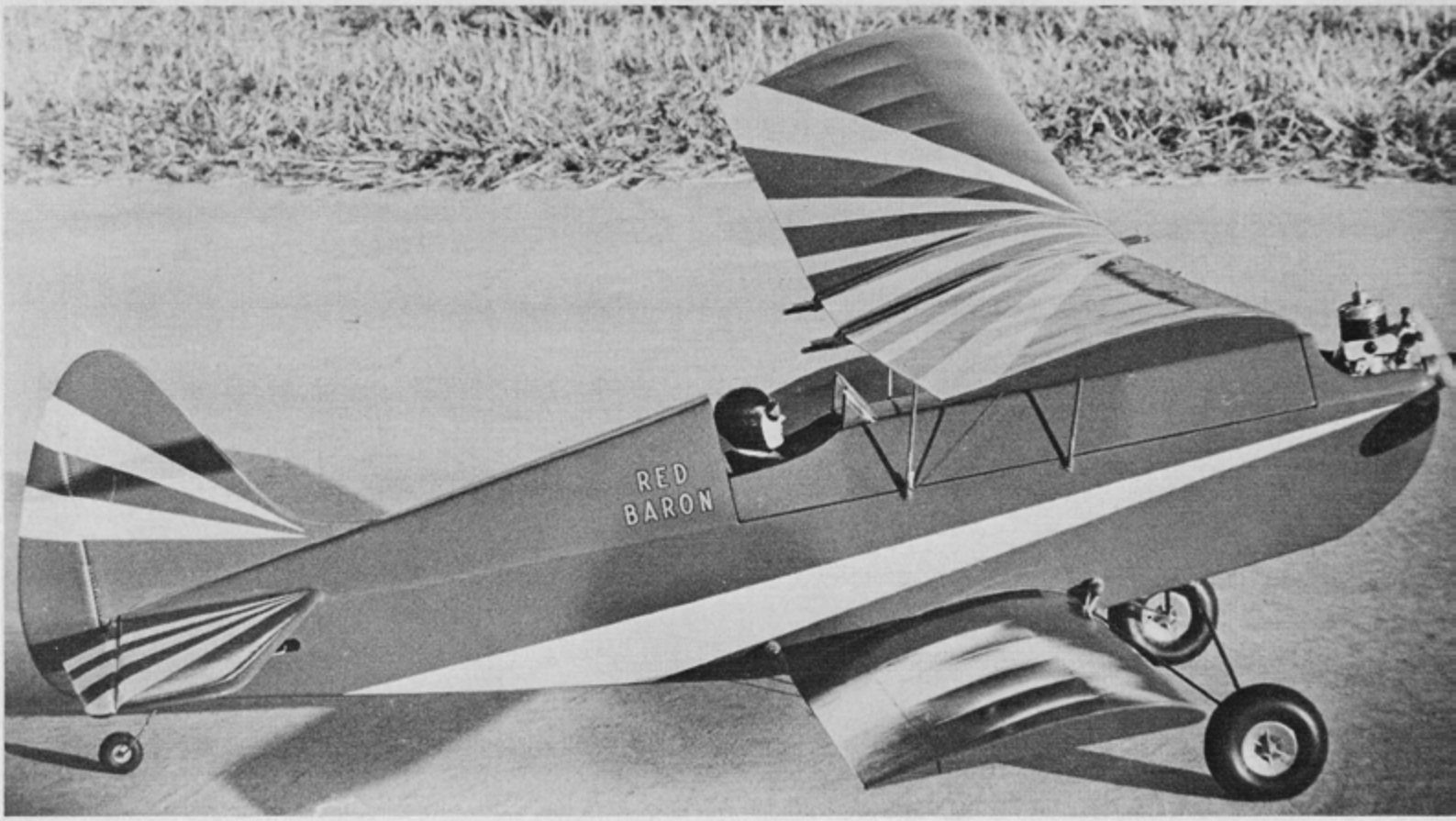


Doug's original Red Baron prototype. OS Max .15 and Controlaire Ghost. Prototype #2 used Bonner 4RS Digital.

THE RED BARON

By DOUGLAS HOBBS **Photos by BILL NORMENT**

For Galloping Ghost or small digital proportional, this 42″ span, .15 powered bipe is just the ticket for Sunday flying.

