

# CLOUD

# DANCER



By Fred Reese

**T**he Cloud Dancer is a large and graceful aerobatic model that will fly well on relatively low power. The light wing loading gives very forgiving handling while providing exciting aerobatic flying.

There is very little in model design that is totally original. Elements of design are brought together in different ways to create something "new." The Cloud Dancer at first appears to be just another combination of well used design components. However, some new materials used along with some older building techniques on a design that is much larger than most off the shelf models designed for the same power, gives a model that is truly unique. Overall, the appearance is that of a skinny P-51 with a different tail group. What makes the Cloud Dancer different is its size, light weight and ability to really perform on smaller engines. Designed for .40 to .60 sized 2-stroke engines and .60 to .80 4-stroke engines, the wingspan is 74" with 850 sq. in. of area, yet it only weighs 6½ lbs., with an O.S. .61 4-stroke in the nose. This gives a wing loading of just 17 ozs. per sq. ft. Comparable kits of similar size will be at least a pound heavier and will need the

**Do you want a large airplane with some real performance, but you're on a tight budget? Fred Reese's newest design will fill the bill!**



largest recommended engine to make it fly right.

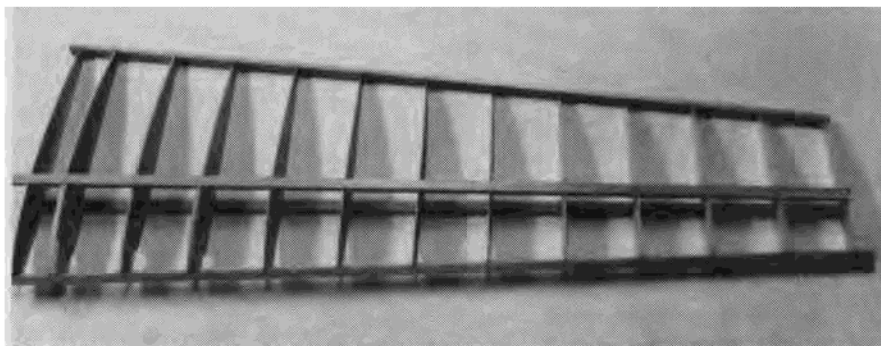
My reason for designing the Cloud Dancer was to produce a clean, aerobatic type model with the same size, weight and power as a Kadet Senior. The resulting model should be able to fly slower and gentler than some of the usual sport models, but not be handicapped in its ability to do aerobatics. The Cloud Dancer has been a success in every way. It is easy to fly, stable, forgiving, can be slowed down like a trainer, yet is really fun to fly.

The very first flight was at an IMAC contest in gale force winds. Power at the time was a Fox .45. The first flight, just before the event was to check out and trim. The second and third flights were in competition which resulted in a second place trophy flying the basic pattern. The .45 gave good performance, but I changed over to my old reliable O.S. .61 4-stroke because it just sounds better.

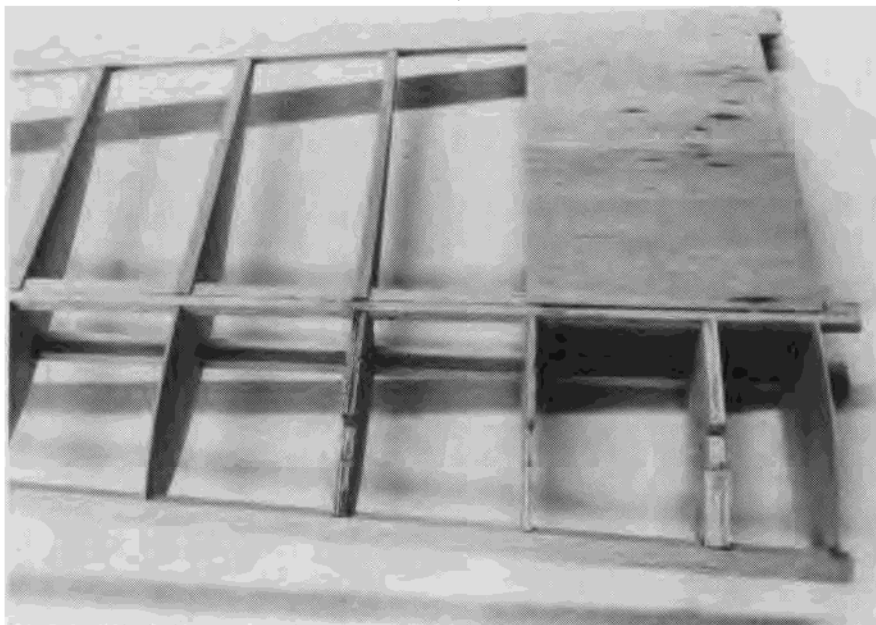
My Cloud Dancer now has over a hundred flights on it and has been flown by almost all of our club members. I really enjoy watching the good pilots fly it. They make the model look good while the model makes the rest of us look good. The best thing the Cloud Dancer does is immediately put the new pilot at ease, you just relax and fly.

Don't let the low power fool you, the clean lines and higher pitch prop, I use an 11 x 8 APC on my .61 4-stroke, let the Cloud Dancer move quickly enough. It is the larger size that makes it comfortable. The light wing loading and forgiving nature will let you get away with tight turns at low speed and altitude that would stall in most models.

