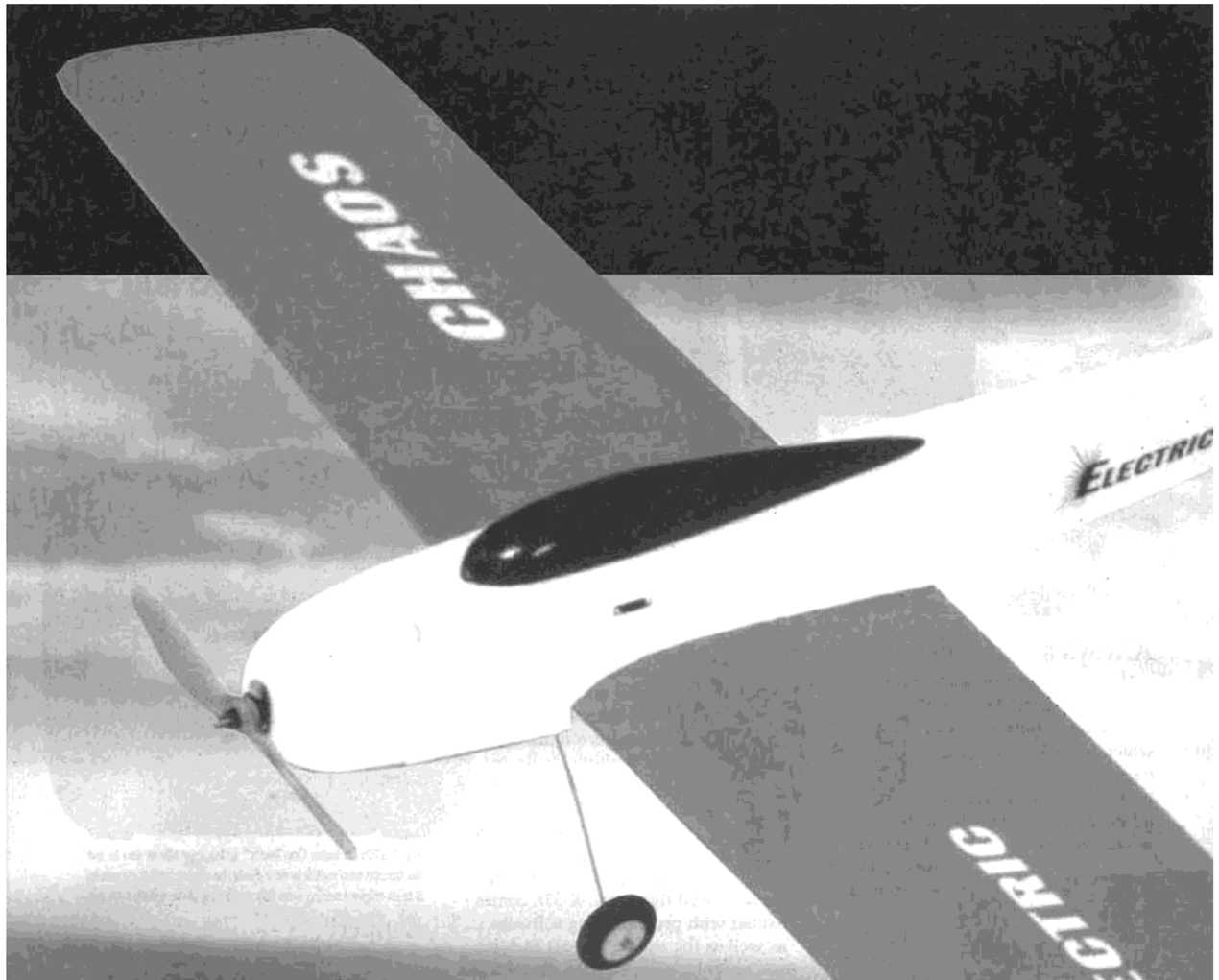


The Electric Chaos borrows a great deal from its predecessor the Utter Kaos, a legacy pattern aircraft designed by Joe Bridi, using the construction techniques of the Electric Kitten designed by Fred Reese. With the encouragement of both of these great model designers, the Electric Chaos became a reality. Having just built the Electric Kitten by Fred Reese, an outstanding high wing Speed 400 Park Flyer, which I would highly recommend, I was ready for full-house performance using the Speed 400 motor.