Why the Biplane?

Most of the old time modelers probably have a soft spot somewhere for the old biplanes of yesterday. It was love at first sight for me in 1928 when I saw an airplane for the first time (a biplane flying overhead). Three years later I built my first model from a kit, a biplane; and it was about the same time that I got my first ride in an airplane, also a Bipe. After all these years, I am still a Bipe lover.

Through the 1930's there were quite a few biplane kits on the market by "Scientific", "Guillow", and "Cleveland", to mention a few. For years now it has seemed that kits and plans for the old Bipe have just slipped into the past. Thanks to some of the old Buzzard Lovers, it looks like these old birds are coming back strong in the model world. The full size ones are reappearing too, as evidenced by the antique aircraft publications.

In the early fall of 1966 I decided to design a biplane for R/C. I wanted a medium size plane that could be flown by a .10 to .15 engine with full galloping ghost. I also wanted one that could later be converted to proportional equipment. Bonner's 4-RS would be a honey here, with considerably less dihedral in both wings and ailerons in the bottom panels.

Everything was worked out on paper and put in the plan before the construction was started. Simple construction was the main idea. The dimensions that I used are as follows: 42″ span for the top wing, 37″ span for the bottom wing with a 6¾″ chord for both; 32″ overall length of the fuselage and rudder, 16″ span for the stabilizer. By February 1967 it was finished and ready to be tested.

The first attempt to fly it was with an O.S. Max .10RC. This was just not quite enough power. The following weekend with an O.S. Max .15RC up front, we were ready to try again. Several hand launches with low throttle as well as several with increased throttle looked very good. With high throttle and a good hand launch, it was off on its first flight, and was 100% all the way. With the engine on low throttle, it was brought right in front of us to a good three point landing. This has been so with each successive flight. No additional balance or trim was needed. Total flying weight was 3 lb. 4½ oz.

The "Red Baron" is equipped with "Controlaire", "Galloping Ghost" transmitter, Controlaire "Ghost" actuator, a

Controlaire #5 relayless receiver with a composite switcher, 500 MA nickel cadmium button pack, and a 2 oz. fuel tank.

I used insignia red with white trim, thus the name, "Red Baron".

CONSTRUCTION

FUSELAGE: Using the **fuselage side** templates, cut two fuselage sides from 3/32" x 4" x 36" balsa sheet. Cut two nose doublers from 3/16" balsa sheet. Cut two fuselage doublers (from F-1 to F-5). Glue nose doubler in place. Using a scrap piece of 1/8" plywood as a spacer between the nose doubler and the fuselage doubler, glue the fuselage doubler in place. Remove the plywood spacer and clean off the excess glue. I used Titebond for the entire construction with a little Epoxy added here and there. Be sure to make up a "Right" and a "Left" fuselage side. Mark on the inside of both sides the positions of F-2, F-3, F-4 and the two 3/16" vertical members in the rear section. Glue the 3/16" x 3/16" longerons along the top and bottom edges of both sides. Glue in the vertical 3/16" x 3/16". Do not use a 3/16" x 3/16" vertical at F-5 position as the F-5 bulkhead notches over the longerons. Glue a strip of 1/8" x 1/2" balsa on the nose side of the F-2, F-3 and F-4 bulkhead positions. These strips will serve as stops for the bulkheads when installing them later.

At this point you need to make the four wing strut wires. Bend these over the **Wing Strut Detail** on the plan at the hatch-line bends only. Leave the wires plenty long at both ends to facilitate bending the remaining angles. Using the side view of the fuselage, make the remaining bends, being sure to make a "Right" and a "Left" for the front and for the rear. The front struts are 1/8" longer than the rear struts—from the hatch-line to the top. Bind and Epoxy the two front struts to F-3, and the two rear struts to F-4.

