

# DeeDee

## .61 Powered Sport Flier

*Author's niece's daughter,  
Kristin O'Conner.*

In designing this sport model several goals were established. They were: keep the weight as low as possible, keep the construction as simple as possible, give it aerobatic capabilities, and, most importantly, make its appearance pleasing. The model's name is taken from the initials of the club I belong to — the DCRC (District of Columbia Radio Control).

First of all let me make a brief comment on the airfoil and then I'll get into the construction details. As you can see from the plans the airfoil is very thick. The airfoil used is the Eppler 473, a symmetrical section whose thickness has been

increased from 16.19% to 18%. Over the years I've been favoring thick sections as they have suited my desires for planes that do not fly too fast and have docile handling traits. In this model these conditions have been realized. That being said it's time to start building.

In order to keep the weight on the low side be very careful in your selection of balsa wood by using light to medium weight stock.

### **Fuselage:**

The first step is to make all of the necessary parts. This includes the sides, doublers, formers and landing gear blocks. Start by

# cee

By Ron Bozzonetti



preparing the 1/8" balsa sides. As the fuselage is long it will necessitate splicing sheets together. I made the splice at the rear end where the size of the cut will be minimal and will be reinforced by a balsa doubler. The plan shows the splice based on the use of 48" long balsa sheets. 4" wide balsa was used which will

require the addition of some balsa at the front end to build up the width to the necessary profile.

After the sides are cut to shape, 1/2" wide triangular stock is added along the edges except for the area where the landing gear plate is located. This allows the corners to be rounded to give a much more pleasing look than if they were left square. To facilitate bending the triangular stock, kerfs are cut every 1/2" along the

curved pieces on the front end of the fuselage.

The next step is to add the 1/16" ply doublers to the front of the fuselage. Note that the doubler is short of the fuselage side along the wing saddle area. This is to make it easy to sand the fuselage side when fitting the wing to the fuselage. Make sure that you cut out the hatch opening from the left side of the ply doubler before it is cemented in place. When in place, push a pin through the balsa side at

## DeeCee

Designed by:

Ron Bozzonetti

### TYPE AIRCRAFT

Sport Aerobatic

### WINGSPAN

68-1/2 Inches

### WING CHORD (MAC)

14 Inches

### TOTAL WING AREA

959 Sq. In.

### WING LOCATION

High Wing

### AIRFOIL

Eppler 473 (18%)

### WING PLANFORM

Double Taper

### DIHEDRAL, EACH TIP

.72 Inches

### OVERALL FUSELAGE LENGTH

58-1/2 Inches

### RADIO COMPARTMENT SIZE

14-5/8" (L) x 2-5/8" (W) x 3" (H)

### STABILIZER SPAN

28 Inches

### STABILIZER CHORD (inc. elev.)

6-1/2 Inches (Avg.)

### STABILIZER AREA

69 Sq. In.

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Top of Fuselage

### VERTICAL FIN HEIGHT

18-1/4 Inches

### VERTICAL FIN WIDTH (inc. rud.)

12-1/4 Inches

### REC. ENGINE SIZE

.61 2-Stroke

### FUEL TANK SIZE

14 Oz.

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

4

### CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

### C.G. (from L.E.)

4-1/2 Inches

### ELEVATOR THROWS

1/2" Up — 1/2" Down

### AILERON THROWS

3/8" Up — 3/8" Down

### RUDDER THROWS

1" Left — 1" Right

### SIDETHRUST

—

### DOWNTHRUST/UPTHRUST

—

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa & Ply

Wing ..... Foam, Balsa & Ply

Empennage ..... Balsa & Ply

Wt. Ready To Fly . . . 125 Oz. (7 Lbs. 13 Oz.)

Wing Loading ..... 18.8 Oz./Sq. Ft.



