported by 1/16" plywood and epoxied. The wingtips are made up with two pieces of 3/16" soft balsa and four pieces of 1/2" soft balsa. The 3/16" balsa pieces are the center plates, built up with 1/2" rims. The landing gear ribs are beefed up with 1/16" plywood, ala Taurus.

Well, you guys, that's about all I can think of to pass along to you regarding the construction of the Sting Ray. With the exception that wing fillets and dummy exhaust pipes can really set it off. Fillets improve the aerodynamics of an aircraft as well.

Since every construction article seems to imply that the prototype was retired intact, I'll mention that I cracked mine up. Damn it, it broke my heart, too! It hit so hard that the fuselage virtually exploded. The wing and tail group remained intact, however, making it rebuildable. It wasn't radio or aircraft failure, by the way—just plain, dumb pilot error.

So, go ahead and build the Sting Ray. It's a sweetheart, and you'll be the envy of your R/C flying buddies.