

#512

The model is a 1/3-size version of the aircraft now flown by Clint McKerry. Span of 96 in. and a light loading provide excellent performance on a Q-35. With one of the bigger, more powerful engines such as the Sachs 3.4, its performance is spectacular.



■ Design by Richard Downing and Jim Van Loo
■ Text by Jim Van Loo

EXTRA 230



I HAVE BEEN in love with aerobatic model airplanes that represent their full-size counterparts since I was a kid. A 1966 cover of *Flying* magazine pictured Harold Krier's Chipmunk. After reading the article inside, looking at the pictures

and talking to Harold, I knew I had to model a Chipmunk. Today the Chipmunk is one of the most modeled airplanes in the paint scheme used by the late Art Scholl.

Almost 20 years later when I walked into a mall book store, I spotted another magazine cover that stirred the same emotions in me. It showed Clint McKerry's Extra 230 in a vertical climb. The magazine was *Sport Aerobatics*. I quickly purchased it and read the article before leaving the mall. On the way home I could think of nothing but that airplane.

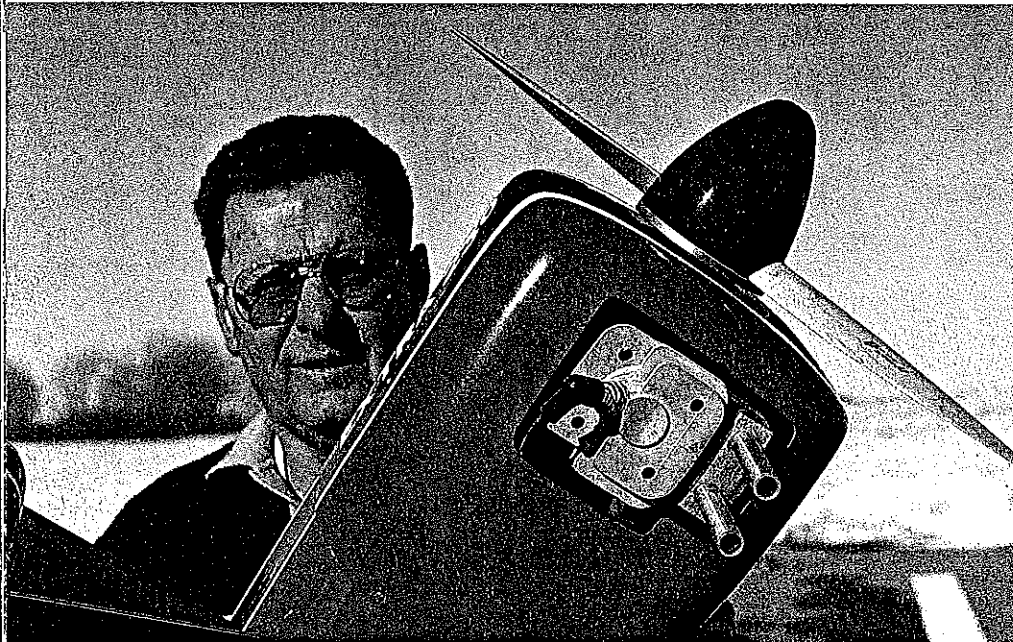
A quick call to Pompano Air Center in Pompano Beach, FL to inquire about the airplane resulted in more information than one could imagine. Clint McKerry wasn't there, but Brian Becker was. (Clint and Brian

Our RC Giant Scale model is patterned after the most talked about new design which competed in the 1984 Aerobatics World Championships for full-size aircraft. It uses a Big Banger engine from 2.0 to 3.4 cu. in. and provides a wide range of performance according to the size chosen and the throttle setting.

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Sitting on Runway 16 at the Spirit Lake Airport, the Extra 230 model displays its sleek lines and brilliant colors. Clint McKenry will be flying the full-size one at the Aerobatics WC this summer (August 1-17) in England while our author will be entering RC Giant Scale events.

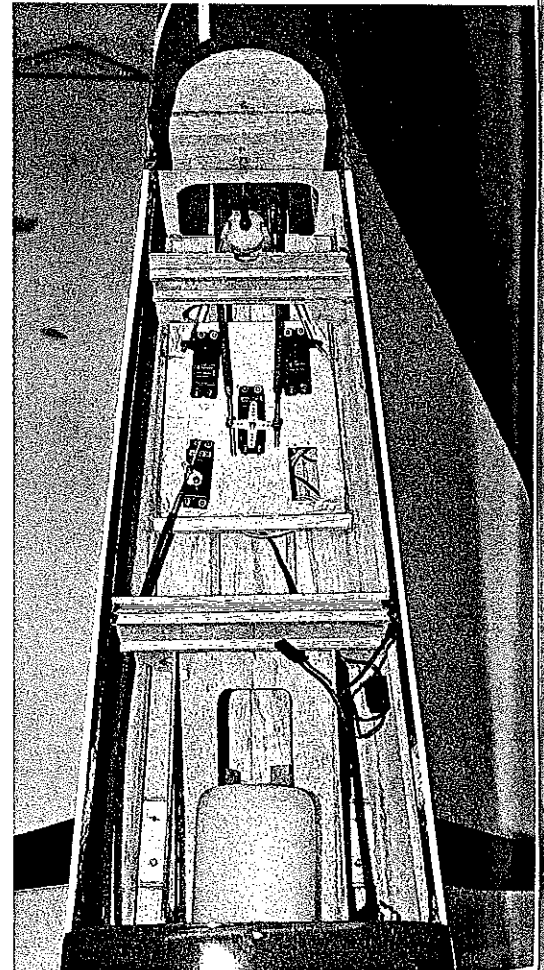


Jim Van Loo holds up the Extra to show how easily the Sachs 3.4 fits inside the cowl. You can mold your own fiberglass cowl or get one (other parts, too) from Spirit Lake Hobbli-Craft.

Plenty of room for detailing in the cockpit. The 1/3-size pilot figure is from Knights of the Air. Removable cockpit area is held in place by Nyrod (see plans/text for the unique system).



are aerobatics instructors at the center.) Brian could not quit saying good things about the Extra 230, and I knew after my conversation with him that I would be flying a model of the Extra 230 before the snow flew. In fact, we flew our first model of it just 21 days after that phone call—and had it at Byron's Fun Fly 85.



Removal of the front cockpit hatch provides easy access to the radio and tank compartment. There is more than ample room for any radio installation you want. There is enough space to make it tempting to include a smoker system or some other goody.



The great lakes region of Iowa (actually Spirit Lake) is home to the model Extra 230, while the full-scale one resides in Pompano Beach, FL.

The full-size Extra 230 is a German mid-wing monoplane designed and built by Walter Extra at his plant in Flugplatz Densloken, F.R. (West) Germany. Walter's prototype was flown at the 1984 Aerobatics World Championships in Hungary by Eric Muller of CAP-21 fame. Readers may remember the coverage of this event in the September 1985 *Model Aviation*. Muller flew the airplane to a respectable sixth place even though he had only a few hours of practice time in it.

The paint trim of the Extra at the 1984 WC was white, black, and yellow with red and green accents very similar to the Diablo. Clint McKenry now flies that same airplane but in new colors. It is painted in Pompano Air Center colors (as is Brian Becker's new Extra 230): red with blue trim and white accent stripes. In a recent conversation, Brian told me that Extra 230s will all be in these colors (until someone wants a different scheme). They had three for sale when this was written.

Clint McKenry switched from the Pitts

to the Extra 230 after watching Muller at the 1984 WC. Competition results indicate that his decision was a good one. At Fond du Lac, WI he placed second at the 16th Annual IAC Championships. During the week of September 21-29, 1985, he again placed second at the U.S. National Aerobatics Championships in Sherman/Dennison, TX. This secured a position for him on the U.S. Aerobatics Team for the World Championships to be held in England during August 1986.

