By Scott Hermann

EXTRA 230

You say you don't have a lot of money ... you don't have much time ... Then why not build this super .40 size Sport Scale!

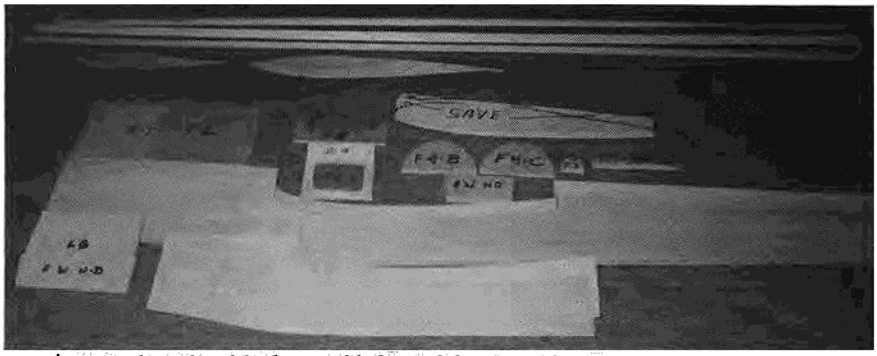
The popular full-size Extra 230, was designed by Walter Extra of Germany, and has been flown by many competition pilots from around the world. This Sport Scale model of the Extra 230 uses simple construction techniques that build a strong, yet lightweight airplane. The midwing configuration does create a bit of a problem in the radio compartment, but standard servos install with plenty of room if hooked up with Z-bends on the pushrods. Ailerons are controlled by separate servos mounted in each wing panel to reduce radio installation problems.

The engine area is easily accessible by the removable front top section of the fuselage. A removable hatch is not one of my favorite means of fuel tank installation, but after fuelproofing the engine compartment and complete tank compartment, no oil has gotten into the airplane.

This airplane flies like it's on rails with limited control throws. When you flip the

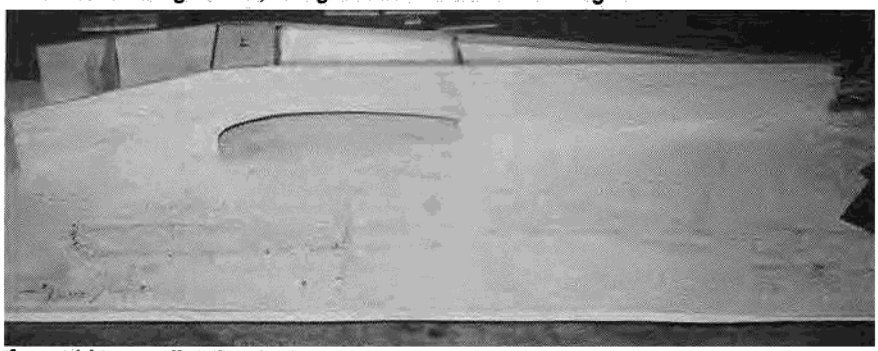
EXTRA 230

Designed By:
Scott Hermann
TYPE AIRCRAFT
Sport Scale Aerobatic
WINGSPAN
54 Inches
WING CHORD
9 Inches (Avg.)
TOTAL WING AREA
486 Sq. In. (Approx.)
WING LOCATION
Mid-Wing
AIRFOIL
Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
⅜ Inches
OVERALL FUSELAGE LENGTH
40 Inches
RADIO COMPARTMENT SIZE
(L) 10" x (W) 2" x (H) 3"
STABILIZER SPAN
18½ Inches
STABILIZER CHORD (incl. elev.)
5 Inches (Avg.)
STABILIZER AREA
92½ Sq. In. (Approx.)
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6¾ Inches
VERTICAL FIN WIDTH (incl. rud.)
6 Inches (Avg.)
REC. ENGINE SIZE
.35-.50 2-stroke/.40-.50 4-stroke
FUEL TANK SIZE
8 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Foam Core & Balsa
Empennage ..... Balsa
Wt. Ready To Fly ... 80-96 Ozs. (5-6 Lbs.)
Wing Loading ..... 23.7-28.4 Oz./Sq. Ft.



uselage parts cut out to form a kit for quick assembly.

ssemble fuselage sides, being sure to make a left and right.