The down side of the low wing loading and clean lines is that it takes a flatter

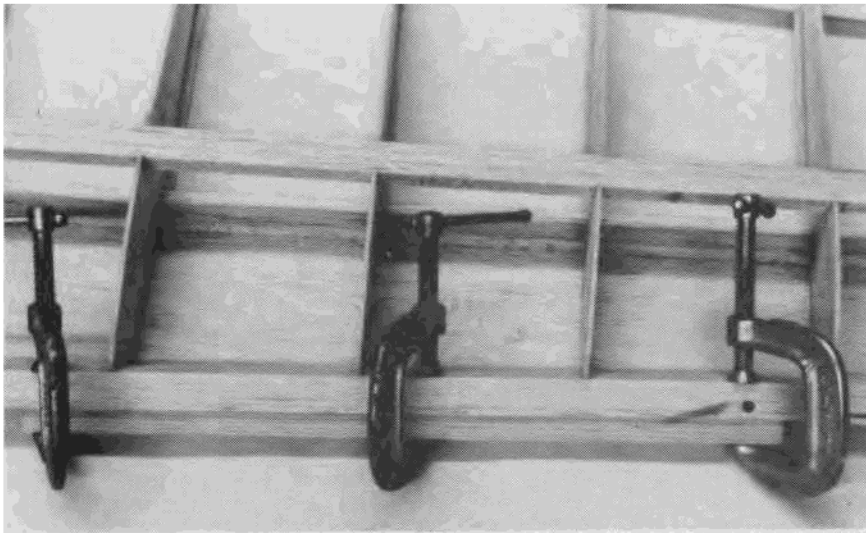


*Pin bottom spar in place on plan. Glue the ribs to the spar. Add the trailing edge, leading edge, and top spar.*

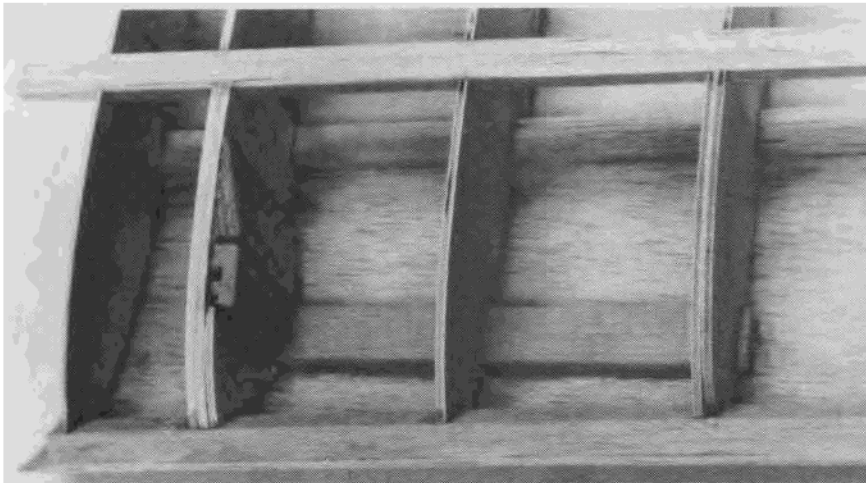


*Remove the wing from the plan and draw a line down the center of the bottom spar. Glue on the center sheeting and capstrips.*

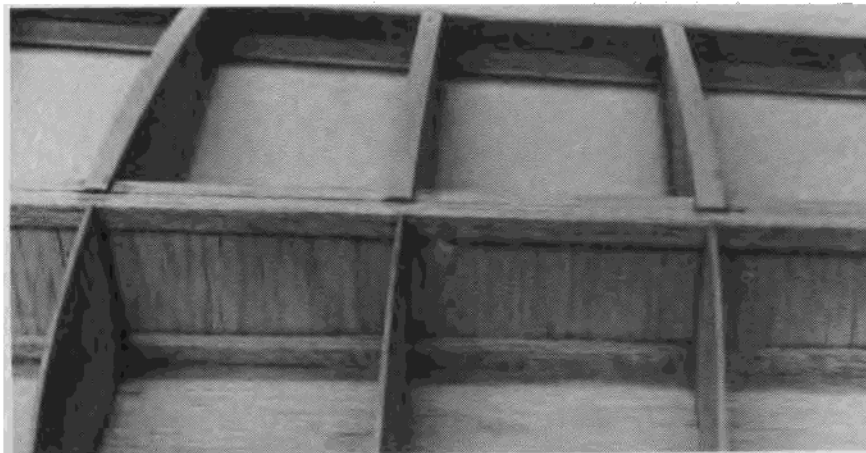




Glue on the bottom 1/16" sheeting. I used clamps and a block of wood to hold the sheeting to the leading edge while gluing.



Cut away the sheeting for the landing gear blocks and glue them in place. Add W-28, the vertical gear block, and the 1" trailing edge stock rear brace.

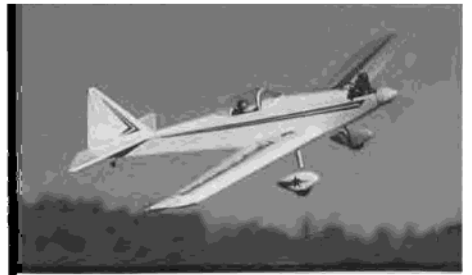


Glue 1/16" balsa shear webs in-between the ribs.

landing approach to get the Cloud Dancer back on the ground. Also, the tail stays up for awhile after the mains are firmly planted, just like the real ones. You just have to be patient on landings and wait until the aircraft is ready to land and don't try to rush it. Sometimes, near the end of the flight I'll take the Cloud Dancer up real high and cut the engine and do dead stick aerobatics

all the way down. I love this kind of model because it is so versatile and forgiving that I end up flying it a lot.