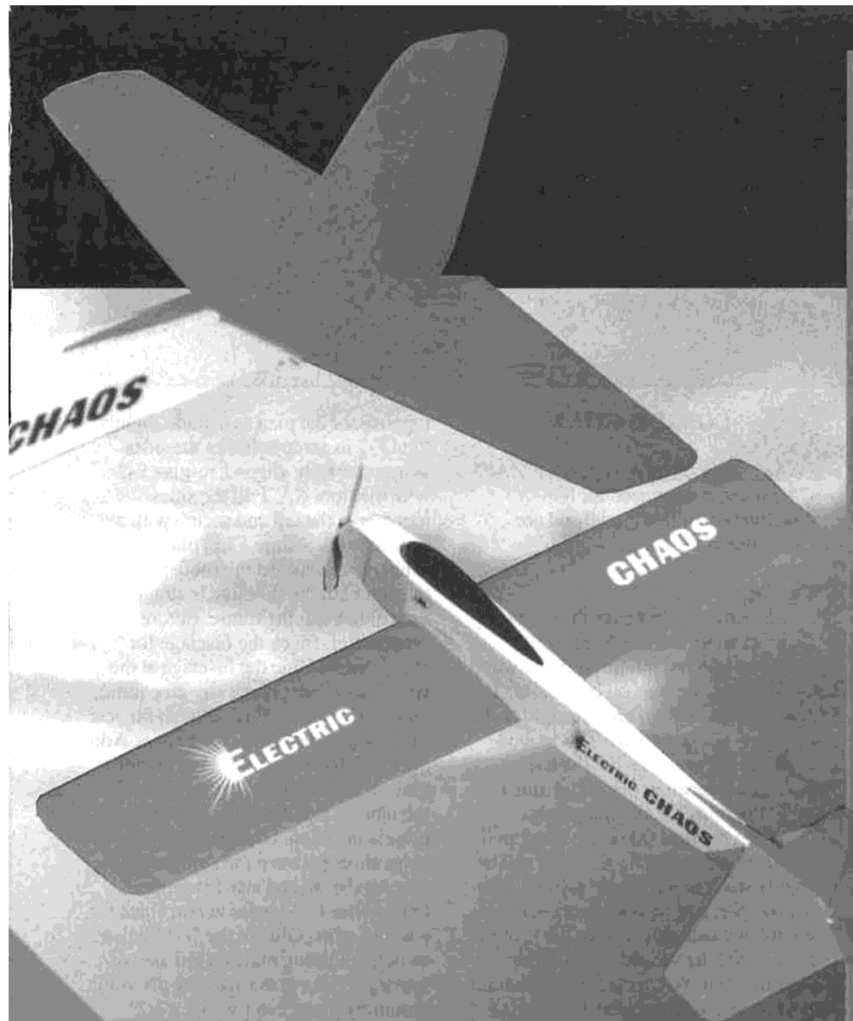
I flew the model the first time with an 8 x 6 APC Slow Flyer prop, a Speed 400 6 volt motor with the Mini Olympus gearbox from Hobby Lobby, using a 7-cell KR600 AE battery pack with Deans Ultra connectors from EMSJomar, which gave 6-1/2 to 10-minute flights.

The plane is about three quarter size of the Utter Kaos, with the fuselage length reduced to cut drag. The wing is almost symmetrical, but for ease of construction, it is flat on the bottom, from the spar to the trailing edge.

The model flew well, with no trim adjustments needed, take-off was smooth and straight and lifted off in about 30 feet. I did Rolls, Loops and some Hammerheads on the first flight.

The prototype Electric Chaos' finished weight was approximately 20 oz., giving a wing loading of only 7.4 oz./sq. ft.