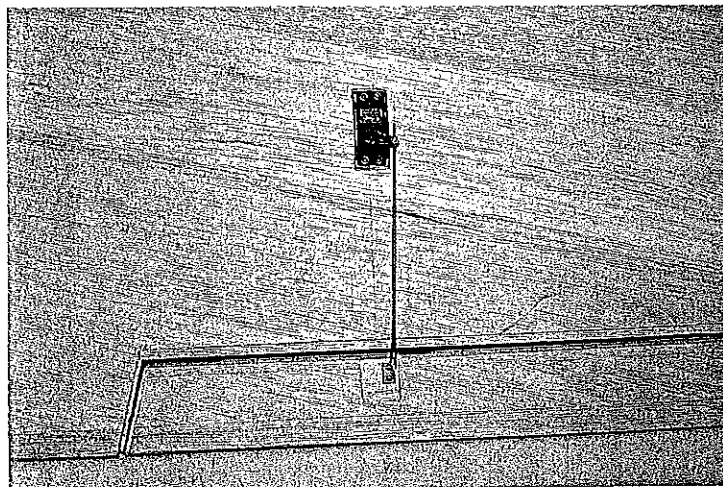
Clint missed winning first place in the team trials by just 12 points. Brian said that Clint went outside of the judging "box" on some of the corners. Had he fudged them (mushing rather than being clean and crisp), the outcome might have been different.

My thanks to Brian Becker and Jean Sorg, editor of *Sport Aerobatics*, for their help with background information about the Extra 230.

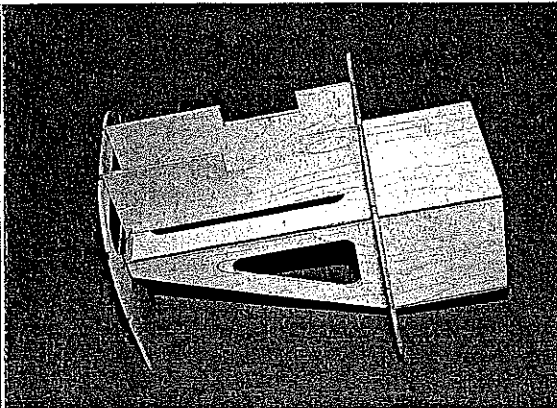
Fuselage construction. Cut the engine and tank box from 1/8-in. plywood. The box

length is determined by the engine to be used; the size shown on the plans is for the Quadra 35-50. Glue the sides, top, and bottom together. Epoxy 1/2-in. triangle stock to the inside of the engine box flush with the front. Wipe any excess epoxy from the fronts of the triangle stock, as the firewall has to be glued to these pieces. Glue the firewall to the box, and set the unit aside. Glue the engine box into F-1. Glue 1/4-in. mahogany to F-2 flush with the top edge of the cutout. Join the engine box assembly to F-2. Glue in the 1/8-in. plywood landing gear supports.

Cut the fuselage sides from 1/8-in. plywood. If 48-in. stock is used, it will be necessary to make 4-in. extensions and glue them on. Lay the fuselage sides on the plans, and mark the former locations. Glue the top 1/4-in. mahogany stringer flush with the top of the fuselage side. The bottom stringer is glued so that half of it extends below the bottom of the fuselage side. Cross sections F-1 through F-7 show this. One way to do this is to use the fuselage formers



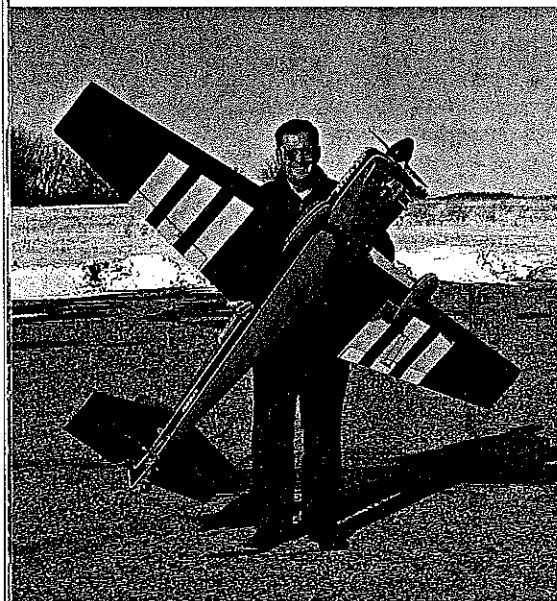
Left: With a model of this size, it is necessary to use a separate servo for each aileron. Shielded wire from the receiver will help reduce ignition noise interference. Use a 4-40-size pushrod from the servo to the aileron. Right: A T-3 aluminum landing gear supports the Extra.



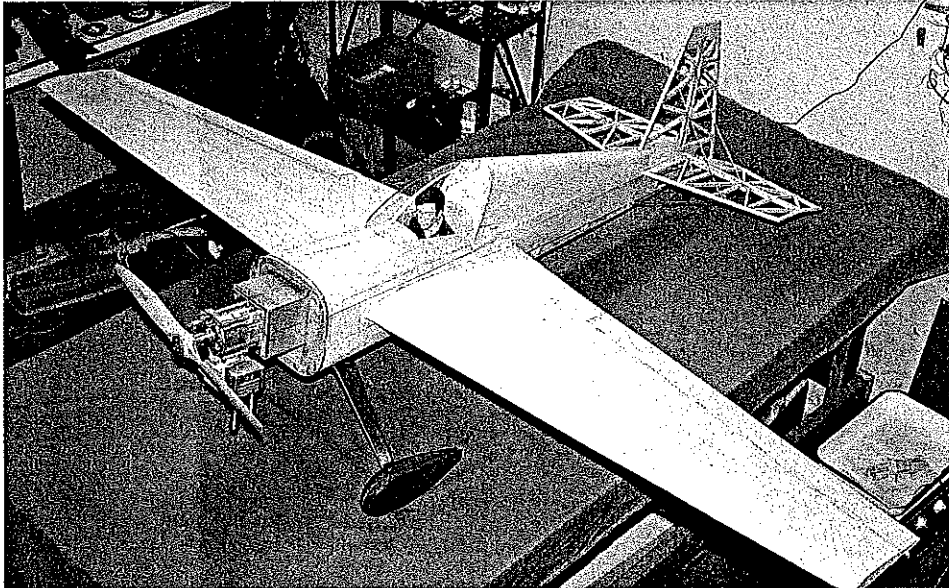
The engine mount box assembly should be built before starting fuselage construction. Make sure it is square, as this is important for accurate alignment of the entire model.

for spacing so that the planking for the front bottom portion can be attached to the sides.

Assemble the fuselage upside down over the plans, letting F-1 and approximately 2 in. of the fuselage front hang over the edge of the workbench. Note that the flat fuselage top (at this point) provides an excellent platform to receive the rest of the structure. Overhanging the workbench isn't a prob-



Jim displays the underside trim. He and Dick Downing were working on a 1/4-scale version of the Extra for 1.20 four-strokes that they expected would be flying in April.



The assembled model just prior to finishing. At this point you start to realize it is nearing completion. Cover it with MonoKote; the white trim is done with automotive striping tape.

lem, as the sides do not curve, and the formers fall in line.

Glue F-1 through F-7 in place. Glue 1/4-in.-sq. mahogany stringers to the formers. Glue in F-1A and 1B. Wet the 1/8-in. balsa planking on the outside only so that it will bend around the bottom easily. Apply the planking to the bottom.

Cut out the planking to accept the landing gear mount. Mark, drill, and tap the 1/4-in. landing gear and mount. Two 1/2-in. triangle reinforcements can be glued to the landing gear supports, providing more surface for gluing the landing gear plate. (The gear is mounted with nylon bolts so that it will break away in the event of a hard landing.) Install the landing gear plate with epoxy glue.