Any modern .40 engine has plenty of power to fly the Cloud Dancer with authority and this is the engine size I intended when I designed the model. This is not to say you power freaks won't enjoy the Cloud Dancer with lots more power. You



## CLOUD DANCER

Designed By:

Fred Reese

**TYPE AIRCRAFT**

Sport Pattern

**WINGSPAN**

73 Inches

**WING CHORD**

12 Inches (Avg.)

**TOTAL WING AREA**

870 Sq. In.

**WING LOCATION**

Low Wing

**AIRFOIL**

Semi-Symmetrical

**WING PLANFORM**

Double Taper

**DIHEDRAL, EACH TIP**

2½ Inches

**OVERALL FUSELAGE LENGTH**

57 Inches

**RADIO COMPARTMENT SIZE**

(L) 15" x (W) 3" x (H) 4"

**STABILIZER SPAN**

24 Inches

**STABILIZER CHORD (incl. elev.)**

7¾ Inches (Avg.)

**STABILIZER AREA**

186 Sq. In.

**STAB AIRFOIL SECTION**

Flat

**STABILIZER LOCATION**

Top of Fuselage

**VERTICAL FIN HEIGHT**

9 Inches

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

8 Inches (Avg.)

**ENGINE SIZE**

.40-.60 2-stroke

.60-.80 4-stroke

**FUEL TANK SIZE**

8-12 Ozs.

**LANDING GEAR**

Conventional

**REC. NO. OF CHANNELS**

4

**CONTROL FUNCTIONS**

Rud., Elev., Throt., Ail.

### BASIC MATERIALS USED IN CONSTRUCTION

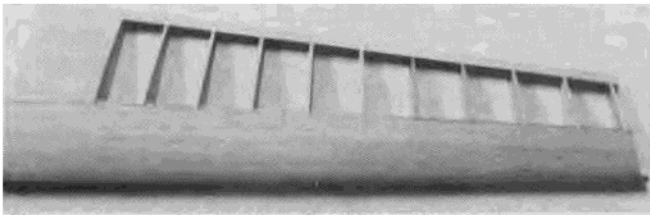
Fuselage .....	Balsa & Lite Ply
Wing .....	Balsa & Lite Ply
Empennage .....	Balsa
Wt. Ready To Fly ..	100 Ozs. (6 Lbs. 4 Ozs.)
Wing Loading .....	16.5 Oz./Sq. Ft.

will love it. For the sake of the article I am calling for a .60 2-stroke or a .80 4-stroke as the top recommended power. You decide, if it will fit, it will work.

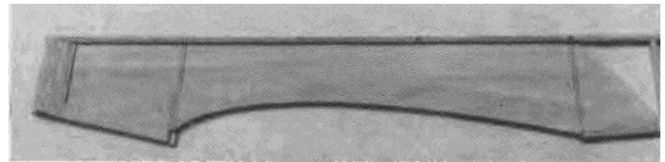
## CONSTRUCTION

### Wing:

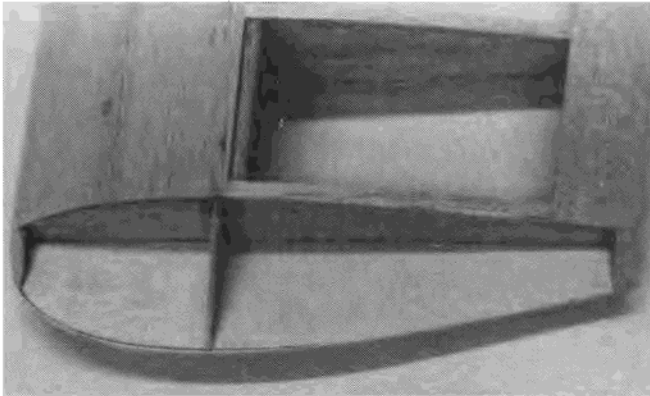
Begin construction with the wing. Photocopy the wing ribs and cut out leaving



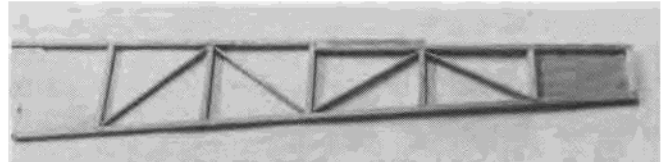
Glue on the top 1/16" balsa sheeting and capstrips.



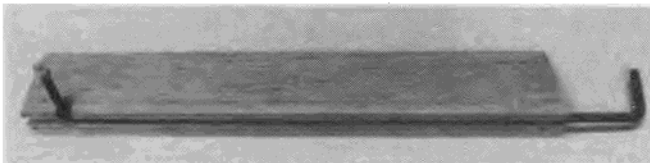
Make the forward fuselage sides from 1/8" lite ply. Glue on the wing saddle doublers and trailing edge stock fire wall brace. Mark the positions of the bulkheads.