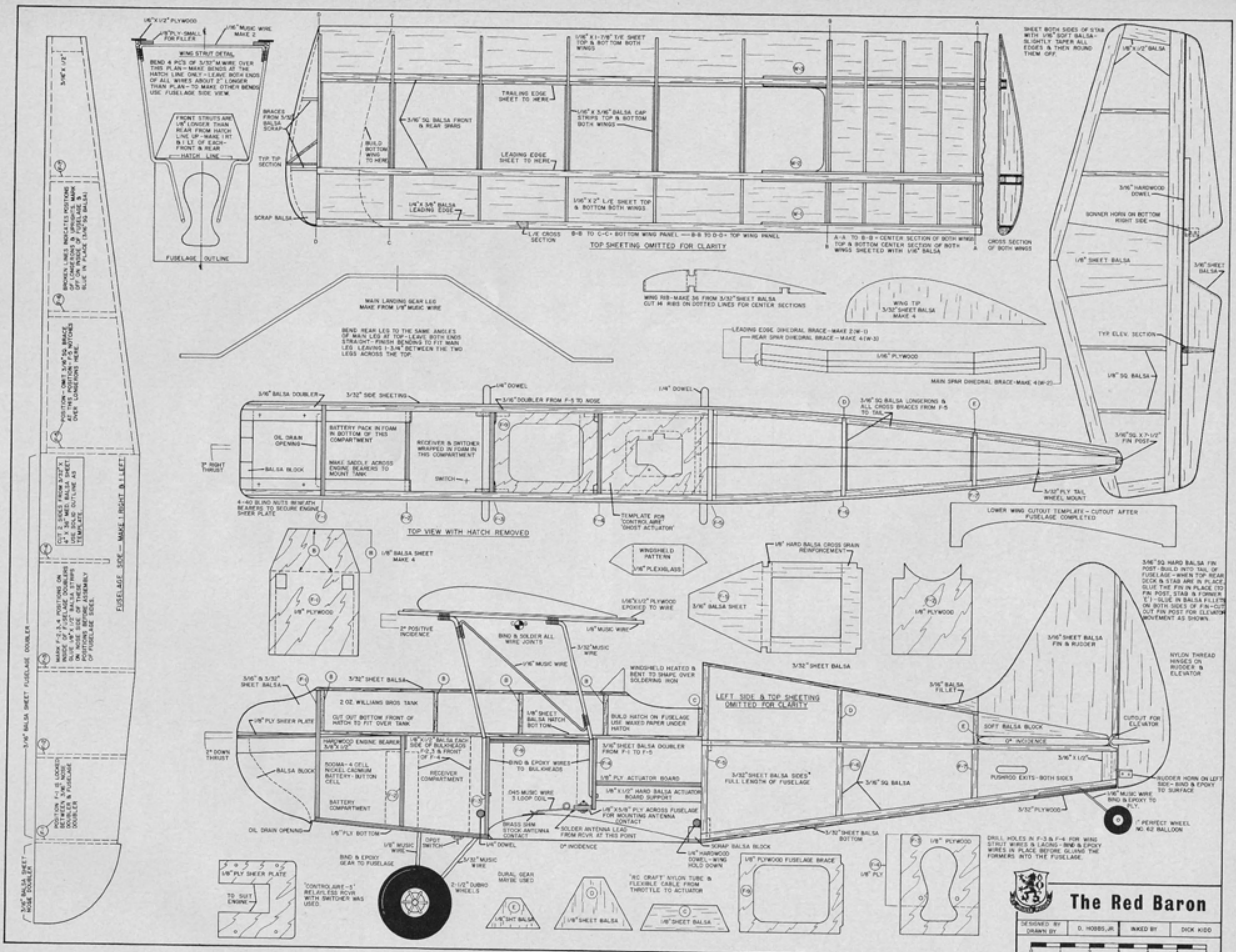
Begin assembly with fuselage sides upside down over top view on the plan. Glue F-1 and F-2 in place. Keep sides square and true while the glue is setting. When this is thoroughly dry, remove from the plan and glue F-3, F-4, and F-5 in their respective positions and add the 1/8" x 1/2" strips on the rear side of each bulkhead to lock them in position. Glue F-9 in place. Cut 1/8" x 5/8" plywood the width of the fuselage and glue it in place at the bottom of F-4. If you use a Controlaire Ghost actuator, you will need the 1/8" x 1/2" balsa supports, as shown, for the actuator board. The latter is 1/8" plywood with 3-48 blind nuts epoxied in place.