Glue 1/4-in.-sq. mahogany tail wheel plate supports to the rear of F-7 and halfway back on the fuselage between F-7 and the rear of the fuselage. Glue on the 1/8-in. plywood tail wheel plate. Glue 1/4 x 1/8-in. balsa cap strips to the rear stringers. Cut and glue 1/4-in. tapered balsa stringers between F-4 and F-7 (cut these a little large to allow for sanding to shape).

We make templates for hot-wire-cutting foam parts from Formica. This material can be sanded smooth, and it lets the cutting

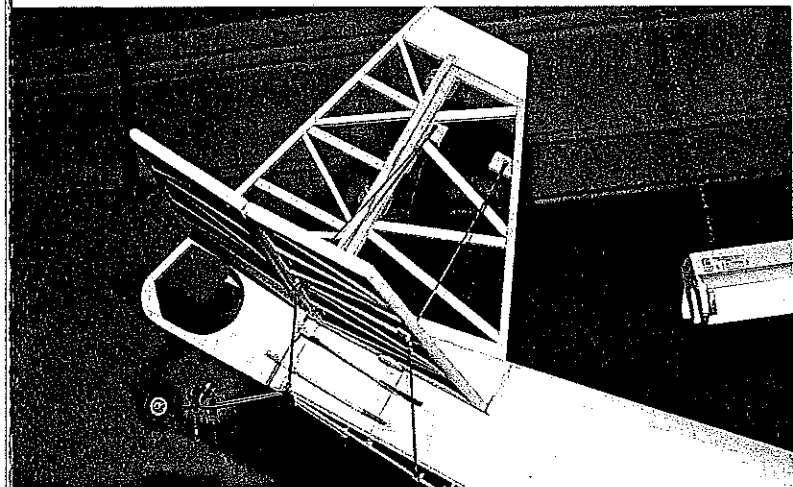
wire glide by easily for a very smooth cut. We use a Nor-Ray foam-cutting machine. Cut out the foam front and rear decks (with the help of an assistant).

Glue 1/8 x 1/2-in. balsa strips to the bottom edges of the rear deck to provide a gluing surface for attachment to the fuselage. Glue 1/8 x 1/4-in. balsa strips to the sides. Sheet the rear deck with 1/16 balsa. Glue 1/8-in. cross-grained balsa to the front of the rear deck, and sand it to shape. Glue 1/8-in. Lite Ply to the rear. Tack-glue a second former to the rear one; this will be removed later when the tail assembly is added. Sand, fit, and glue the rear deck to the fuselage.

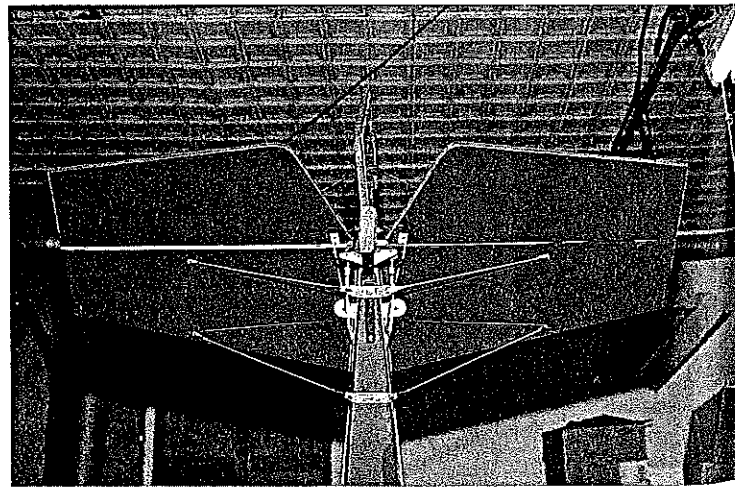
Build the fuselage front deck in the same manner. Add F-3A at the rear of the canopy in preparation for planking and sanding this area.

Tail parts are built from 3/8-in.-sq. balsa in a straightforward way. However, do note that the 1/8-in. plywood tail post support should be marked for hinges and the hinge slots should be cut before it is glued in place, as it will be difficult to do the slotting later.

Cut fin/fuselage fairing pieces from 1/2-in. balsa. By tack-gluing 1/8-in.-sq. to the center of these (where the fin goes) and a 1/8-in.-sq.

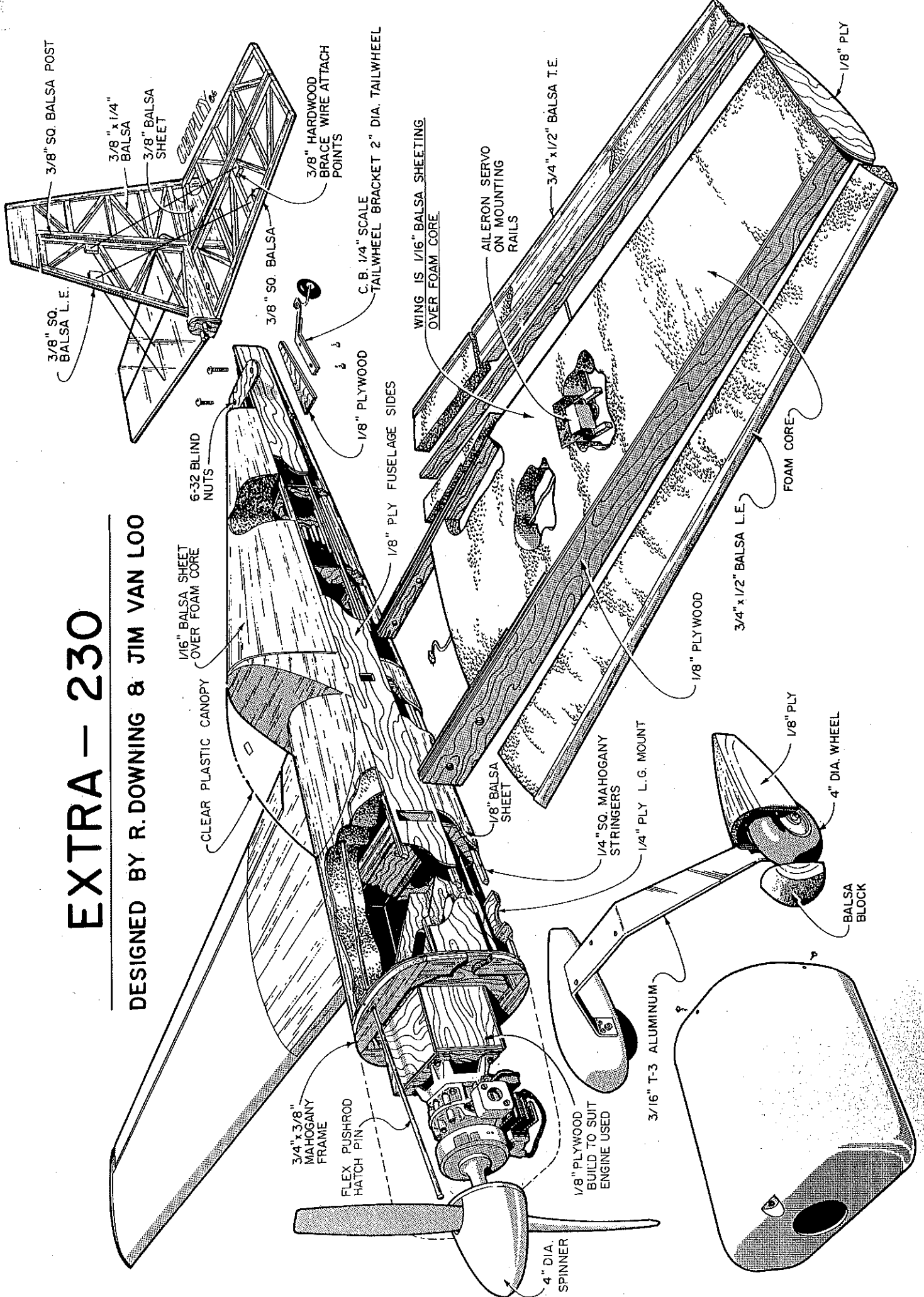


Left: The tail assembly is removable for ease of transportation. Two 6-32 bolts and support wires made from quick links hold the assembly in place. Right: Dual pushrods for the elevators and rudder provide positive control. Strong tail section is mahogany-reinforced plywood.