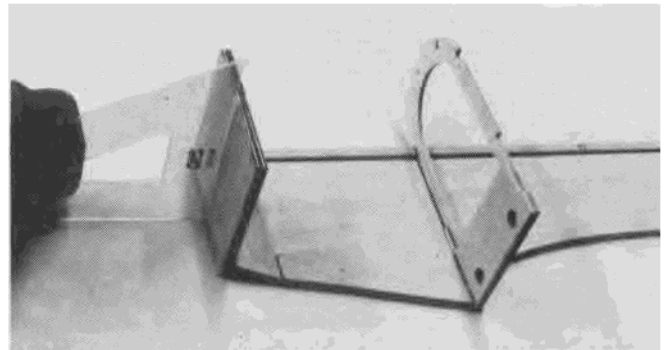
Glue on the 1/8" lite ply. Wingtips with W-15 and W-16 braces. Add some scrap fill at the front and rear to make covering easier.



Glue on the top and bottom 1/4" sq. longerons and uprights, while pinned down over the plan. Add the 1/8" x 1/4" diagonals and 1/16" balsa fill at the rear.



Fit the Goldberg 1/8" aileron linkage into the trailing edge stock, and glue to the wing.



Drill the fire wall and set the motor mount blind nuts and glue to one side. Glue doubler F-3A to F-3 and drill the two wing dowel holes, then glue to the fuselage side.

a little edge. Contact cement pairs of 1/16" x 3" balsa sheets together and then contact cement the cut out ribs onto the wood. When the ribs are cut out and separated, there will be two of each rib. Rubber cement thinner will remove or soften any adhesive left too long. Glue the plywood doublers W-2A and W-4A onto ribs W-2 and W-4.

Cover the wing plan with wax paper and pin the bottom 1/4" x 1/2" x 36" hard balsa spar in place on the plan. The second wing half is built over the same plan, but the spar is pinned down over the marks indicated for the left wing panel. Position each rib on the spar and glue with thin CA. Pin the 3/8" x 1/2" trailing edge to the plan and glue the ribs to the trailing edge. Glue on the 3/8" sq. leading edge and top 1/4" x 1/2" hard balsa spar.

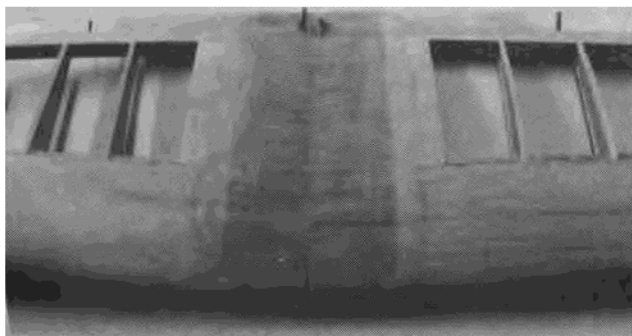
Remove the wing panel from the plan and draw a line down the center of the bottom spar. Glue on the 1/16" x 7/8" (1") bottom trailing edge sheet. Add the bottom, center 1/16" sheeting aft of the line on the spar and add the capstrips using the line as the cut-off mark. Glue the 1/16" x 3" balsa leading edge sheet to the spar so that it touches the ends of the capstrips and center sheeting.

Pin the wing panel down over the plan again. Starting in the center of the wing, lift the bottom sheeting to make contact with the ribs and glue with thin CA. After the ribs are glued to the sheet, glue the sheet to the 3/8" sq. leading edge. I used a clamp and a strip of wood to hold the sheeting tight while applying the thin CA so there would be less of my skin to sand off later. I hate that.

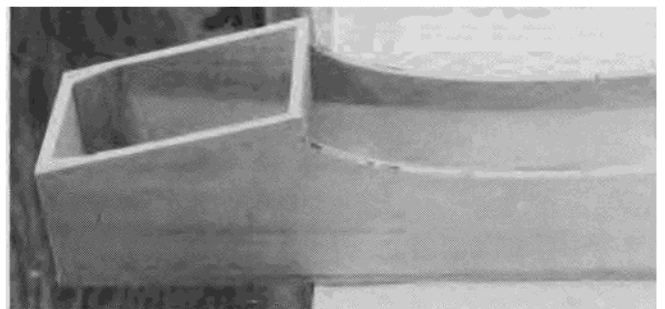
Remove the wing from the plan and cut away the bottom sheet for the 3/8" x 3/4"

hardwood landing gear blocks slotted for 3/16" wire. Glue the gear blocks in place and sand flush with the bottom sheeting. Glue W-2B in place and use a section of the scrap gear block for the vertical landing gear support. Glue a piece of 1" trailing edge stock behind the vertical gear block.