Assemble and align fuselage upside-down over plans.

high rate switches to full control throw, you get an unbelievable roll rate and snap maneuvers that are hard and predictable. With the O.S. 46 used in the prototype, the vertical performance is awesome and vertical slow rolls are a beautiful sight.

If you think this sounds like your kind of airplane, I think you'll be surprised how easy it is built and how quickly you'll be in the air with this sharp looking Sport Scale model, that gets a lot of looks on the ground and many oohs and ahhs in the air.

CONSTRUCTION

Wings:

Start construction of the wings by cutting two panels from 2" polystyrene foam. This white foam can be purchased from most lumber stores and is very easy to work with. I cut my cores with a bow, and this technique is relatively simple as long as you go slowly and are careful. (The RCM book on foam wings is very helpful if this process is new to you.) I use a standard automotive battery charger with thin music wire on my bow and get excellent results with this set-up.

After the cores have been cut, sanded lightly, and cleaned of all dust, the sheeting for the wing can be matched and the edges can be glued together. Edge glue all four wing sheets together from two full 4" sheets of 1/16" balsa and another sheet cut diagonally to save some material. By cutting this way, only 10 sheets are required instead of 12 sheets with a lot of waste.

Sheet the wing cores with the skins using 3M spray 77 adhesive or equivalent, but make sure that any other product doesn't attack the foam. Trim all perimeter edges and sand flush with the edges of the wing core.

Add the 3/8" sq. trailing edges using white glue and hold them in place with masking tape until the glue is completely dry. At the same time, cut the 1" leading edges from 3" x 3/8" sheet and glue them in place. Glue the 1/4" sheet tip blocks in place in the same manner. When the glue is dry, carve all of the edges to the rough shape and then sand the wing panels to their final shape.

Cut out the servo openings in the foam and sheeting on the bottom of the wing to suit your servos and then, using a heated piece of 1/2" copper tubing, melt tunnels in the core from the center of the wings to the cut-outs to route your servo wires. Notch the sheeting at the wing center on the bottom surface so you don't lose the location of these tunnels after the wings are joined.

Sand the wing root to the proper angle for joining the wings, bottom side up on a flat surface. When satisfied with the fit, join the panels with epoxy, making sure the leading and trailing edges are perfectly matched. Inset the 1/8" ply reinforcing plates to the top of the wing as shown on plan.

Wrap the wing center joint with 2" fiberglass cloth and epoxy or resin. I usually add a double layer of cloth where the wing bolts go on the rear edge of the wing for extra reinforcement. Set aside the wings for later fitting of the ailerons.

Tail Surfaces:

All tail surfaces are cut from 1/4" x 4" sheets. Cut out all of the parts and glue on the 1/4" sq. tip reinforcing stock using medium CA.

Sand the leading edges round and sand the trailing edges to a slight taper as shown on the plans, to achieve a clean looking surface. Sand the leading edges of the control surfaces to a 45° angle to achieve gapless control surfaces.

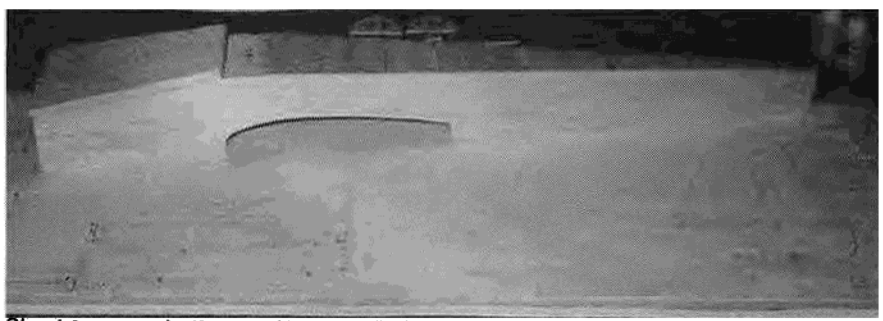
Fuselage:

Cut out all of the parts as shown on the plans. Be sure to save your upper wing saddle cut-outs.