EXTRA - 230

DESIGNED BY R. DOWNING & JIM VAN LOO



strip to the bottom, you can sand this difficult piece to shape on the fuselage.

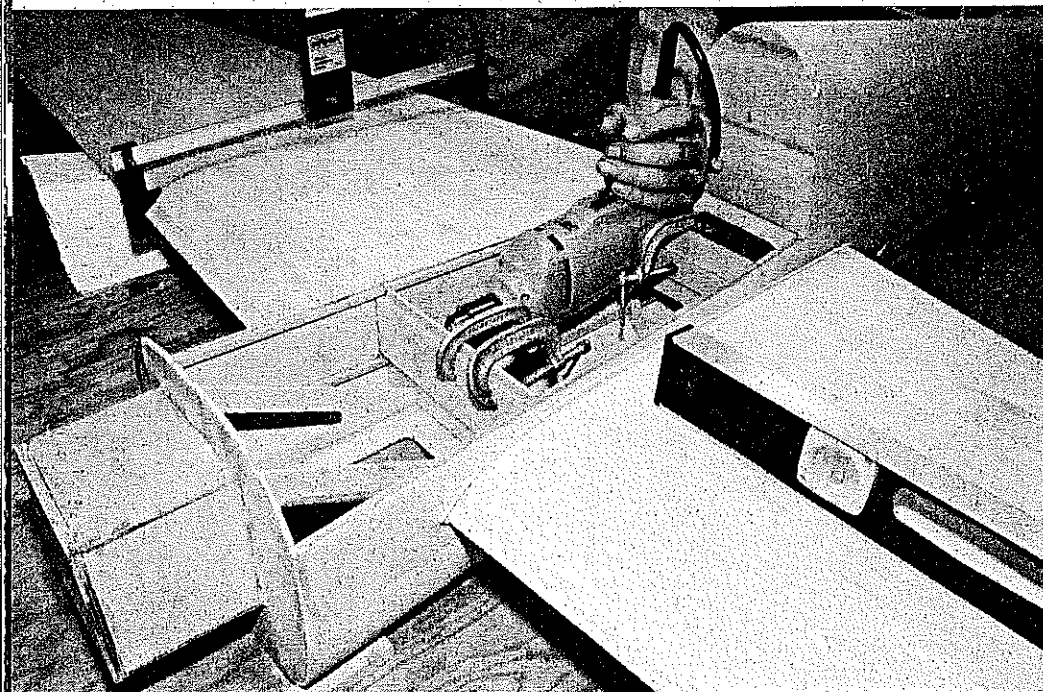
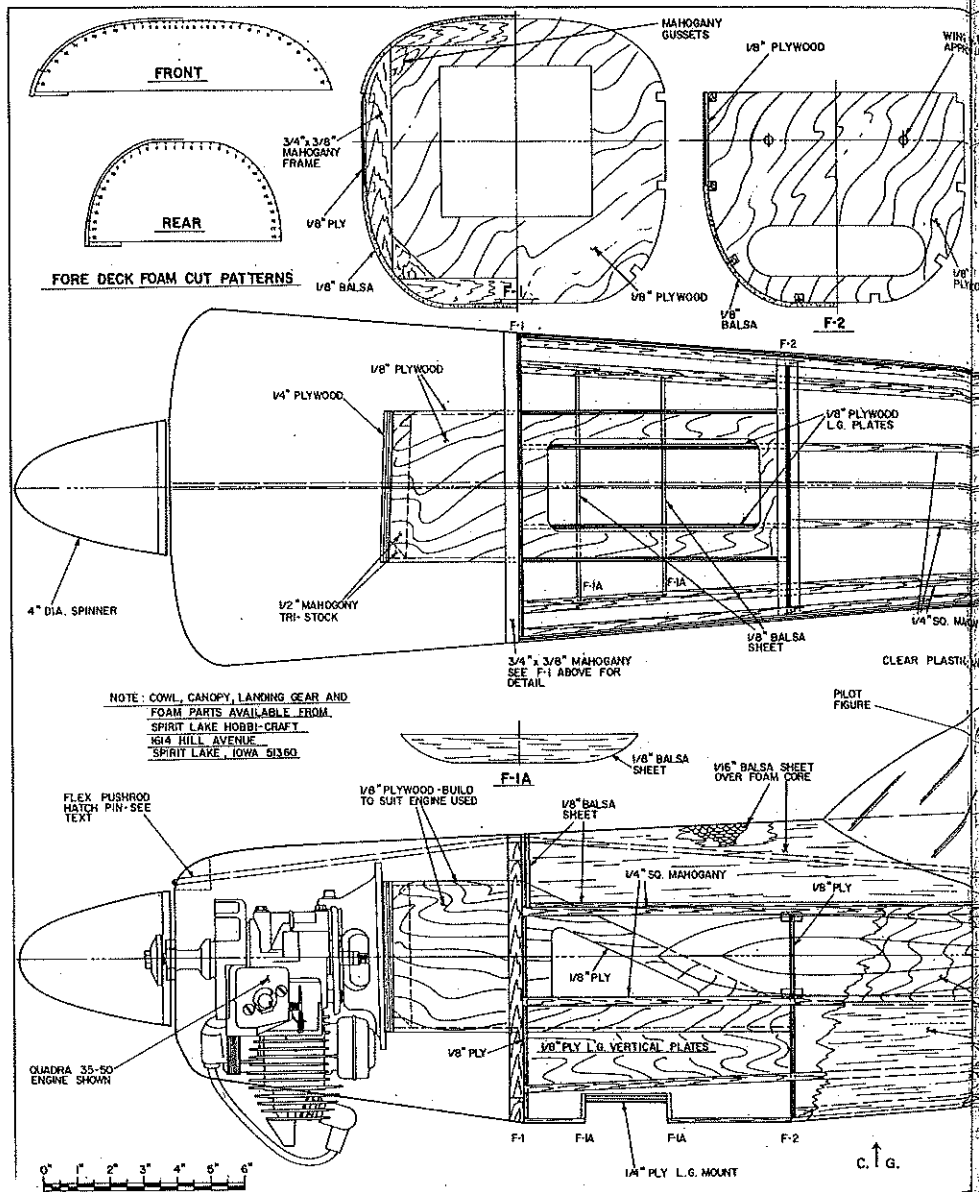
Cut two 1/8-in. plywood tail-mounting brackets, and notch the fuselage and horizontal stab to accept them. Drill holes as shown on the plans for 6-32 bolts and blind nuts, the blind nuts to be glued to the plate in the stab. The matching plate in the fuselage will be glued on when the tail assembly is mounted. Hinge the rudder and elevators.

Wing. The cores and other foam parts are cut from foam that you can obtain from a local insulation firm. It should be virgin foam of at least 1-lb. density. Hot-wire-cut the cores and spar locations exactly as shown on the plans. It takes a little longer to build wing panels in this way, but this is a large airplane, and the wings must not be allowed to flex. (By building the panels in this way with full-length, full-depth spars embedded in the foam and then sheeted, we aren't able to twist the wing panel or to get it to flex.) Glue the spars to the foam cores with contact cement or epoxy.

Sheet the wings with 1/16 balsa, and add the leading and trailing edges. Cut out the root ribs, but do not glue them on now.