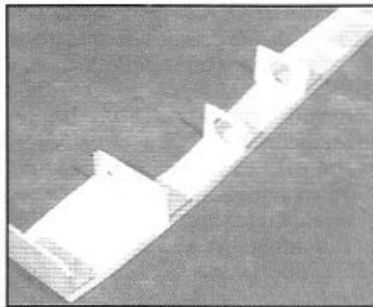
Roy Day, author's friend and fellow club member, photographed the Dee Cee in-flight.

each corner of the hatch cutout so that it can be accurately located when it is cut out later. The hatch outline shown on the plan was made for a Du-Bro 14 oz. fuel tank mounted sideways. You should size the hatch opening to accommodate your tank selection. The hatch is secured to the fuselage as shown on the plans. The fuel tank compartment is not very large, especially in width, so make sure that your tank selection will fit. Also, be aware that the landing gear support blocks further restrict the available space. Add the 1/16" vertical grain balsa doublers to the rear of the fuselage. To stiffen the fuselage sides, 1/4" x 3/8" sticks are now added at the locations shown on the plan. The two sides are now ready for assembly. Note that the firewall has the addition of 1/4" x 3/8" balsa sticks added to the top and bottom. This is to make it easy to

sand these two edges to the angles matching the fuselage profile. Also, note that holes are pre-drilled for the engine mount, throttle control rod, and wing hold-down dowel. Holes for the fuel lines are drilled later.

On my models, the engine is mounted sideways merely for aesthetics. In this configuration the muffler just clears the fuselage, but the plans show the engine up-right — so take your choice. Wanting a little bit more clearance I cut a 1/4" extension from a Du-Bro 6" exhaust extension. The two halves are now ready for assembly. The four formers are added to one of the sides, making sure that they are perpendicular to the side. When dry, the other side is glued on, again assuring that it is properly aligned. The next step is to glue the rear of the sides together. This is followed by the





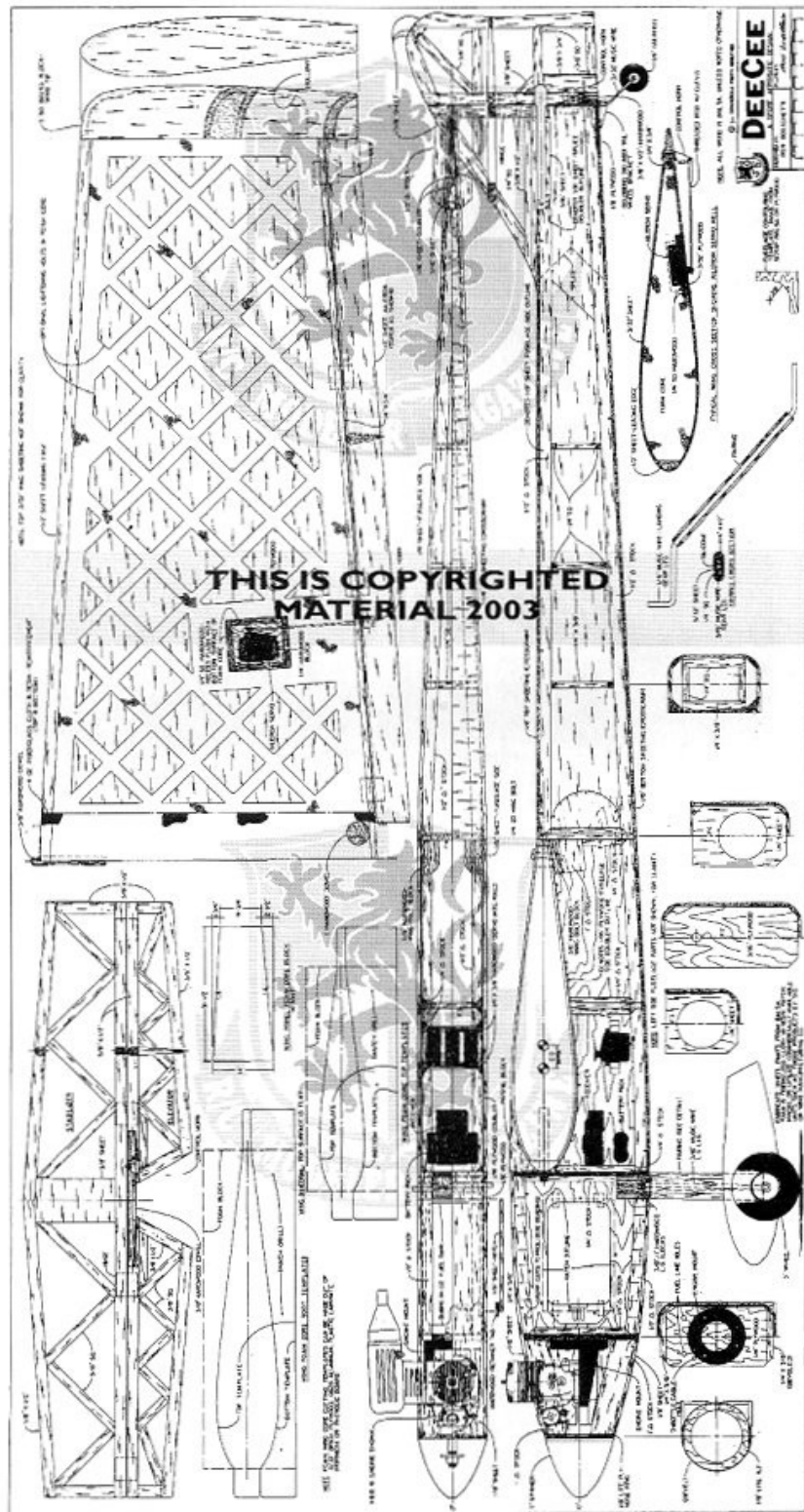
Right side showing formers, triangular stock on edges and fuselage stiffeners.