ELECTRIC



The Electric Chaos is a Park Flyer that is a Fully Aerobatic Pattern Aircraft with Excellent Slow Speed Handling During Landings

By Robert Larson

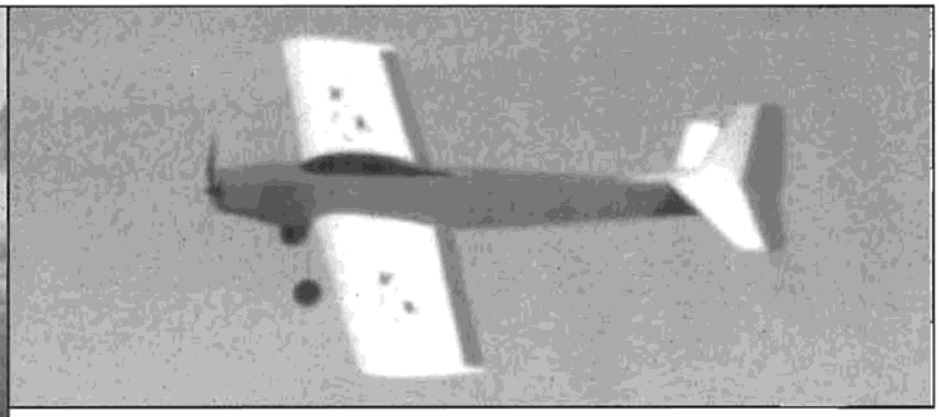
ELECTRIC CHAOS

Designed by:
Robert Larson
TYPE AIRCRAFT
Electric Sport/Pattern
WINGSPAN
46 Inches
WING CHORD
8 Inches (Avg.)
TOTAL WING AREA
350 Sq. In. (Approx.)
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Tapered
DIHEDRAL, EACH TIP
1 Inch
OVERALL FUSELAGE LENGTH
32-5/8 Inches
RADIO COMPARTMENT SIZE
2-3/8" (L) x 1-7/8" (W) x 2-1/4" (H)
STABILIZER SPAN
17-1/4 Inches
STABILIZER CHORD (inc. elev.)
5-1/4 Inches (Avg.)
STABILIZER AREA
54 Sq. In. (Approx.)
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7-3/4 Inches
VERTICAL FIN WIDTH (inc. rud.)
5 Inches (Avg.)
REC. MOTOR SIZE
Speed 400 6V/2.3:1 Gearbox
BATTERY SIZE
7-Cell to 10-Cell KR 600AE
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
C.G. (from L.E.)
2-1/2 Inches
ELEVATOR THROWS
3/4" Up — 3/4" Down
AILERON THROWS
5/16" Up — 5/16" Down
RUDDER THROWS
1-1/2" Left — 1-1/2" Right
SIDETHRUST
1/2 Degree Right
DOWNTHRUST/UPTHRUST
—

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa
Empennage	Balsa
Wt. Ready To Fly	18 Oz. (1 Lb. 2 Oz.)
Wing Loading	7.4 Oz./Sq. Ft.

CHAOS



Material List

10 — 1/8" sq. x 36" balsa
4 — 1/8" x 1/4" x 36" balsa
2 — 3/16" sq. x 36" balsa
1 — 1/32" x 3" x 36" balsa
3 — 1/16" x 3" x 36" balsa
1 — 1/8" x 3" x 36" balsa
1 — 1/4" sq. spruce x 6"
1 — 1/8" dowel x 3"
1 — 1/32" dia. wire x 18"
1 — 1/16" dia. wire x 13"
1 — 1/8" lite ply 6" x 6"
1 — 1/16" ply 3" x 3"
1 pr. — 2" Dave Brown Lectra Lite treaded wheels
4 — sheets Litespan covering
1 pr. — 1/16" wheel collars (2 pr. for pushrod adjustment)

CONSTRUCTION

Assembly Note: A variety of "ZAP" CA products were used for the construction of this model and are called out in the text.

Fuselage:

Lay waxed paper over the plans, then pin down the top fuselage 1/8" longeron. Do not pin through the wood, but rather place pins on both sides. To save time cut two of each upright and diagonal 1/8" sq. sticks. The second stick for the second side. Pin the bottom longeron in place and glue in all of the uprights and diagonals.

When the first side is finished, pull out all of the pins. The side will still be lightly stuck to the waxed paper. Lay a second piece of waxed paper over the completed side and replace some of the pins. Build the second side directly over the first. When complete, separate the two sides and add the 1/16" balsa gussets to support the landing gear. Add the 1/8" sq. servo rail supports to each side.