Measure and cut the ailerons. The rear spar makes an excellent trailing edge for truing the leading edge of the aileron. Try to get a minimal gap between the wing and aileron. We have not had aileron flutter with these surfaces either sealed or unsealed; however, roll rate is much better when the ailerons are sealed.

A servo is used for each aileron. Cut mounting holes, and add servo rails. We install the servo so that just the wheel shows. The servo pushrod is 90° to the hinge line. Cut a hole in the root rib for the servo extensions. To make a tunnel in the foam for the aileron extensions, heat a piece of 1/8-in. music wire and slide it through the



Carefully align the wing panels and fuselage before drilling the 1/4-in. mounting holes. With the author's power drill, there was room only for a 2-in. bit (good time to use a broken one).

foam to the servo area.

After sanding, the wing panels are ready for mounting. Alignment is the key to how well the airplane will fly.

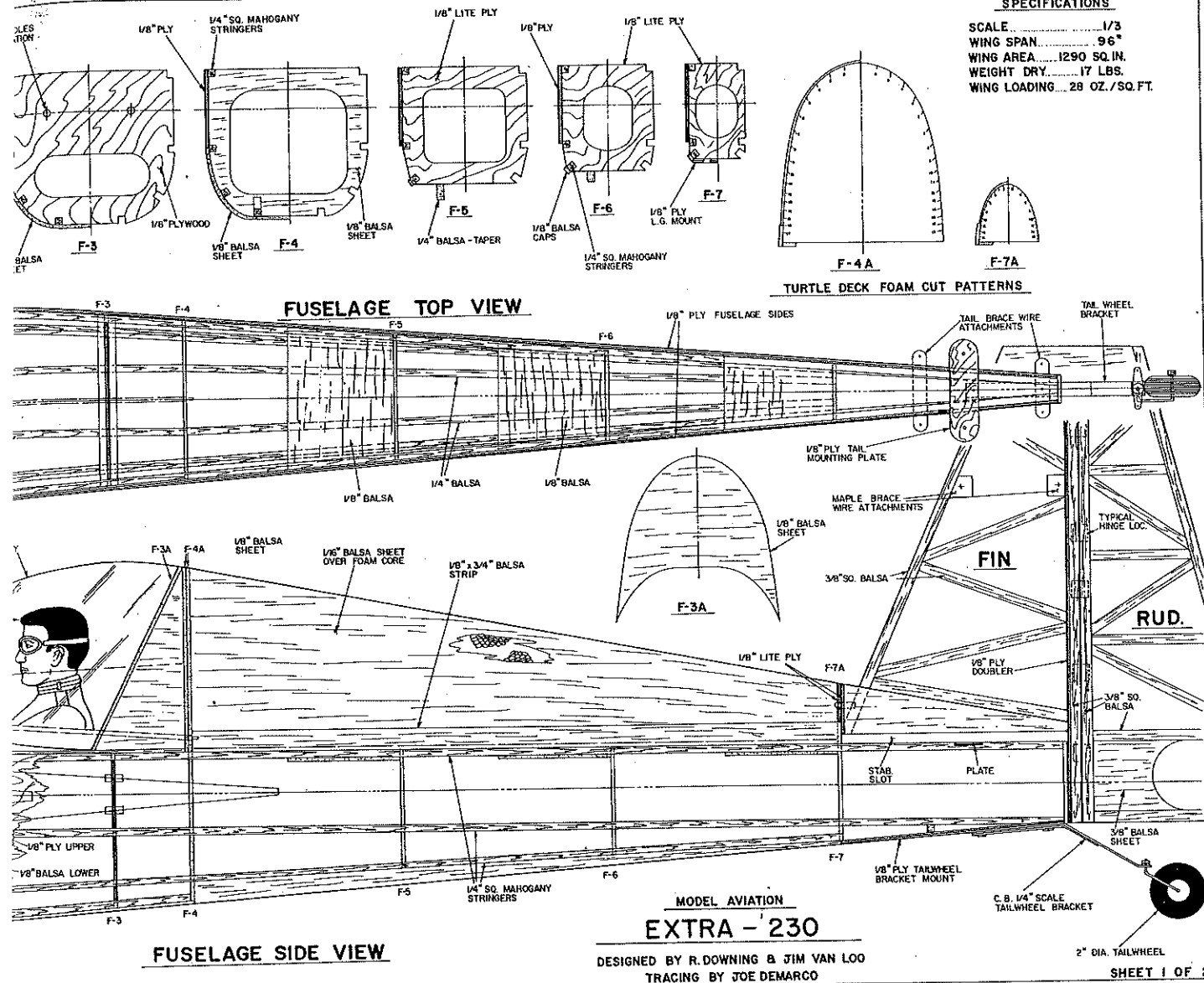
Assembly. If you look closely at the picture of the fuselage on the bench, you will notice small blocks under the front. We actually tack-glue these to the bench and airplane. The fuselage is blocked so that the engine thrust line and the top edge of F-2 are level.

Before you secure the fuselage to the bench, it is necessary to cut out the spar locations in the fuselage sides. A hole is cut with a Dremel tool in front of F-2 and F-3 on the right side and behind F-2 and F-3 on the left side. Slide the root ribs onto the spars (don't glue them yet), secure the fuselage, and slide the wing panels tight against the fuselage sides. Check for 0° dihedral and incidence. Clamp the spars, and recheck the alignment. When everything is set, drill 1/4-in. holes through the spars and formers; we use carriage bolts with washers on both sides and wing nuts to hold the wings and fuselage together.

Remove the wing panels. Slide off the

SPECIFICATIONS

SCALE.....1/3
 WING SPAN.....96"
 WING AREA.....1290 SQ. IN.
 WEIGHT DRY.....17 LBS.
 WING LOADING...28 OZ./SQ. FT.



FUSELAGE SIDE VIEW

**MODEL AVIATION
 EXTRA - 230**

DESIGNED BY R. DOWNING & JIM VAN LOO
 TRACING BY JOE DEMARCO

SHEET 1 OF 2

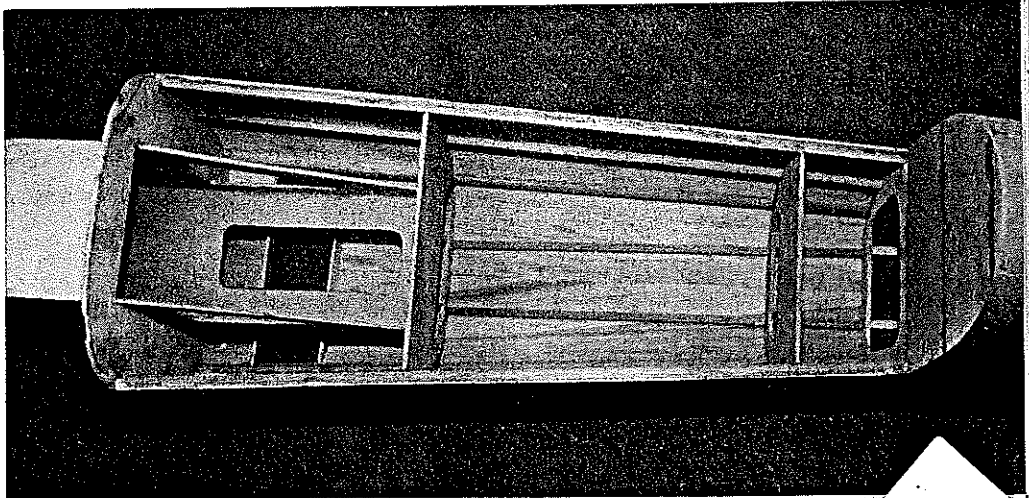
root ribs, and coat the ends of the panels with epoxy. Return the root ribs to the panels, and put the spars back in the fuselage. Put a piece of wax paper between the spars and formers, and install the carriage bolts to secure the wings solidly. Recheck the alignment. Fold the wax paper over the top of the spar, and glue the 1/4-in. mahogany alignment guides in place. Any gap between the wing panels and root ribs can be filled with Model Magic filler after the epoxy dries.