addition of 1/4" x 3/8" balsa sticks to the top and bottom of the stiffeners previously added to the fuselage sides.

The landing gear support blocks are added at this stage. With a long drill, go through the top triangular stock and drill a hole through the bottom landing gear plate using the vertical block as a guide. Make a small balsa plug to fill this hole in the triangular stock. Add the wing bolt blocks supported by 1" triangular stock. 1/4" triangular stock can now be added to the junctions of the formers and fuselage sides. Add the blind nuts for the engine mount in the firewall. Sand the top and bottom of the fuselage and cover with 1/8" balsa sheet applied cross-grain. The 1/8" ply tail wheel support is added at this stage. Cut out the hatch. I felt a little uneasy relying on just the 1/8" balsa covering to support a tank with a full load of fuel, so I added a layer of lightweight fiberglass cloth to the bottom of the fuel tank compartment after the hatch was cut out. With the fuel tank in place, locate and drill holes for the fuel lines before the cowl is added. I opted to place the elevator servo at the rear of the fuselage. If you decide to do the same, note that the space in the rear is narrow, so make certain that the position you select will allow you to mount the servo without touching the opposite side. With the servo in this location I had to add some lead in the engine compartment to get the model to balance properly. I believe that if the servo was located in the radio compartment, the lead could be eliminated.

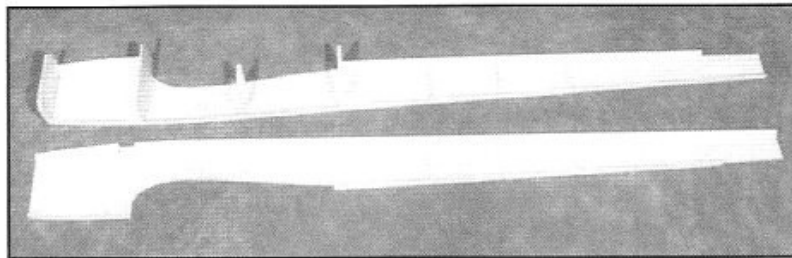
Fill the top of the fuselage where the stabilizer seats with 3/16" balsa. The cowl sides along with the top and bottom were made from 1/8" sheet balsa with 1" triangular stock added to the inside corners. The cowl outline shown on the plan is based on the use of a 3" spinner. Make the cutout for your engine and then sand the back of the cowl as needed to have the front of the cowl align with the spinner backplate. The cowl can now be glued in place.