Bind the 1/16" wire landing gear to F-2 with thread or fine wire. Using the top view of the plan as a guide, lightly glue F-2 in place between the sides. When correctly aligned, re-glue F-2 with medium CA. Pull the sides together at the tail and secure with a rubber band. Secure F1 in place with a rubber band. Adjust the rubber band tension until the fuselage is straight, then glue F1 to the frame. Before proceeding, check the fuselage for straightness. Glue the fuselage at the tail. If necessary, crack any glue joint, make shift and re-glue. Glue in the rest of the top and bottom crosspieces. Add the top 1/16" balsa sheet, but do not glue on the bottom sheeting until after the wing is fitted and the mounting dowels installed. Glue in the 1/16" balsa sheet between the stringers at the rear for the fin and sub-fin support. Glue in the 1/16" balsa at rear sides for lead out exits. Glue in the 1/16" balsa switch mounting plate on left side of fuselage. Glue in the 1/8" lite ply wing mounting plate, use 1/8" sq. x 1/2" fillet blocking. Do not install bottom sheeting in front of wing until wing has been installed.

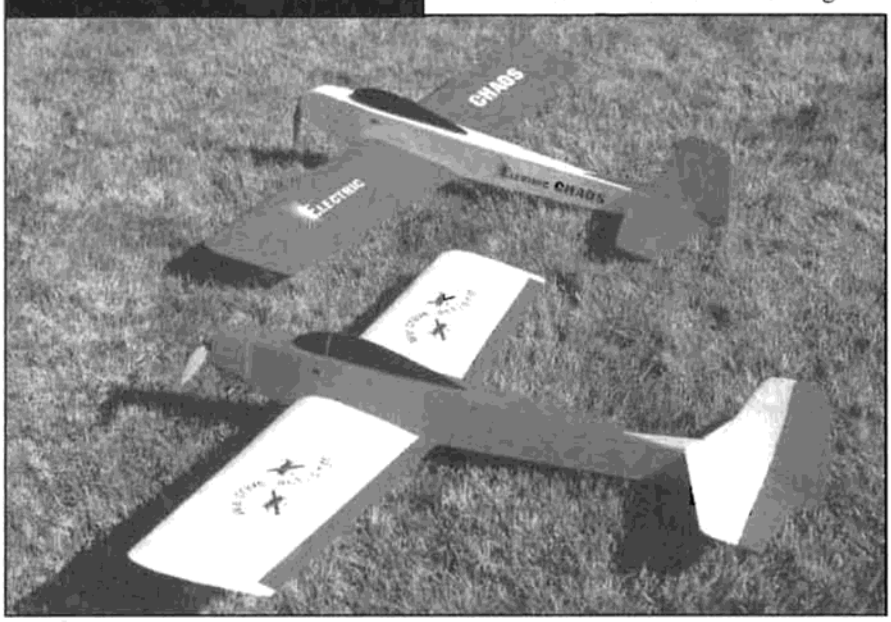
Using the plan as a guide (motor note: 1-1/2 degrees right thrust), glue the 1/16" balsa gussets to the 1/4" sq. spruce motor mounts. Glue the motor mounts in place on F1. Glue in the two lite ply servo mounts using your servos as spacers.