Cut the plywood floor and glue to the bottom of the fuselage between F-1 and F-3. Clean off all excess glue. Using Titebond, slide the engine bearers into place. When this assembly is thoroughly dry, apply a bead of Epoxy glue around all plywood joints. Pull the two sides together at the tailpost with rubber bands; **DO NOT** glue together. Glue the 3/16" x 3/16" cross pieces in place at F-6 and F-7, top and bottom. The tailpost is next. Cut a piece of hard 3/16" x 3/16" balsa strip 7 1/2" long. Glue it between the two sides, flush at the bottom and the rear of the fuselage. The rudder will be glued to this post later. Glue "D" and "E" in place at F-6 and F-7. Sheet both sides from F-5 to F-7 with 3/32" sheet. Sand the top edges of the sheet level and flush with top of F-5, "D" and "E". Sheet the top with 3/32" sheet; trim and sand flush with the sides.

The hatch is built-up right on the fuselage, using a piece of plastic wrap between the two to prevent sticking. The bottom of the hatch is a solid sheet covering the entire area. Pin this to the fuselage. Glue the "B" formers in place and sheet both sides with 3/32" sheet. At this point re-pin the hatch to the fuselage from the outside and remove the pins from the inside through the open top of the hatch. Sheet the top of the hatch with 3/32" sheet. The cockpit may be cut or painted on. The top cowl is built up from 3/16" balsa inside and 3/32" balsa outside, overlapping F-1 to member with the hatch. Mark the position of the landing gear. Drill holes, bind and epoxy the landing gear in place. Cut 3/32" plywood for tail wheel mount. Drill holes, bind, and epoxy the wire to the plywood and glue this assembly in place. Sheet the bottom of the fuselage from F-5 to rear with 3/32" sheet.

Back to the wing struts now. Be sure that all four struts are lined up correctly. Bind the 1/8" wire platforms to the top of each strut with fine copper wire and solder them. Bend the 1/16" wire braces as shown in the wing strut detail and fuselage side view. Bind all joints with fine copper wire and solder them. Cut two strips of 1/16" x 1/2" plywood for the wing platforms. Drill holes, bind and epoxy the plywood platforms to the 1/8" wire platforms of the strut assembly. This gives a smooth flat surface on which the wing will rest. I used 1/16" foam on top of the plywood. Be sure to keep a close check on the alignment of the wing strut assembly from start to finish. Cut a piece of 1/8" plywood to suit your engine, then