The shaping of the fuselage can now

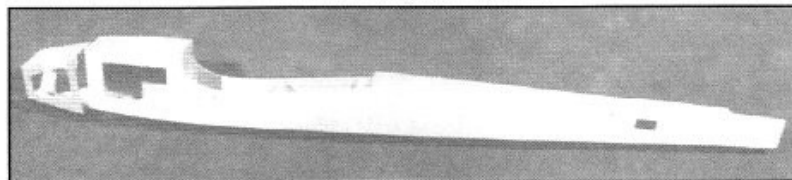


## PLAN #1319

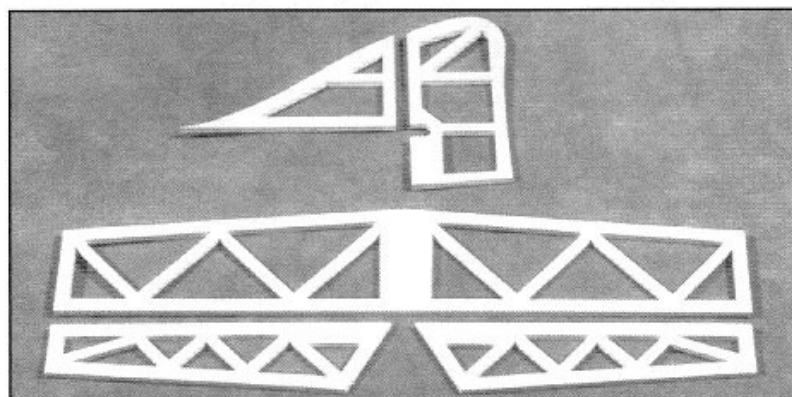
FULL-SIZE PLANS AVAILABLE SEE PAGE 181



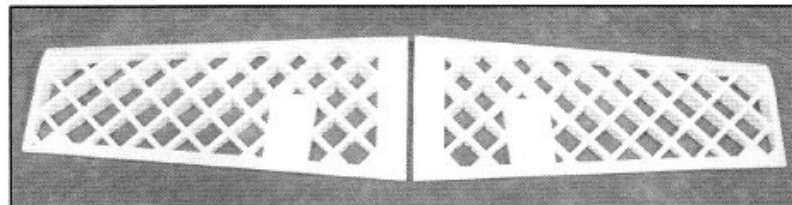
Formers, triangular stock and stiffeners are glued in place. Left fuselage side is ready to be glued on.



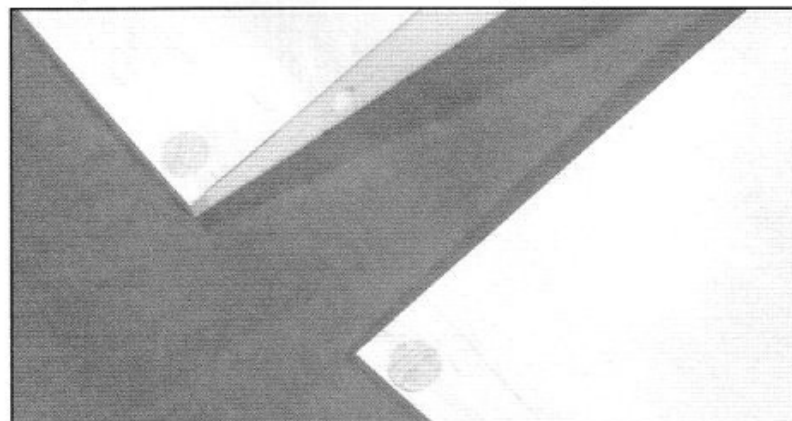
Assembled fuselage ready for the cowl to be glued in place and for the edges to be rounded. The cowl is reversed in this photo to show the cutout for the engine.



Tail assemblies prior to shaping. The hardwood dowel connecting the elevator halves is yet to be added.



Lattice pattern cut from the foam core resulted in a weight savings of 5 oz.



Wing trailing edge showing the hardwood dowel inserts. Note the hole for the servo lead. This hole is lined with a paper tube.

be done. The edges of the fuselage were rounded to a 7/8" radius. It's helpful to make a template for this. Do not round the rear of the fuselage where the vertical fin is located. This is to allow the addition of 1/4" triangular stock for supporting the vertical fin. Likewise, the area at the landing gear block and the area at the trailing edge of the wing were not rounded. And that should take care of the basic fuselage construction.