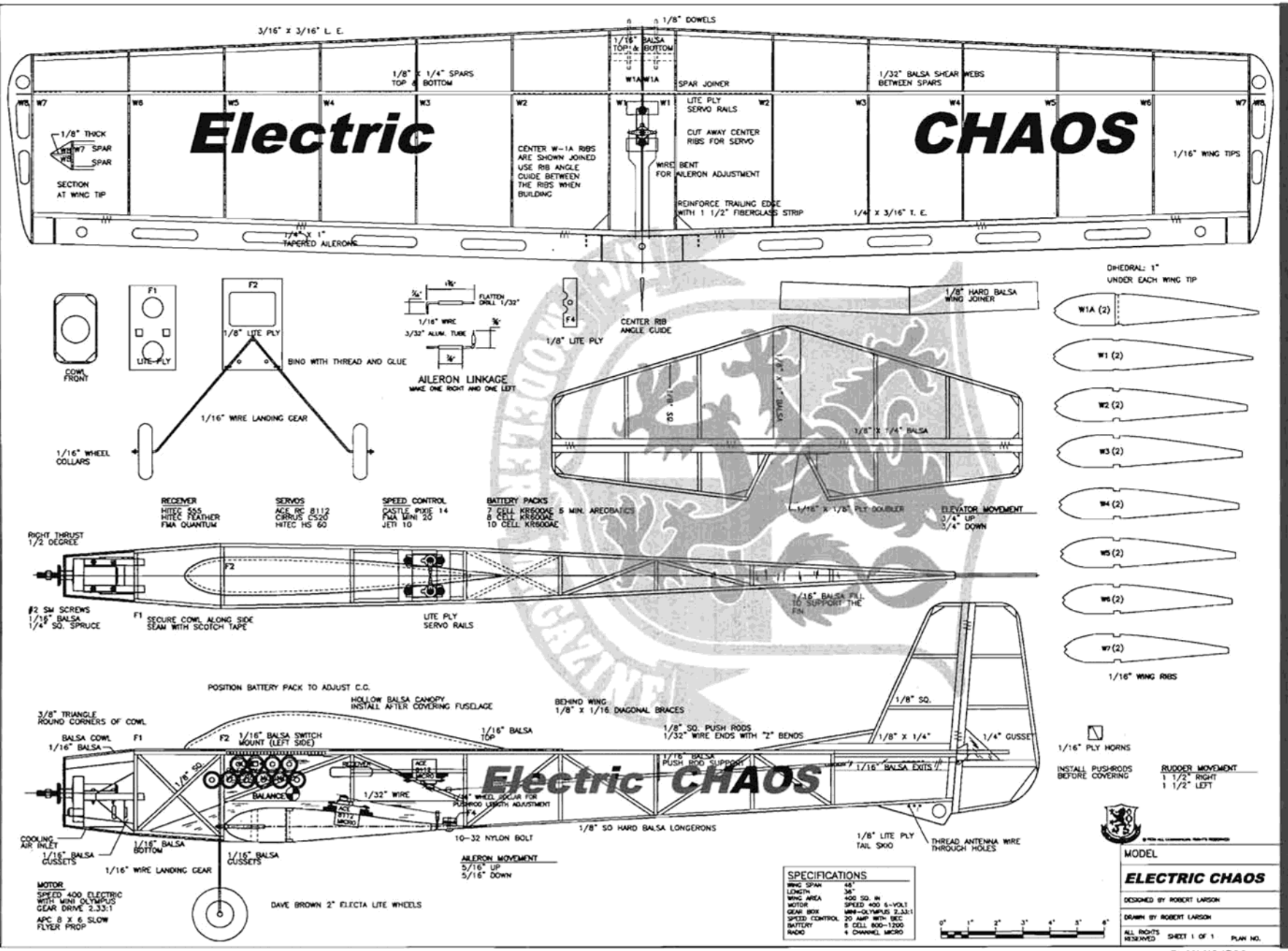
Using lightweight balsa, carve, hollow out, and sand the canopy. This is to be painted before installing and installed after covering is complete.

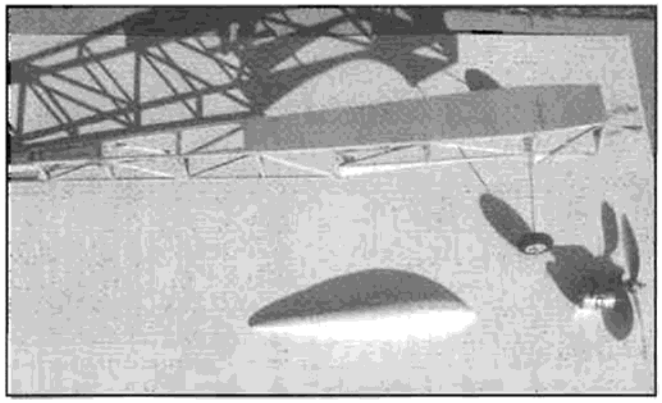
Wing:

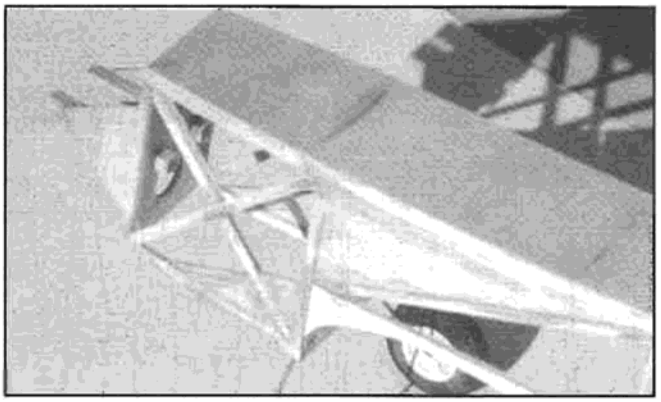
Like the fuselage, the wing and all the other parts of the model are built-up over the plans. Pin the spars in place over the plan and slide on the ribs. Glue the ribs to the spars with thin CA. Glue on the leading and trailing edges with medium CA. Glue on the wingtips and sand.