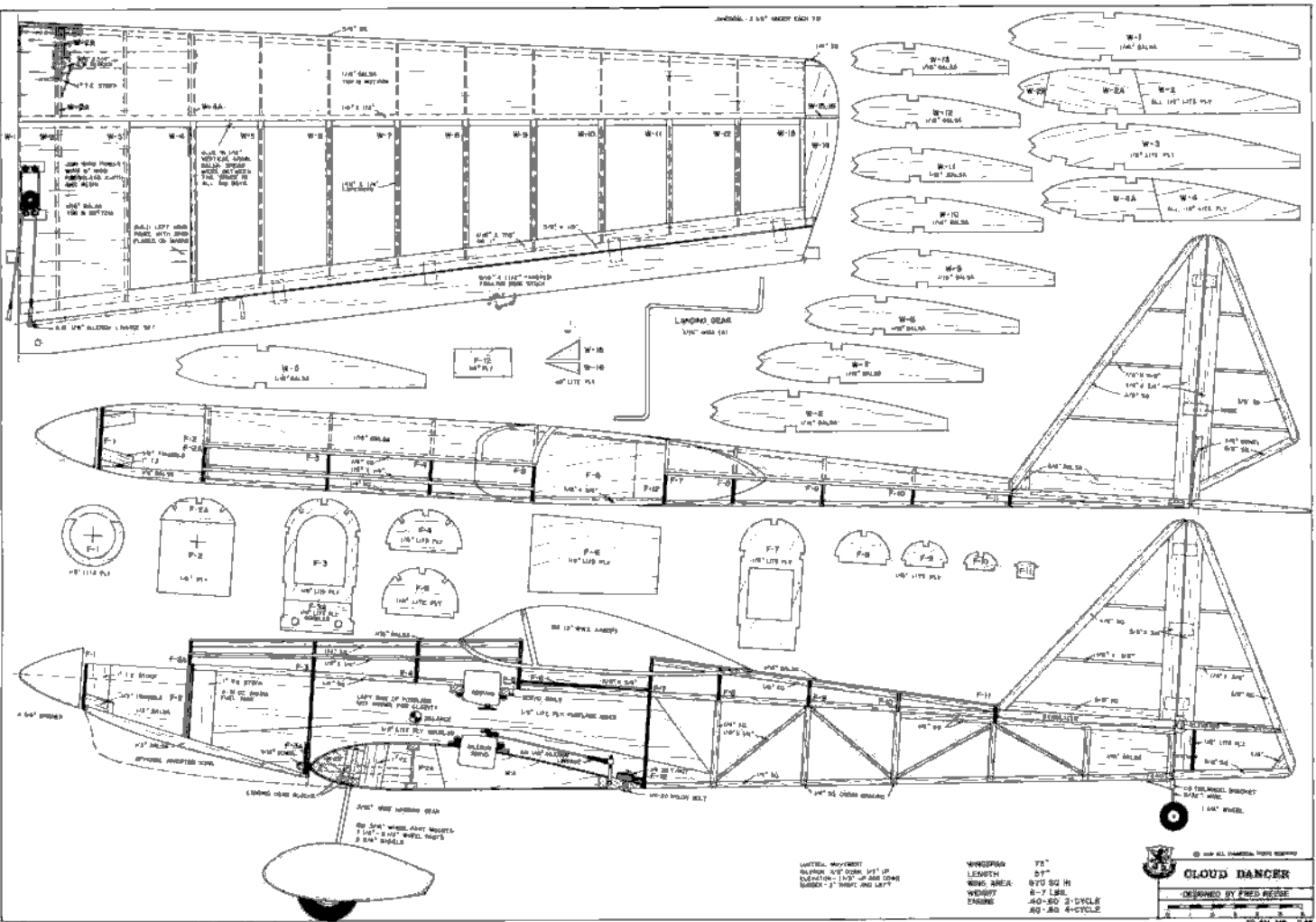
Pin the wing back down onto a flat surface and complete the structure. Glue in the 1/16" vertical grain balsa shear webs between the spars and all of the ribs. Glue on the top 1/16" x 7/8" (1") trailing edge strip. Draw a line down the center of the top spar and add the capstrips, center sheeting and glue on the leading edge sheet. To glue on the leading edge sheet, apply a bead of white glue to the tops of the ribs only. Apply a bead of slow curing CA along the spar and leading edge and press the sheet in place. Roll forward onto the ribs and leading edge.



Join the two wing panels with glass cloth and resin.



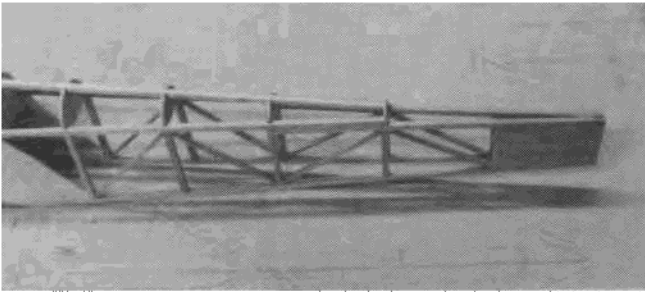
Glue on the second side with the nose over the workbench. This keeps the two sides parallel.



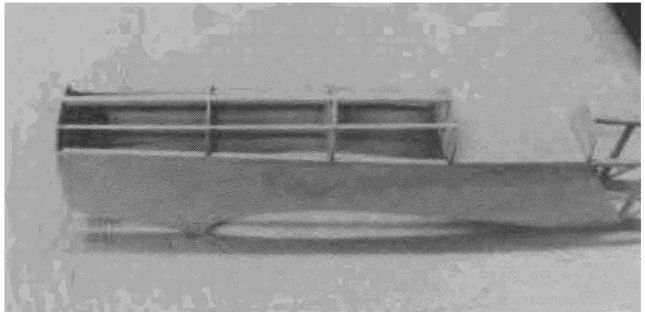
Pin the sheeting to any ribs not in contact with the sheet until the white glue cures. Add the wingtips and fit the Goldberg 1/8" aileron linkage into the trailing edge and glue in place. Fit the ailerons. Build the second wing panel over the plan using the marks on the plan to position the

spar. The ribs then go in the other direction, but stay over the wing plan. Position the trailing edge to the ends of the ribs. Glue the two wing panels together with CA blocking up one wingtip 5". This may seem like a lot of dihedral to some of you so you could reduce it if you want.