#### Horizontal & Vertical Tails:

These two components use conventional construction techniques and are made from 3/8" thick balsa. The two halves of the elevator are joined by a hardwood dowel. Sand the rudder and elevator to a taper. The hardwood insert on the bottom of the rudder is to provide additional support for the 3/32" tail wheel wire.

#### Wing:

As can be seen from the plan and the photograph, I cut a lattice pattern out of the foam cores for a weight savings of 5 oz. You'll have to decide whether this savings is worth the extra effort that this entails. The wing loading on my model came out to 18.8 oz. per square foot versus 19.5 oz. per square foot if I had not removed the foam. The lattice pattern is made by making a top and bottom template out of poster board. The templates are taped to the core, and holes are drilled through each cutout. The cutting wire is passed through the hole and guided along the template cutout.

The cores are now sheeted with 3/32" balsa. With the wing sheeted, add the leading and trailing edge stock. Note that the leading edge does not go all the way to the center of the wing but is short of it to allow for the placement of a ply insert that will support the wing dowel. Shape the leading edge and sand the trailing edges flush with the sheet covering. The servo cutouts can now be made along with the holes for the servo leads.

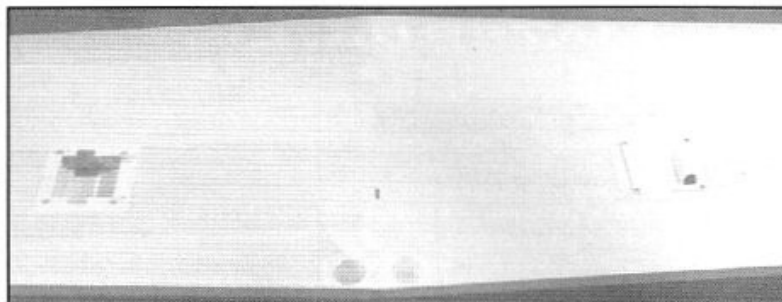
The tips used on this model are Hoerner Vortex Retarder tips and are similar to those used on Cessna aircraft. In theory they reduce the vortices at the wingtip, resulting in a reduction of drag, thereby improving performance. Whether this holds true for models I'm uncertain. What I am certain about is that they do enhance the model's looks and are worth the effort to construct. Mine were made from blocks of balsa, which, after shaping, were hollowed to achieve a 1/4" wall thickness. Join the two wing panels together, keeping the top of the wing flat.

The one-piece ply insert where the 3/8" hardwood dowel will be located is now added and shaped. Locate the position of the wing hold-down bolts and cut holes where hardwood dowels are inserted and sanded flush with the top and bottom wing surfaces. This is to keep the wing bolts from crushing the wing when they are tightened. With the wing sanded smooth, 4 oz. fiberglass cloth, 4" wide, is added to the center section, top and bottom. The ailerons were cut from a 1/2" thick balsa sheet and shaped with a razor plane and sandpaper. After the wing is fitted to the fuselage, you should build up the top center of the wing to fair with the fuselage.

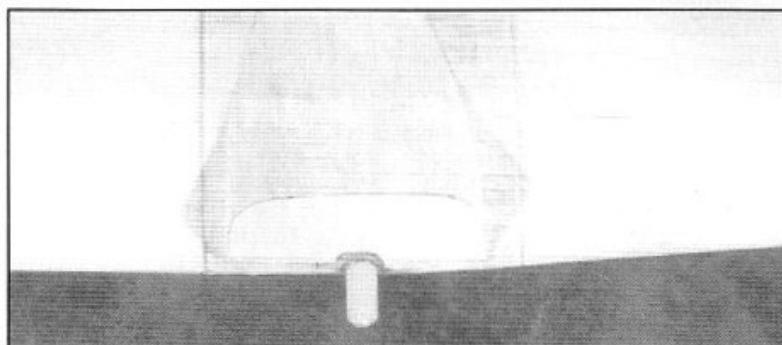
#### Landing Gear:

The struts should be made from 3/16" music wire with the two sections being identical. Our new club field has a paved runway that made the addition of wheel pants practical. To complement the wheel pants, fairings were added to the struts. Note the cross section view on the plan for the fairing. I purposely made the cavity larger than the strut diameter. The theory is that the flexing of the strut will not stress the fairing, causing cracks or glue joint failures. The fairing was attached with RTV silicone adhesive because of its flexibility when cured. This was accomplished by building up one side and the two edges first. The strut was then centered in the fairing, the RTV adhesive was applied, and then the remaining side was glued in place and the whole assembly was allowed to set up overnight. Add 1/4" balsa to both edges of the fairing and when dry you can shape the assembly.