Glue the two W-1A ribs at an angle for dihedral, then add the 3/16" leading edge and the 1/4" x 3/16" trailing edge.

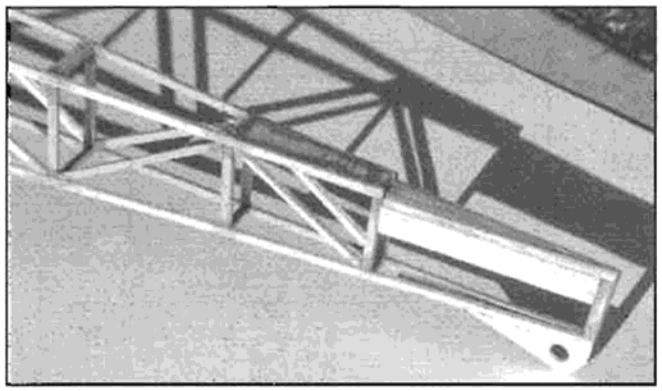


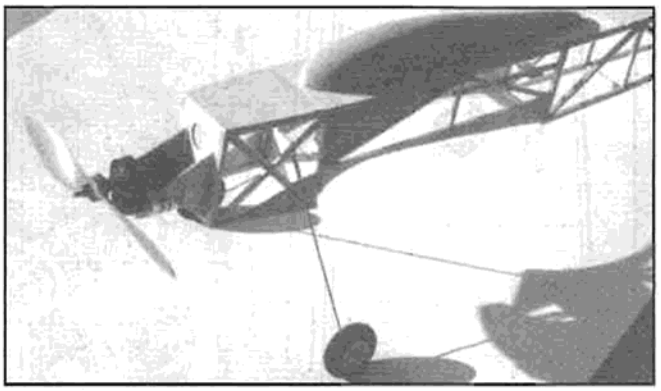






LEFT: The fuselage is built-up using balsa sticks and lite ply formers, with a minimum of balsa sheeting. RIGHT: Bottom front fuselage sheeting is not installed until the wing is fit to the fuselage. Balsa gusset above wing is for the radio switch mounting (left side only).





LEFT: Rear of fuselage showing the 1/16" balsa sheet inserts for vertical fin and stabilizer mounting. RIGHT: A Speed 400 electric motor and Mini Olympus gearbox are mounted on 1/4" sq. spruce rails with balsa gussets.

Do not glue on the top sheet until the wing panels are joined.

Join the wing panels, blocking up one wingtip 2". Use thin CA to bond the spar joiner together and medium CA for the leading and trailing edges. Glue on the top 1/16" balsa sheeting. Round off the leading edge.

Strengthen center section of wing by laminating, with thin CA glue, a piece of lightweight fiberglass 1-1/2" x 2-1/2" at trailing edge.

Make the shear webs with 1/32" balsa between ribs.

Make the aileron linkage from 3/32" o.d. brass tube and 1/16" music wire. Be sure to make a right and left side. Flatten the ends of the uprights with pliers, and drill with a 1/32" drill bit for "Z" bend. Solder the uprights to the wire.

Cut the two inboard trailing-edge pieces to receive the aileron linkage. I cut a V-groove with an X-Acto knife.

Add a slight amount of washout to wingtips when covering.

Empennage:

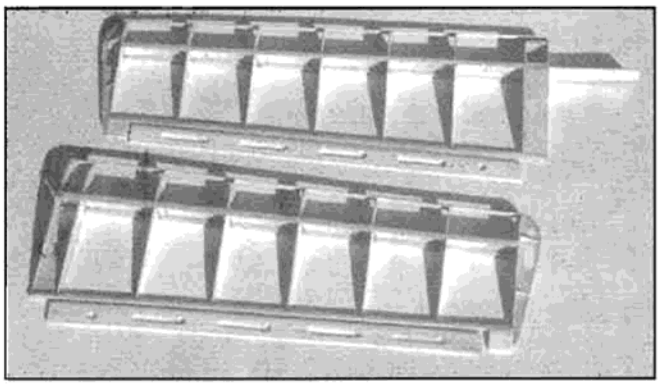
Build the tail surfaces over the plan and waxed paper using 1/8" sq. and 1/8" x 1/4" hard balsa. Round off the edges with sandpaper and prepare for covering.