WILLIAMS
OS
FUEL TANK
WILLIAMS


The Red Baron
DESIGNED BY
DRAWN BY
D. HOBBS, JR.
INKED BY
DICK KIDD
WING STRUT DETAIL
BEND 4 PC'S OF 3/32" M.WIRE OVER THIS PLAN - MAKE BENDS AT THE HATCH LINE ONLY - LEAVE BOTH ENDS OF ALL WIRES ABOUT 2" LONGER THAN PLAN - TO MAKE OTHER BENDS USE FUSELAGE SIDE VIEW.
FRONT STRUTS ARE 1/8" LONGER THAN REAR FROM HATCH LINE UP - MAKE 1 RT. & 1 LT. OF EACH - FRONT & REAR
HATCH LINE
FUSELAGE OUTLINE
1/16" X 1/2" PLYWOOD
1/16" MUSIC WIRE MAKE 2
TOP SHEETING OMITTED FOR CLARITY
B-B TO C-C - BOTTOM WING PANEL — B-B TO D-D - TOP WING PANEL
A-A TO B-B = CENTER SECTION OF BOTH WINGS TOP & BOTTOM CENTER SECTION OF BOTH WINGS SHEETED WITH 1/16" BALSA
CROSS SECTION OF BOTH WINGS
TRAILING EDGE SHEET TO HERE
LEADING EDGE SHEET TO HERE
3/16" SQ. BALSA FRONT & REAR SPARS
1/4" X 3/4" BALSA LEADING EDGE
1/16" X 2" L/E SHEET TOP & BOTTOM BOTH WINGS
1/16" X 3/16" BALSA CAP STRIPS TOP & BOTTOM BOTH WINGS
BUILD BOTTOM WING TO HERE
TYP. TIP SECTION
SCRAP BALSA
L/E CROSS SECTION
SHEET BOTH SIDES OF STAB WITH 1/16" SOFT BALSA - SLIGHTLY TAPER ALL EDGES & THEN ROUND THEM OFF.
3/16" HARDWOOD DOWEL
SONNER HORN ON BOTTOM RIGHT SIDE
1/8" SHEET BALSA
TYP. ELEV. SECTION
1/8" SQ. BALSA
3/16" SQ. X 7-1/2" FIN POST
MAIN LANDING GEAR LEG MAKE FROM 1/8" MUSIC WIRE
BEND REAR LEG TO THE SAME ANGLES OF MAIN LEG AT TOP - LEAVE BOTH ENDS STRAIGHT - FINISH BENDING TO FIT MAIN LEG. LEAVING 1-3/4" BETWEEN THE TWO LEGS ACROSS THE TOP.
WING RIB - MAKE 36 FROM 3/32" SHEET BALSA CUT 14 RIBS ON DOTTED LINES FOR CENTER SECTIONS
WING TIP 3/32" SHEET BALSA MAKE 4
LEADING EDGE DIHEDRAL BRACE - MAKE 2 (W-1)
REAR SPAR DIHEDRAL BRACE - MAKE 4 (W-3)
MAIN SPAR DIHEDRAL BRACE - MAKE 4 (W-2)
1/16" PLYWOOD
TOP VIEW WITH HATCH REMOVED
3/16" BALSA DOUBLER
3/32" SIDE SHEETING
3/16" DOUBLER FROM F-5 TO NOSE
1/4" DOWEL
OIL DRAIN OPENING
BALSA BLOCK
BATTERY PACK IN FOAM IN BOTTOM OF THIS COMPARTMENT
MAKE SADDLE ACROSS ENGINE BEARERS TO MOUNT TANK
RECEIVER & SWITCHER WRAPPED IN FOAM IN THIS COMPARTMENT
SWITCH
TEMPLATE FOR 'CONTROLAIRE' 'GHOST ACTUATOR'
3/16" SQ. BALSA LONGERONS & ALL CROSS BRACES FROM F-5 TO TAIL
3/32" PLY TAIL WHEEL MOUNT
2° RIGHT THRUST
4-40 BLIND NUTS BENEATH BEARERS TO SECURE ENGINE SHEER PLATE
LOWER WING CUTOUT TEMPLATE - CUTOUT AFTER FUSELAGE COMPLETED
1/8" BALSA SHEET MAKE 4
1/8" PLYWOOD
WINDSHIELD PATTERN
1/16" PLEXIGLASS
1/8" HARD BALSA CROSS GRAIN REINFORCEMENT
3/16" BALSA SHEET
3/16" SQ. HARD BALSA FIN POST - BUILD INTO TAIL OF FUSELAGE - WHEN TOP REAR DECK & STAB ARE IN PLACE, GLUE THE FIN IN PLACE (TO FIN POST, STAB & FORMER 'E') - GLUE IN BALSA FILLETS ON BOTH SIDES OF FIN - CUT OUT FIN POST FOR ELEVATOR MOVEMENT AS SHOWN.