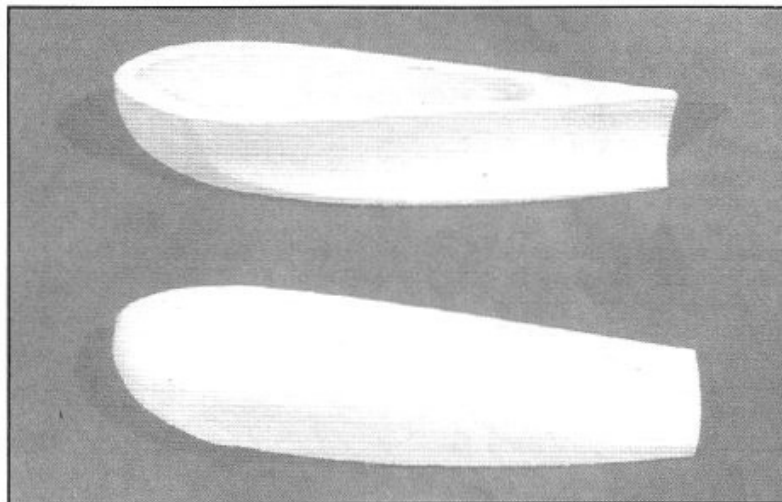
The wheel pants construction utilized a process developed by Marion Mecklenburg, one of our club members, which uses brown paper such as the bags furnished at your grocery store. Forms were made from the same type of foam as the wing cores. Numerous strips, about 2"-3" long and 1/2" wide, were cut from the paper bags. These were thoroughly soaked in a solution of warm water and white aliphatic glue in a ratio of approximately four parts water and six parts glue. Strips of paper are removed from this mixture, with the excessive amount removed by lightly squeezing a strip between your fingers and applying it to the form. You do not want to remove all of the glue mixture but need to retain a thin film to assure a good bond between layers. This action is repeated until the form is completely covered. This is allowed to partially dry and is repeated until five or six layers



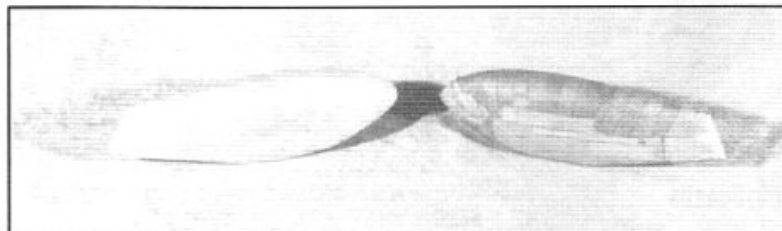
Bottom view of wing center section. Hardwood dowels at trailing edge are where the wing bolts will pass through. Boxes were constructed to house the aileron servos which were then inserted into cutouts in the wing. The servo cover shown on the right also serves as the servo mount. This is an item available from Hobby Lobby. The cutouts for the servo leads is yet to be made.



Wing center section showing the addition of fiberglass cloth and the fairing to the fuselage. A 3/8" dowel is used to hold the wing leading edge in place.



Hoerner wingtips rough shaped. Final sanding is done after the tips are glued onto the wing. The tips are hollowed to achieve a 1/4" wall thickness.



Wheel pant on right is shown prior to sanding. Six layers of brown paper strips have been applied. The wheel pant on the left is shown after sanding and is ready for painting.