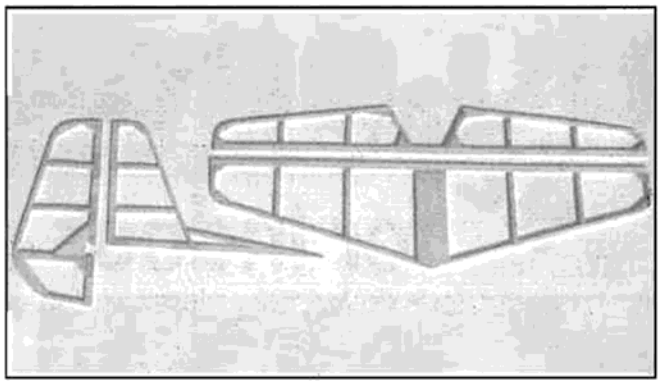
Cowl:

Build the cowl from 1/16" balsa. Lightly glue the sides to the base and install triangular blocks. Glue light 1/16" balsa sheet for top and install triangular blocks in corners, then glue on the front. Shape by sanding corners round. Cut the prop hole in the front and motor cooling hole in the bottom.

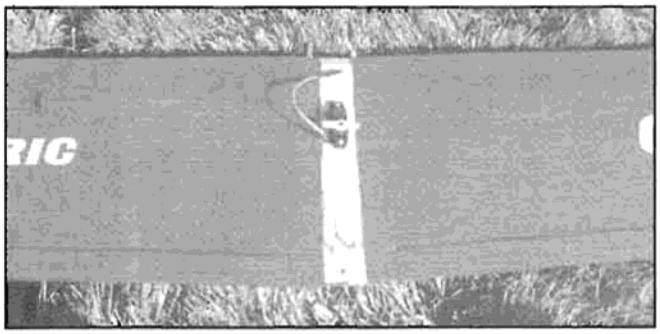
Assembly:

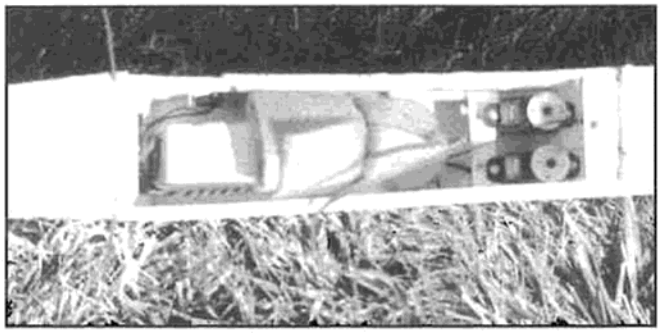
Fit the wing into the wing saddle. Center the wing in the fuselage, and drill a 1/8" hole in F2 and through the leading edge of the wing. Push a piece of 1/8" dowel through the leading edge and F2. Glue the dowel into the wing with a drop of thin CA. Drill other side, and install the second dowel.





LEFT: The wing panels are built-up over the plans using balsa construction. RIGHT: Tail surfaces are lightweight balsa structures assembled over the plans.





LEFT: The aileron servo is mounted in the wing. See plans for details. RIGHT: The radio equipment/battery compartment is located above the wing.

Remove the wing, and glue both dowels with thin CA. Make the pushrods from hard 1/8" sq. balsa and 1/32" wire. Cut the 1/8" sq. balsa to length using the plan as a guide. Bind the wire ends in place with thread and thin CA from the front of the leading edge. Round off the fronts of the dowels.

Put the wing in the fuselage, and install one wing bolt in the trailing edge. Drill and tap, Use 10-32 nylon bolt. Harden the holes in the wing and the threads in F3 with thin CA. Re-tap the threads.

Make "Z" bend at the servo ends and cut slots for the exits at the rear. The elevator pushrod exits through the rear of the fuselage. Install the two servos and the pushrods into the fuselage before covering.