NYLON THREAD HINGES ON RUDDER & ELEVATOR
3/16" SHEET BALSA FIN & RUDDER
3/16" BALSA FILLET
CUTOUT FOR ELEVATOR
SOFT BALSA BLOCK
0° INCIDENCE
3/16" X 1/2"
PUSHROD EXITS - BOTH SIDES
RUDDER HORN ON LEFT SIDE - BIND & EPOXY TO SURFACE
1/16" MUSIC WIRE BIND & EPOXY TO PLY.
3/32" PLYWOOD
1" PERFECT WHEEL NO. 62 BALLOON
3/32" SHEET BALSA BOTTOM
LEFT SIDE & TOP SHEETING OMITTED FOR CLARITY
3/32" SHEET BALSA
3/32" SHEET BALSA SIDES FULL LENGTH OF FUSELAGE
3/16" SQ. BALSA
1/16" X 1/2" PLYWOOD EPOXIED TO WIRE
1/16" MUSIC WIRE
2° POSITIVE INCIDENCE
BIND & SOLDER ALL WIRE JOINTS
3/32" MUSIC WIRE
WINDSHIELD HEATED & BENT TO SHAPE OVER SOLDERING IRON
BUILD HATCH ON FUSELAGE USE WAXED PAPER UNDER HATCH
3/16" SHEET BALSA DOUBLER FROM F-1 TO F-5
1/8" PLY ACTUATOR BOARD
1/8" X 1/2" HARD BALSA ACTUATOR BOARD SUPPORT
1/16" X 5/8" PLY ACROSS FUSELAGE FOR MOUNTING ANTENNA CONTACT
SOLDER ANTENNA LEAD FROM RCVR AT THIS POINT
1/8" SHEET BALSA HATCH BOTTOM
BIND & EPOXY WIRES TO BULKHEADS
.045 MUSIC WIRE 3 LOOP COIL
BRASS SHIM STOCK ANTENNA CONTACT
3/16" & 3/32" SHEET BALSA
1/8" PLY SHEER PLATE
2 OZ. WILLIAMS BROS TANK
CUT OUT BOTTOM FRONT OF HATCH TO FIT OVER TANK
HARDWOOD ENGINE BEARER 3/8" X 1/2"
1/8" X 1/2" BALSA EACH SIDE OF BULKHEADS F-2, 3 & FRONT OF F-4
500MA - 4 CELL NICKEL CADMIUM BATTERY - BUTTON CELL
RECEIVER COMPARTMENT
BATTERY COMPARTMENT
2° DOWN THRUST
OIL DRAIN OPENING
1/8" PLY BOTTOM
1/8" MUSIC WIRE
OPDT SWITCH
BIND & EPOXY GEAR TO FUSELAGE
3/32" MUSIC WIRE
2-1/2" DUBRO WHEELS
DUAL GEAR MAYBE USED
1/4" DOWEL
SCRAP BALSA BLOCK
1/4" HARDWOOD DOWEL - WING HOLD DOWN
"CONTROLAIRE-5" RELAYLESS RCVR WITH SWITCHER WAS USED.
TO SUIT ENGINE
1/8" SHT BALSA
1/8" SHEET BALSA
"RC CRAFT" NYLON TUBE & FLEXIBLE CABLE FROM THROTTLE TO ACTUATOR
1/8" PLYWOOD FUSELAGE BRACE
1/8" PLY
DRILL HOLES IN F-3 & F-4 FOR WING STRUT WIRES & LACING - BIND & EPOXY WIRES IN PLACE BEFORE GLUING THE FORMERS INTO THE FUSELAGE.
FUSELAGE SIDE — MAKE 1 RIGHT & 1 LEFT
3/16" BALSA SHEET FUSELAGE DOUBLER
3/16" BALSA SHEET NOSE DOUBLER
3/16" X 1/2"
BROKEN LINES INDICATES POSITIONS OF LONGERONS & UPRIGHTS. MARK OFF ON INSIDE OF FUSELAGE & GLUE IN PLACE (3/16" SQ. BALSA)
POSITION - OMIT 3/16" SQ. BRACE AT THIS POSITION - F-5 NOTCHES OVER LONGERONS HERE.
CUT 2 SIDES FROM 3/32" X 4" X 36" MED. BALSA SHEET USE SOLID OUTLINE AS TEMPLATE.
MARK F-2, 3, 4 POSITIONS ON INSIDE OF FUSELAGE DOUBLERS GLUE 1/8" X 1/2" BALSA STRIPS ON NOSE SIDE OF THESE POSITIONS BEFORE ASSEMBLY OF FUSELAGE SIDES.
POSITION F-1 IS LOCKED BETWEEN 3/16" NOSE DOUBLER & FUSELAGE DOUBLER