## MATERIAL LIST

- 2 — 1/8" x 4" x 48" balsa — fuselage sides
- 1 — 1/8" x 3" x 36" balsa — fuselage sides
- 2 — 1/8" x 4" x 36" balsa — fuselage top and bottom
- 5 — 1/2" x 36" balsa — triangular stock, fuselage
- 1 — 1/8" x 3" x 36" balsa — cowl
- 1 — 1" x 36" balsa — triangular stock, cowl
- 1 — 1/4" x 3/8" x 36" balsa — fuselage stiffeners & cross braces
- 1 — 1/16" x 12" x 24" plywood — fuselage doublers
- 1 — 1/16" x 3" x 36" balsa — rear fuselage doublers
- 1 — 3/16" x 6" x 12" plywood — fuselage former & landing gear blocks
- 1 — 1/4" x 6" x 12" plywood — fuselage former
- 4 — 3/8" x 1/2" x 36" balsa — tail structure
- 1 — 3/8" x 3/4" x 36" balsa — vertical stab. structure
- 14 — 3/32" x 4" x 36" balsa — wing skin
- 1 — 1/2" x 3" x 36" balsa — wing leading edge
- 2 — 1/4" x 3/4" x 36" balsa — wing trailing edge facing
- 1 — 1/2" x 3" x 36" balsa — allerons
- 2 — 3" x 3" x 12" balsa — wingtips
- 1 — 3/16" x 36" music wire — landing gear struts

have been built up. After it has completely dried it can be sanded smooth. Alternatively, one can buy wheel pants from suppliers such as Sig.

### Assembly:

This is the critical part. If you want a good flying model free of any bad traits, then you need to spend a little effort to assure that everything is aligned properly. I start by fitting the wing to the fuselage, making sure that the wingtips are equidistant from the ground and equidistant from the centerline of the fuselage. With the wing aligned and seated on the fuselage, drill the holes for the wing hold-down bolts and the hole for the front dowel. With the wing bolted to the fuselage, fit the stabilizer in place, assuring that it is equidistant from the wingtips and parallel to the wing. To provide additional glue surface for the stabilizer, add 1/2" triangular stock to the fuselage/stabilizer junction. This is critical as the fuselage area at the rear is very small and is inadequate to hold the stabilizer on during aerobatic maneuvers without the benefit of the triangular

stock. Next the fin is fitted, making sure that it is perpendicular to the stabilizer and aligned to the centerline of the fuselage. 1/4" triangular stock is added to the fin/stabilizer junction for additional support.

### Finishing:

The wing, and horizontal and vertical tails were covered with MonoKote, except for the wingtips, which were painted. I've never been successful in getting MonoKote to stick for any length of time in the area around the engine. Consequently, I've been painting my fuselages to overcome this problem. To avoid the chore of preparing the wood of the fuselage by applying a grain filler and then sanding followed by more filler and more sanding, etc., etc. I've adopted the practice of using lightweight silkspan as the filler material which has nearly eliminated the sanding process and results in a smooth grain-free finish. This method was also used on the fairings of the landing gear struts.

### Engine:

I powered my model with a Clarence Lee modified K&B .61. This modified engine has plenty of power and idles beautifully. Modelers looking for a powerful, reliable engine at a reasonable cost should consider this power plant. This size engine is more than adequate for this model if you can keep the weight close to the 7 lbs. 13 oz. that I achieved. I've no doubts that an engine larger than a .61 size will give you a model with sizzling performance.

### Radio:

I outfitted my model with equipment from FMA Direct. The receiver used is the Quantum 8 and the servos are the PS300BB. This equipment has been rock solid with no hint of any problems. Other modelers at our field have likewise experienced the same reliable performance with this equipment.

### Flying:

Balance the model at the forward location shown on the plan for starters. This worked out to be just right for me. This model has not exhibited any bad traits and is a very stable and predictable flier. While a pattern flier I'm not, it will perform most maneuvers that I've tried with ease. These include aileron rolls, loops, spins, and snap rolls. Other pilots who have flown this model have confirmed its stability and predictability. Slow flight is very good with no sluggishness with the controls. The landing traits of this model are reminiscent of the Stik series of models. Touchdowns can be made at a very slow speed with a nose high attitude with no signs of stalling and with complete aileron and rudder responses. All in all, the model is a sheer delight to fly.