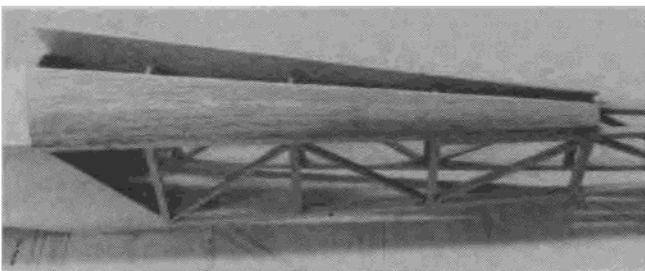
Wrap the center section of the wing with 6" wide glass cloth (6 to 8 ozs.) and tack in place with drops of CA. The glass cloth can be glued down with CA, epoxy, or polyester resin, whichever you prefer. Blot off any excess resin with Kleenex or toilet tissue. Sand the cloth lightly and feather the edges



**Pull the tail together and glue. Add bulkhead F-7 and the cockpit floor, F-6. Glue on the top rear bulkheads and top stringer.**



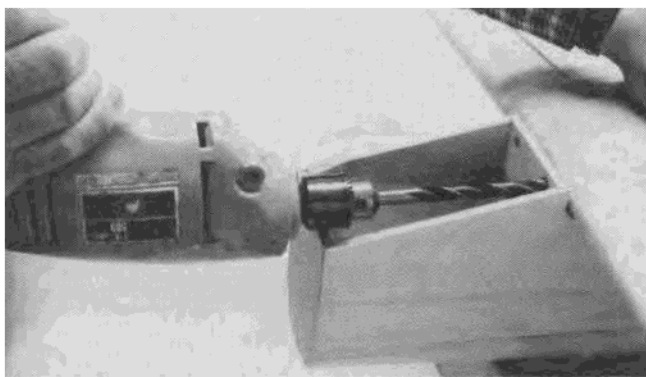
**Glue on the top front bulkheads and stringers.**



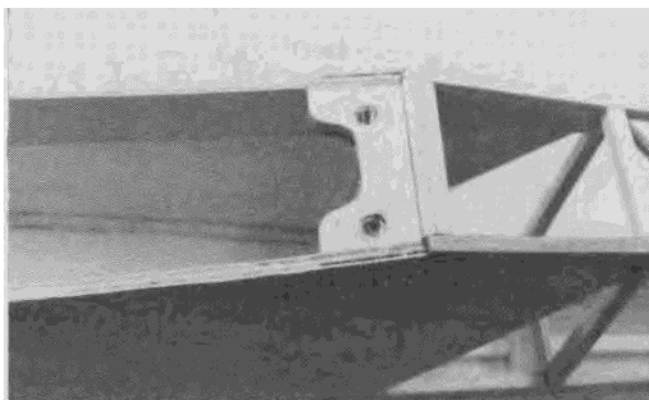
**Glue the 1/16" balsa top sheeting to the sides and dampen. Pull the sheet over the bulkheads and glue.**



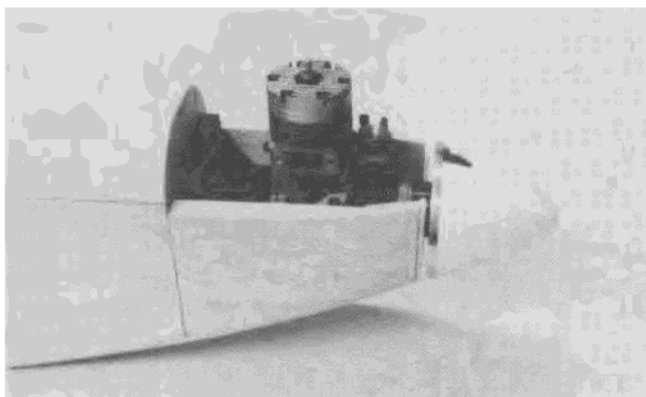
**Glue on the top front 1/16" sheeting. Add the cockpit sides and shape.**



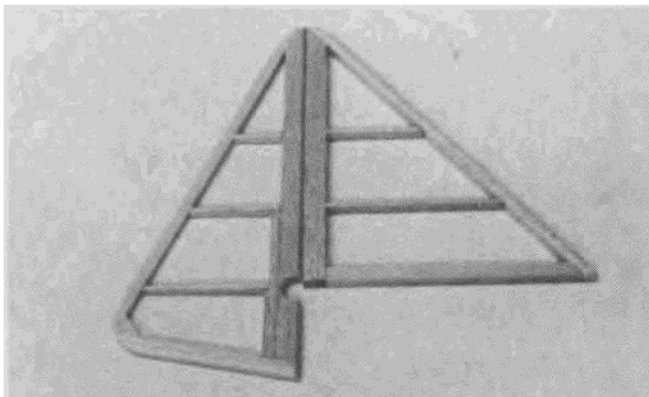
*Align the wing to the fuselage and tack cement in place. Drill the holes for the wing mount dowels into the wing. Drill the holes in the trailing edge for the wing bolts.*



*Set the 1/4-20 T-nuts into F-12. Note F-12 has been cut away to clear the aileron linkage.*



*Mount the engine and glue on the cowl sides and bottom. Fit the spinner ring, F-1, and carve to shape.*



*Build the vertical fin and rudder. The triangular shape is distinctive, but it is also warp-free and very strong.*

of the cloth. Finish feathering the edges with vinyl spackle.