Hinge the rudder and elevator with EZ hinges cut into quarters. Trim away the covering on the bottom of the stabilizer for the fuselage side glue joints. Glue the stabilizer and elevator to the fuselage. Cut a strip away on the top of the stabilizer and fuselage for the fin. Glue the fin and rudder in place, taking care to align it with the center of the fuselage and nose. Cover and glue in place the balsa sub-fin. If you will be flying from pavement, glue a piece of 1/32" wire to the bottom of the sub-fin to keep it from wearing.

Cut out the two 1/16" plywood control horns and drill the pushrod holes. With the servos centered and the control horns held in place, make 90° degree bends in the pushrod wires. Complete the "Z" bends in the rear. Cut away the covering on the rudder and elevator where the control horns will be glued. With the control horns on the wires, glue the control horns in place, keeping the surface straight. Put a second coat of medium CA around these joints.

Covering and Finish:

Cover your model with a lightweight covering material. I used Litespan from Hobby Lobby. Brush Balsaloc, Balsarite, or Sig Stix-It to the wood edges to adhere the Litespan covering. Balsaloc is like thick white glue and is water soluble, until it dries. Stix-It and Balsarite are like a thick butyrate dope. Follow the directions that come with the Litespan and get the covering as taught and free of wrinkles as possible before shrinking. It shrinks, but not a lot. You can pull wrinkles out with the iron along the edges. Iron on the bottom covering and then re-coat the overlap seams with adhesive. Leave the bottom of the center uncovered. Cover the top of the wing. Iron the bottom covering to tighten first, then place the wing panel flat on the bench. Hold the wing panel flat with some weights while shrinking the top covering with a heat gun so the wing does not twist. Cover the rest of the model.

Trim away the covering over the stabilizer for the fin. Cover the parts and remove the covering in the area for the glue joints, before gluing into the fuselage.

Install the hinges. I used CA hinges by Great Planes. Glue the stabilizer into the fuselage.

The canopy is painted with a light spray coat of flat black, white lacquer, or Krylon. Apply any other trim at this time, before assembly.

Equipment Installation:

In the prototype I used Ace 8112 micro servos, an FMA Tetra receiver, and a 600 mAh battery pack. With this lightweight radio pack, the model balanced as shown on the plan. Hook up the motor, speed control, switch, and

battery pack. For safety, leave the propeller off during all of the installation and testing. With the switch off, plug the speed control into the receiver. Test and adjust the throttle response according to the speed control directions. The speed control expects maximum control throws from the transmitter, both high and low. Install the motor, receiver, and speed control in the model. You can use a little small bubble pack or thin foam around the receiver to protect it. The speed control is suspended in the fuselage by the wires.

I have several different battery packs that I use in the Electric Chaos. For normal flight time, I use a 7-cell KR600AE pack that weighs 5 oz. The 600 mA battery pack will give 6 minutes of hot-dogging or up to 15 minutes of slow flight. For pattern performance I use a 10-cell KR600AE. I charge all of these batteries with my FMA Supernova 250S fast charger.

Glue a strip of the loop side of Velcro to the top inside of the fuselage. Glue the fuzzy side of the Velcro to the battery pack. Position the battery pack in the fuselage so the model balances about 1/4" ahead of the spar. This is a little nose heavy, but you can adjust it to suit your flying. Mark the position of the battery on the wing after flying and adjusting. Still with no propeller, check out the system, noting the throttle response, control response with the motor running. Do not run the motor for long times on the bench, with or without the propeller. Resist that temptation to see how long it will run. There is a possibility of burning up either the motor or the speed control.

Attach Dave Brown Lectra Lite Flight wheels, they are about half as wide as Lite Flight wheels. Attach with 1/16" wheel collars, servo keepers will also work.

Flying:

Take-off is straight and easily steered with the rudder. The Electric Chaos will be flying within about 20 feet. Maintain a gentle climb-out until it reaches a comfortable altitude. Adjust the surface throws and C.G. to suit your flying and just enjoy.

The Electric Chaos does all the aerobatics, and best of all, throttle back and it lands slowly. Winter fliers will notice the absence of cold numbing fingers from evaporation of nitro fuels, and love the warmth of fully charged batteries. You will like no messy fuel clean-up and your wife will love the lack of fuel stains on your clothes.

Have Fun!