mount it on the engine bearers.

Cut holes at the rear of the fuselage for the pushrod exits. Sand all corners and edges slightly round, excepting the area where the stabilizer will be mounted.

STABILIZER AND ELEVATORS: Make up the bottom sheeting from 1/16" soft balsa. Glue the edges with white glue. When dry, cut the sheet to the outline of the stabilizer. Mark off all positions on the top side of this sheet. Pin the sheet down flat and glue on the 1/8" x 1/2" leading edges, and trailing edge, and tips. Glue the 1/8" x 1/8" strips and the 1/8" sheet center piece in place. Glue on the top 1/16" sheet. Slightly taper the leading edges and tips and round all edges. Glue the stabilizer to fuselage and check alignment closely. The elevators are cut from 3/16" medium balsa sheet. Assemble the elevators over the plan with 3/16" hardwood dowel. **DO NOT** attach elevators to the stabilizer at this time.

FIN AND RUDDER: Cut the fin and rudder from 3/16" medium balsa sheet. Sand to a slight taper and round all edges. The fin is glued to the top of the stabilizer, former "E", and the long tailpost. Trim the tailpost to match the fin. Cut out the tailpost and top of fuselage as shown in side view to allow installation as well as the up and down movement of the elevators. Install the elevators first, then the rudder. I sewed these on after all painting and trimming was finished.

TOP WING: Cut thirty-six (36) ribs from 3/32" balsa sheet. I used two (2) 1/8" plywood ribs for templates and then sandwiched several balsa ribs in between the plywood ribs and sanded the balsa ribs to shape with fine sand paper. Some of the ribs will be cut later to fit in the center sections. Use waxed paper over the plan, and pin the 1/16" balsa sheet leading and trailing edge sheeting over the plan. Glue and pin in place the 1/4" x 3/8" balsa strip leading edge. Glue in the cap strips between the leading edge and trailing edge sheeting. Using four or five ribs as guides, locate the front and rear bottom spars and glue them in place. Glue all ribs in place except the root rib (At section "B-B"). Add the top spar and the wing tip. Sand the tip to match the contour of the ribs. When this panel is dry, remove and make the left panel. To do so, lay the 1/16" leading edge and trailing edge over the plan and mark very lightly the rib positions. Now turn the two sheets over and mark these same positions on the opposite side. This side is now the top. Pin both sheets over the plan as in the other panel. This time the wing tip will be at the center section of the plan. This is just like building this panel upside down or on the back side of the plan. Glue in the cap strips, leading edge, ribs, spars and tip the same way as in the right panel.

BOTTOM WING: The bottom wing is constructed in the same manner as the top wing. Both wing center sections are made up in the same manner. Cut the 1/16" sheet balsa to the length needed and glue the edges together to form a solid sheet for the bottom. Mark rib positions and pin the sheet down. Glue on the 1/4" x 3/8" leading edge. Using the ribs as guides, glue on both bottom spars. Check these locations against end panels to be sure. Cut all dihedral braces from 1/16" plywood. Using one of these plywood braces as a template, cut two pieces 3/8" wide from 3/16" medium sheet balsa, the full length of the plywood. These two pieces are a filler to go between the top and bottom main spars of the center sections. Glue one of these fillers on top of the front spar. Cut the top spar and glue it on top of the filler. Keep the center section pinned down and fit each end panel to it. Bevel the leading edge end and spar ends to give the proper dihedral. Dihedral at the bottom edge of the tip rib is 1 3/4" for the top wing and 1 1/2" for the bottom wing. Cut the remaining ribs to fit between the leading edge and the spars and glue them in place. Remove from the board and assemble the bottom wing in the same manner. Bevel the top side of the leading edge strip as shown on the plan. Sheet the top of the center sections first, then the end panels, using 1/16" sheet balsa. Be sure to keep each panel flat as you apply the sheeting. Sheet the top of the wing tip and add cap strips to the top of all ribs. Round off all leading edges as shown to give proper airfoil. **DO NOT** round off the bottom side of the bottom wing where it sits in the fuselage. This area of the leading edge is left square to conform with the lines of the fuselage.

ANTENNA: Install the antenna in the bottom wing through small holes made in the ribs. Glue the antenna at every point of contact with the wing to prevent rattle and vibration. Cut a small hole in the top of the center section that will be inside the fuselage. Run the antenna lead out through this hole. Solder lead to the center of a piece of brass shim stock. Cut the shim stock large enough to cover the hole and glue to the center section with contact cement. Adjust the tension on the homemade spring contact in the fuselage to give tight contact to the brass shim stock when the wing is mounted.

We have used this type of concealed antenna on five planes with great success. It is not advisable to use a metallic dope with this type of installation, however.

At this point I would like to thank three people for their assistance in this presentation. First my thanks go to my older son, Doug Jr., for an excellent job in tracing and blueprinting my plans. My thanks go also to my two flying buddies, Bill Norment and Milton Newsom. Bill is a professional photographer and also sports editor for our local newspaper, the "Robesonian". Bill gets all the credit for these photos. Milton operates his own electronics business, "Broadcast and Communications", and gets credit for all the electronics involved.

Me? I'm just a sub clerk in the Lumberton, N.C. 28358 Post Office.