Now, the tail assembly. With the fuselage secure, place a piece of wax paper between the two 1/8-in plywood hold-downs for the horizontal stab, and bolt them together. Remove the shaped tail fairing from the fuselage. Do not remove the second 1/8-in. ply F-7A former.

Place wax paper between the fuselage and stab with a cutout for the hold-down mount. Place the horizontal stab on the fuselage, and check the alignment with the wing. If satisfied, remove the stab, apply 5-min. epoxy to the fuselage, replace the stab, and hold it level. After curing, drill two 1/4-in. holes in the rear formers as shown on the

plans. Cut the rear fairing apart, and trial-fit the vertical fin to the fuselage with the fairings in place. Remove everything, and insert two 1/4 x 1 1/2-in. dowels into the holes drilled in the rear formers. Slot the fairings

to accept the dowels. When you are satisfied with the completed assembly, glue it together. I used 5-min. epoxy for this, but I had to work fast. A good triangle is needed to get proper align-



Front area of the fuselage under construction shows plenty of room for a smoker tank behind the fuel tank. Equipment area could even hold a redundant radio system if desired.

ment of the vertical fin. Glue $\frac{1}{4}$ x $\frac{3}{8}$ -in. strips to the rear of the fuselage for tail support alignment.

Rear tail support wires are made from quick links and solder links. These can now be made and installed. The support wires are a must, as without them the horizontal stab would not be strong enough during maneuvers. Naturally, you'll have to remove the supports prior to covering. Install the tail wheel; we used a C.B. Associates $\frac{1}{4}$ -scale assembly.

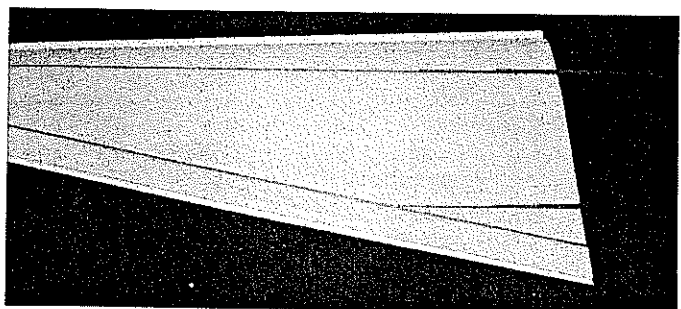
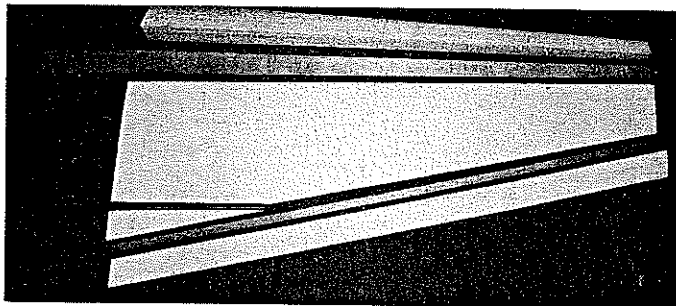
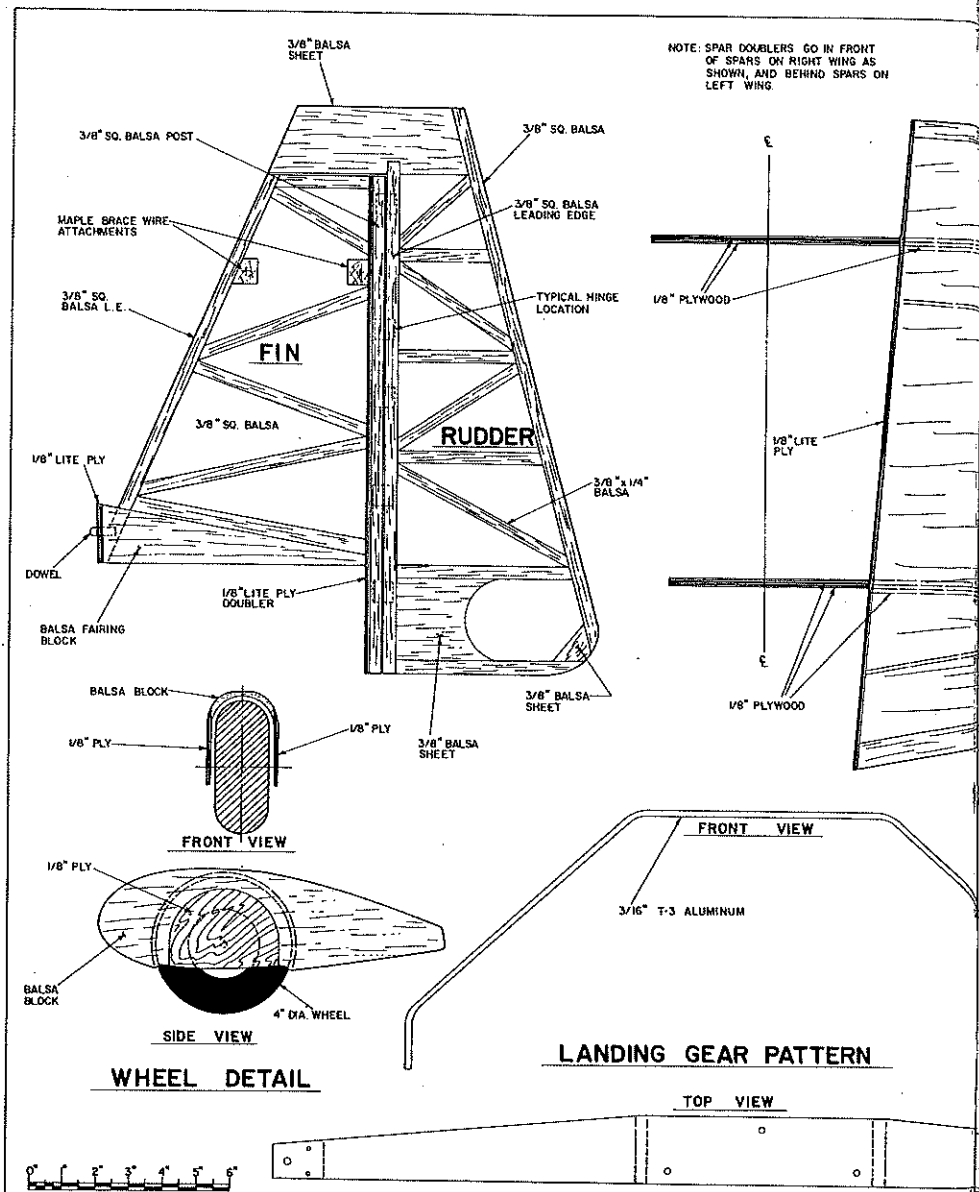
Make the wheel pants from balsa blocks and $\frac{1}{8}$ -in. plywood. Or you can purchase 10-in. fiberglass wheel pants.

Cowl mounts are made from $\frac{3}{4}$ x $\frac{3}{8}$ -in. mahogany pieces placed around F-1. Cowl cutouts are dictated by the particular engine to be used. The cowl is held in place with sheet metal screws.