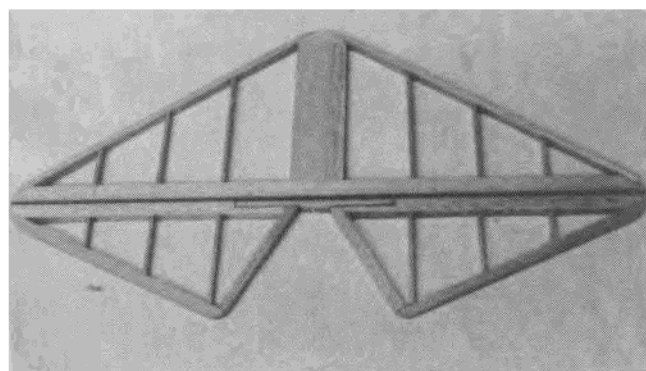
#### **Fuselage:**

Build the fuselage by first cutting out the 1/8" lite ply forward fuselage sides and wing saddle doublers. Glue the saddle doublers to the sides and mark the positions of the bulkheads. Glue in the 1" trailing

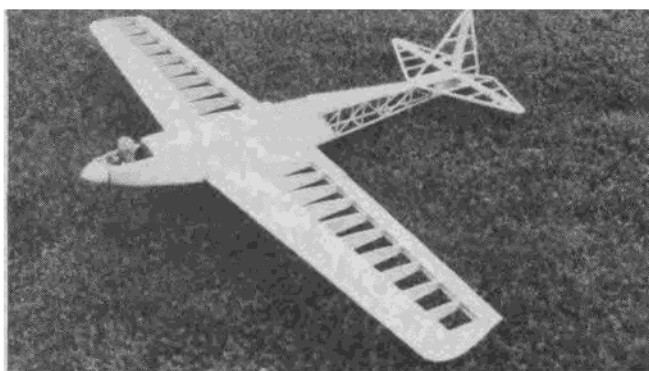
edge stock behind the fire wall mark. Note in the photographs that the saddle doubler is notched at the bottom to key in the bulkhead F-3 and F-3A. Pin the right side onto the plan (saddle doubler up). Protect the plan with wax paper. Glue on the top and bottom 1/4" sq. hard balsa longeron and pin in place. Complete the side structures with

1/4" sq. uprights and 1/8" x 1/4" diagonals. Fill the rear bay with 1/16" balsa for the pushrod exits.

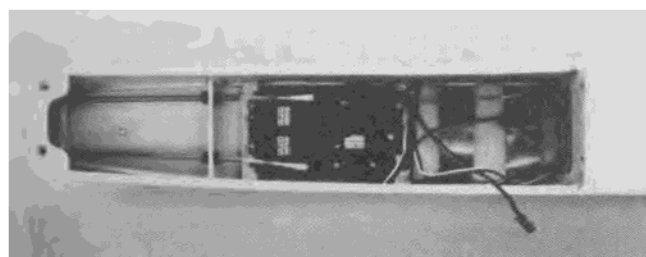
Glue the 1/4" sq. top and bottom longerons to the second fuselage side and pin down over the plan with the doubler side down. Complete the second fuselage side. Set the 6-32 blind nuts in the fire wall for the



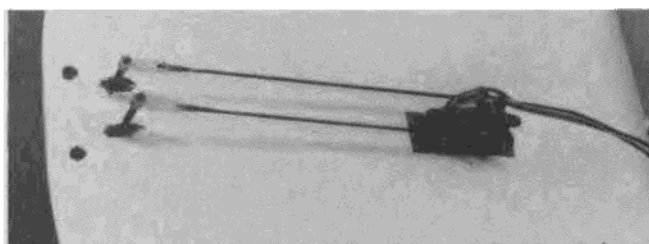
*Build the horizontal stabilizer/elevators. Join the elevator halves with 3/8" dowel.*



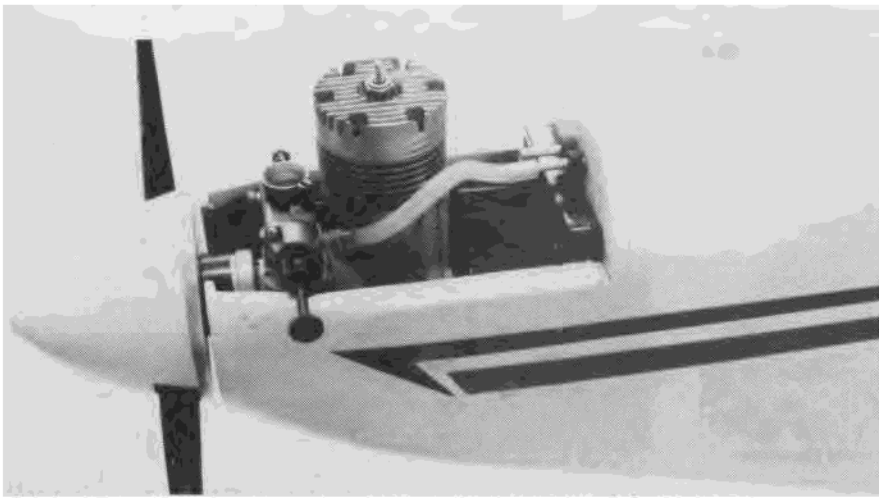
*The assembled bare bones. The structure is very light for its size, yet is very strong.*