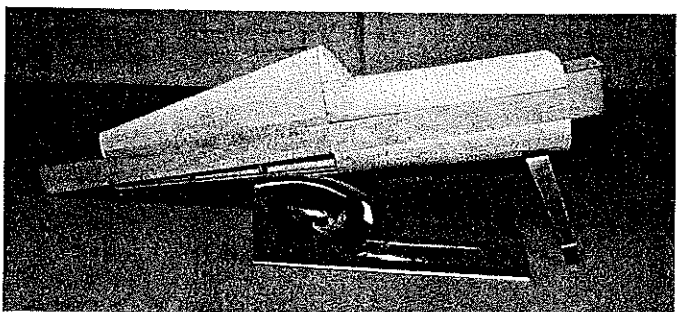
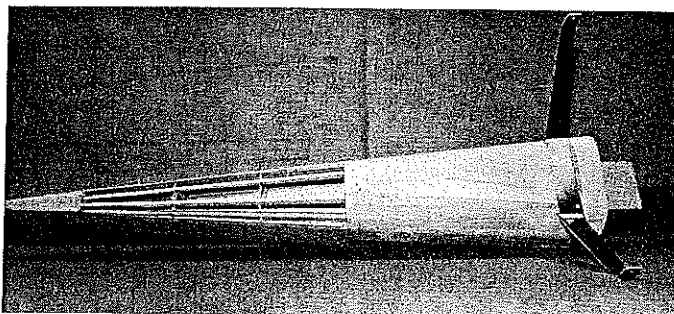
The hatch retaining pin is made from a section of standard flexible plastic pushrod material. Shape a scrap balsa block, and glue it to the inside of the cowl as shown on the plans. With the hatch in place on the fuselage, drill through F-1 and the sheeting on the front of the hatch with a drill bit that provides a snug fit for the outer plastic tubing.

Remove the hatch. Drill the cowl, balsa block, and the sheeting on the back end of the hatch with the same size bit. Run a piece of outer tubing through the hatch, and glue it in place. Cut a length of outer tubing sufficient to pass through the cowl from F-1 to the balsa block. Insert one end of this tubing into F-1.

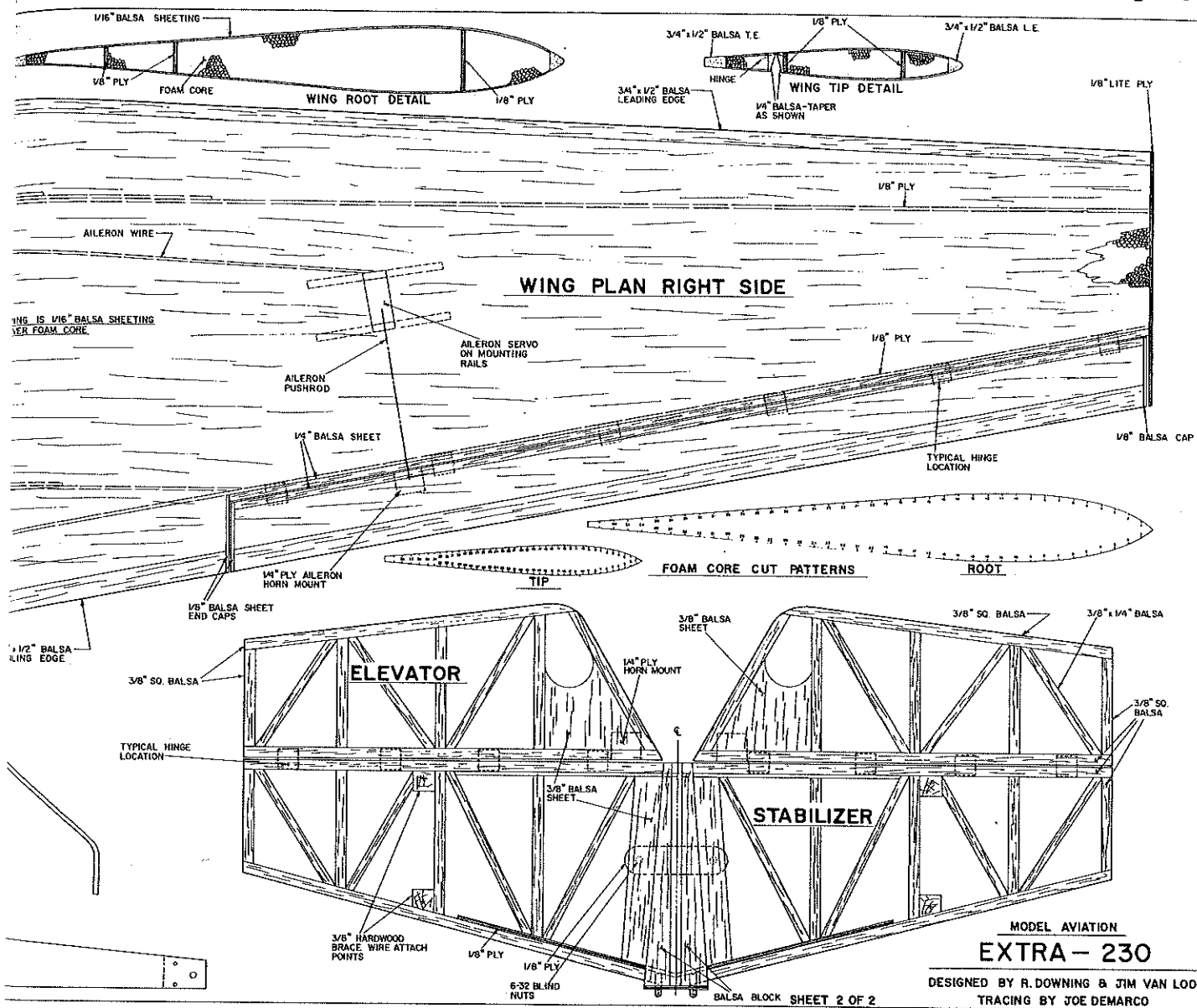
Glue a piece of pencil lead to one end of the inner tubing. Place the hatch on the fuselage. Push the inner tubing through the outer tubing glued to F-1 and through the outer tubing glued in the hatch. When the pencil lead contacts F-4A it will make a mark for drilling. Remove the hatch, and drill F-4A on the mark. Line this hole with a



Left: Wing panel and spars ready for assembly. Right: Assembled wing panel shows the full-length spars that provide incredible strength. Continuous aerobatic maneuvers place a tremendous load on the wings, and it is essential that they be rigid and totally free of flexing.



Left: Bottom of fuselage shows details of the stringers and landing gear attachment. Gear is mounted with nylon bolts designed to break away in a hard landing. Right: The fuselage assembly with finished cabin area. A number of parts, such as the canopy, can be purchased.



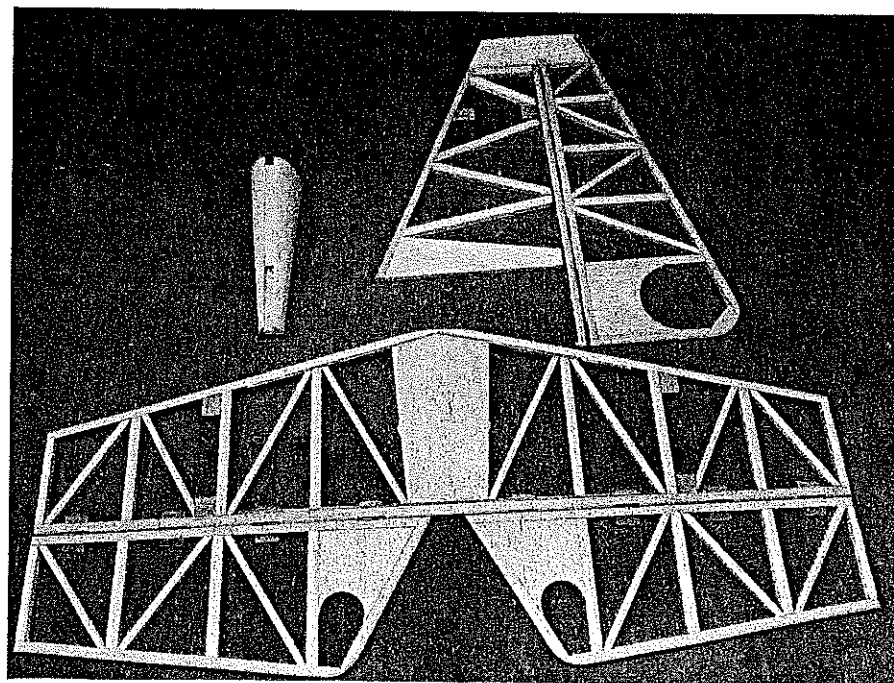
short piece of outer tubing.

Install the cowl, and drill a hole for a sheet metal screw through the cowl and into the mahogany cowl mount directly over the hatch pin. This screw should be long enough to lock the hatch pin in place when tight. With the cowl in place, trim the outer piece of tubing glued to F-1 flush with the front of the cowl. Cut the inner tubing to the proper length to run through the cowl, hatch, and F-4A. Place a 2-56 screw and flat washer in one end of the inner tubing.

Equipment and covering. There is plenty of room in the fuselage to let the builder's imagination rule for whatever kind of equipment installation is desired: dual elevator pushrods, smoke system, etc. Similarly, the large space in the cockpit area lends itself to much detailing if desired.

The model shown in the pictures is covered and trimmed with MonoKote, and the cowl and wheel pants are painted with a matching color. White striping is automotive trim tape.

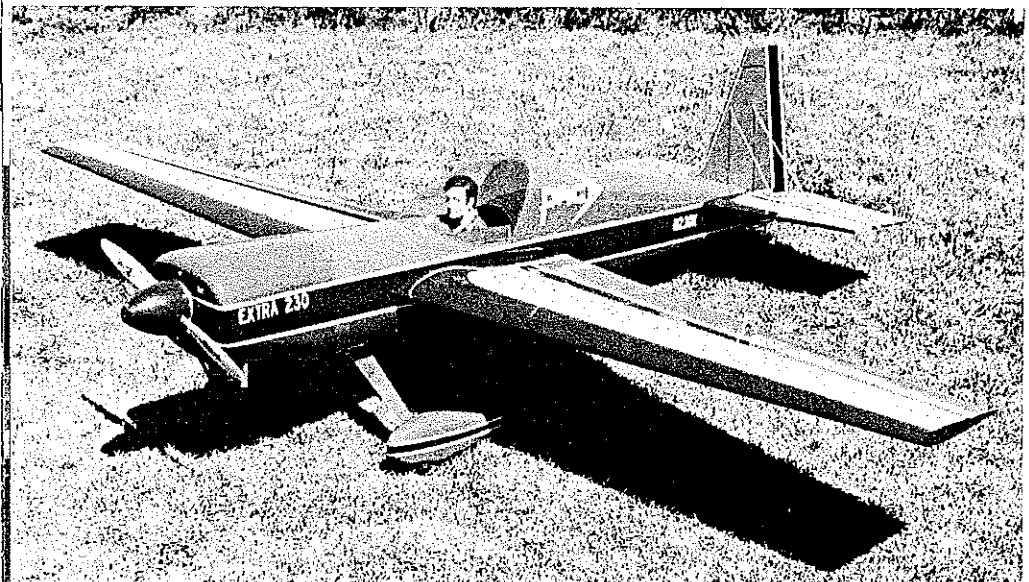
The total weight of our model with a Quadra 35 is 17 lb. The balance point



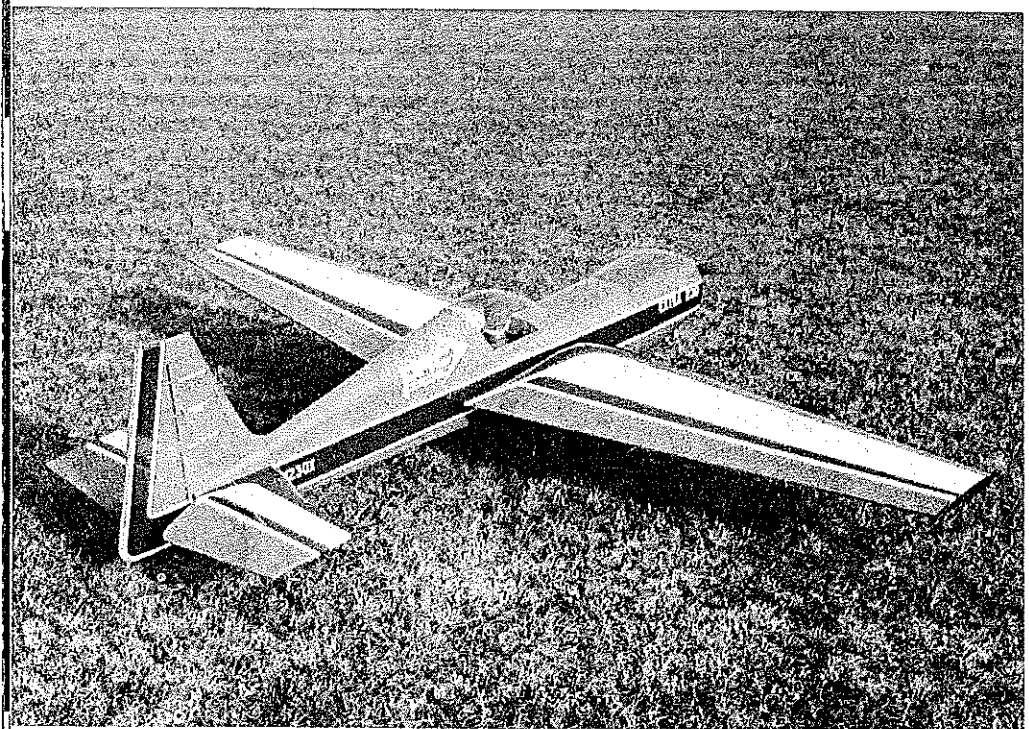
The completed tail surfaces. Text has details on how to easily construct the tail fairing.



With the size of today's cars, it is nice that the Extra can be broken down to the point where two of them can be easily carried in a Datsun. Field assembly takes only about 10 minutes.



Looking much like a Stephens Acro, the full-size counterpart to this model was the most promising new airplane at the 1984 Aerobatics World Championships held in Hungary.



Decal lettering based on McKerry's prototype can be obtained from Spirit Lake Hobby-Craft.

should be within 1/2 in. in front of or behind the center of gravity (CG) marked on the plans, depending on how sensitive you want your aircraft to be (more sensitive with a rearward CG). We balanced the model by moving the 1.0 Ah battery pack—to the rear in our case.

Flying. Dick Downing, to whom I owe much credit for his part in producing this design and prototype model, had it ready to go when I arrived at his house. A quick trip to the flying field, two taxi tests, and we were ready for the air. Gene Sauter, a good friend, was on hand with his video camera, along with a contingent of Spirit Lake modelers.

The wind was right down the runway at about 15 mph. The throttle was applied, and the Extra was rolling. After about 100 ft., the Extra lifted off and climbed straight out. With a cheer of encouragement from everyone present, my hat size immediately became too small. We flew the Extra for about 15 minutes—looping, rolling, snapping, and making many low passes.

Time for landing. I throttled back, kept the nose down, and flaired it about 6 ft. off the ground. It was a no-bounce three-point landing, and I have a video to prove it.

I have flown the airplane many times since and subsequently changed to a Quadra 50. A new airplane shown in many of the pictures with this article has a Sachs Dolmar 3.4 engine. I am impressed with the smoothness and response of the Sachs. With this powerhouse you can bore holes faster, climb faster, and do anything you can imagine, but when throttled back, the Extra 230 is the same docile airplane it was with the Quadra 35.

For those who may be interested, the cowl, canopy, landing gear, and foam parts for this model are available from the author: Jim Van Loo, RR 1 Box 28B, Sergeant Bluff, IA 51054; phone (712) 943-4103.

With a remarkable smoothness of takeoffs and landings reminiscent of a trainer, this plane moves on to a crispness and grooveiness that appeals so much to veteran pilots.