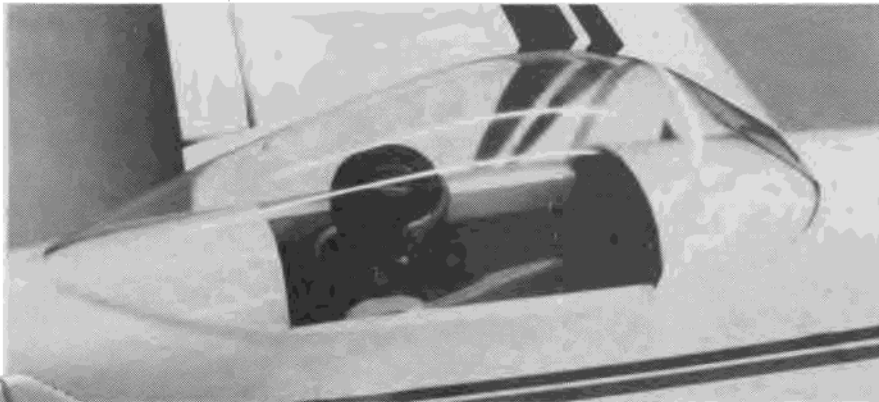
*Futaba servos installed in the standard 2 + 1 tray.*



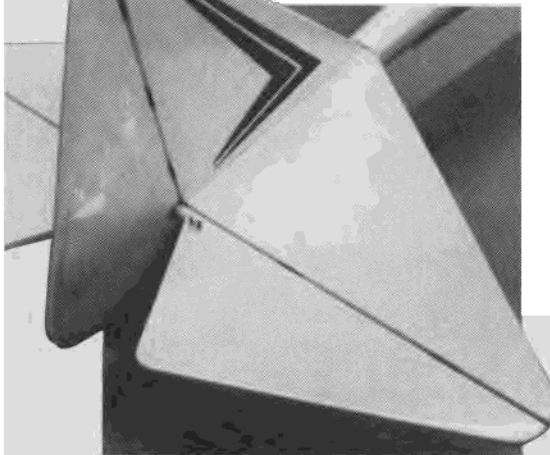
*Aileron servo and linkage in the wing.*



Original Fox .45 on long mount, subsequently changed to O.S. .61 4-stroke.



Williams Bros. 2" pilot figure inside a Sig 13" WW II canopy.



motor mount and drill the two 5/16" holes for the wing mount dowels in F-3 and F-3A. Cut away a notch in the top longeron at the front to fit the fire wall, also cut away a notch in the bottom longeron at the rear of the saddle to fit bulkhead F-7. Glue the fire wall and F-3 to one of the fuselage sides. Glue the second fuselage side to the

**LEFT:** Trim was cut from Super MonoKote film and ironed on. Parts are assembled after covering and decorating.

bulkheads using the notches in F-3 to align the sides. Pull the tail together and glue. Insert bulkhead F-7 and glue. Add the cockpit floor F-6. Glue in the top forward bulkheads F-1A, F-4, and F-5, and add the stringers. Glue in the top rear bulkheads F-8 through F-11 and the top 1/4" sq. stringer. Glue in the 1/4" sq. bottom crosspieces. Glue on the top 1/16" balsa sheeting to the fuselage sides and the base of the top bulkheads. Dampen the sheeting on the outside until it bends easily over the bulkheads and glue in place. Add the 3/8" x 3/4" cockpit side fillers and carve to shape. Glue in the 1/4" plywood rear wing mount, F-12.

Fit the wing saddle to the wing and align the wing to the fuselage by measuring from the wingtips to the rear of the fuselage on each side. It should be the same. Tack glue the wing into the fuselage to keep it from shifting while drilling for the dowels and rear bolt. Drill 5/16" holes into the wing through the holes in F-3. Drill two 1/4" holes through the trailing edge and F-12. Remove the wing and glue the two 5/16" dowels into the wing back to the shear web. Enlarge the holes in F-12 to 5/16" and install two 1/4"-20 T-nuts.

Install the engine and engine. Build up the balsa nose sides and bottom. Fit F-1, the spinner ring and shape the nose to the spinner.

#### Tail:

Build the tail parts over the plan and sand to shape.

#### Finishing:

Sand everything to final shape and finish sand with 220 sandpaper. Apply a coat of Balsarite. Cover and decorate the fuselage and tail parts separately before final assembly using your favorite iron-on film covering. If you are using one of the newer coverings be sure to follow the directions exactly to get a really nice job.

I mounted the engine upright for simplicity of operation, however, it could be mounted inverted and enclosed in a cowl as shown on the plan. It could also be side mounted and covered with cheek cowls. Do whatever you like best and enjoy it.

*(Editor's Note: We would like to see some photos of finished Cloud Dancers.)* □

**From  
RCModeler  
June 1993**