Glue the 1/16" ply fuselage doubler to each fuselage side being sure to make both a right and a left side. To do this, lay them on your table with the top of each side lined up together.

Mark all of the bulkhead locations on the inside of the fuselage sides.

Add the 3/8" tri-stock to the bottom of



Sheet fuselage bottom and add chin block with assembly still pinned to plans.

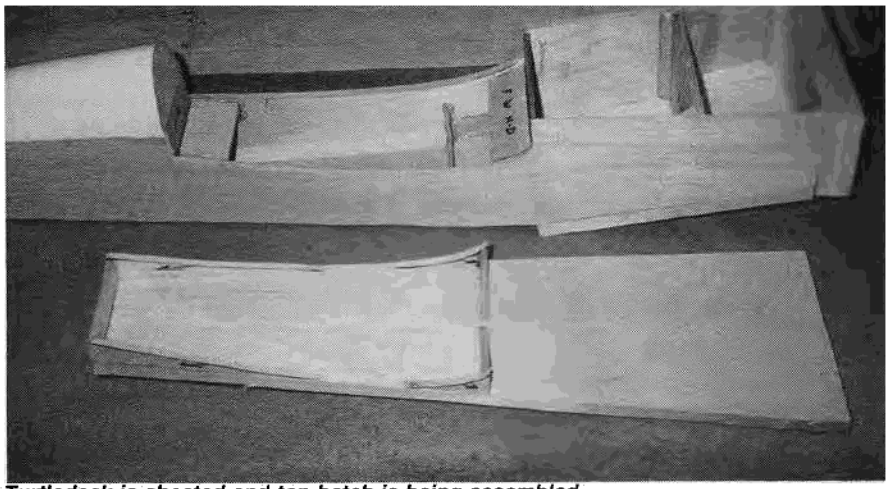
After bottom is sheeted, turn right side up and add turtledeck formers, stringer, and wing hold-down blocks.

MATERIALS LIST

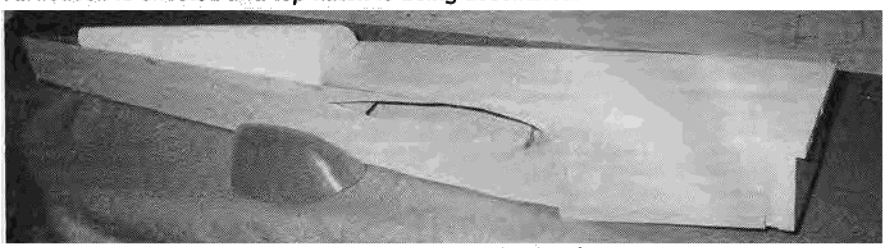
Wings:
8 — 1/16" x 4" x 36" sheeting
2 — 3/8" sq. x 36" T.E. stock
1 — 3" x 3/8" x 36" L.E. stock
2 — 1/4" x 1" x 36" aileron stock
2 — foam wing cores

Fuselage:
2 — 3/16" x 4" x 36" sheet
2 — 3/8" tri x 36" stock
1 — 1" tri-stock
1 — 1/4" ply 6" x 12"
1 — 1/8" ply 6" x 12"
1 — 1/16" ply 12" x 24"
1 — 1/4" sq.
1 — 1/64" x 6" x 24"
1 — 1/2" x 6" x 36"

Tail Surfaces:
1 — 1/4" x 4" x 36"
1 — 1/4" x 3" x 36"
Sig-RP-BA-249 Aluminum landing gear or equivalent
2 — 2½" wheels
1 — 1" tail wheel and tail wheel bracket
1 — Great Planes CANPF016 4" x 7" canopy
1 — pair wheel pants to suit



Turtledeck is sheeted and top hatch is being assembled.

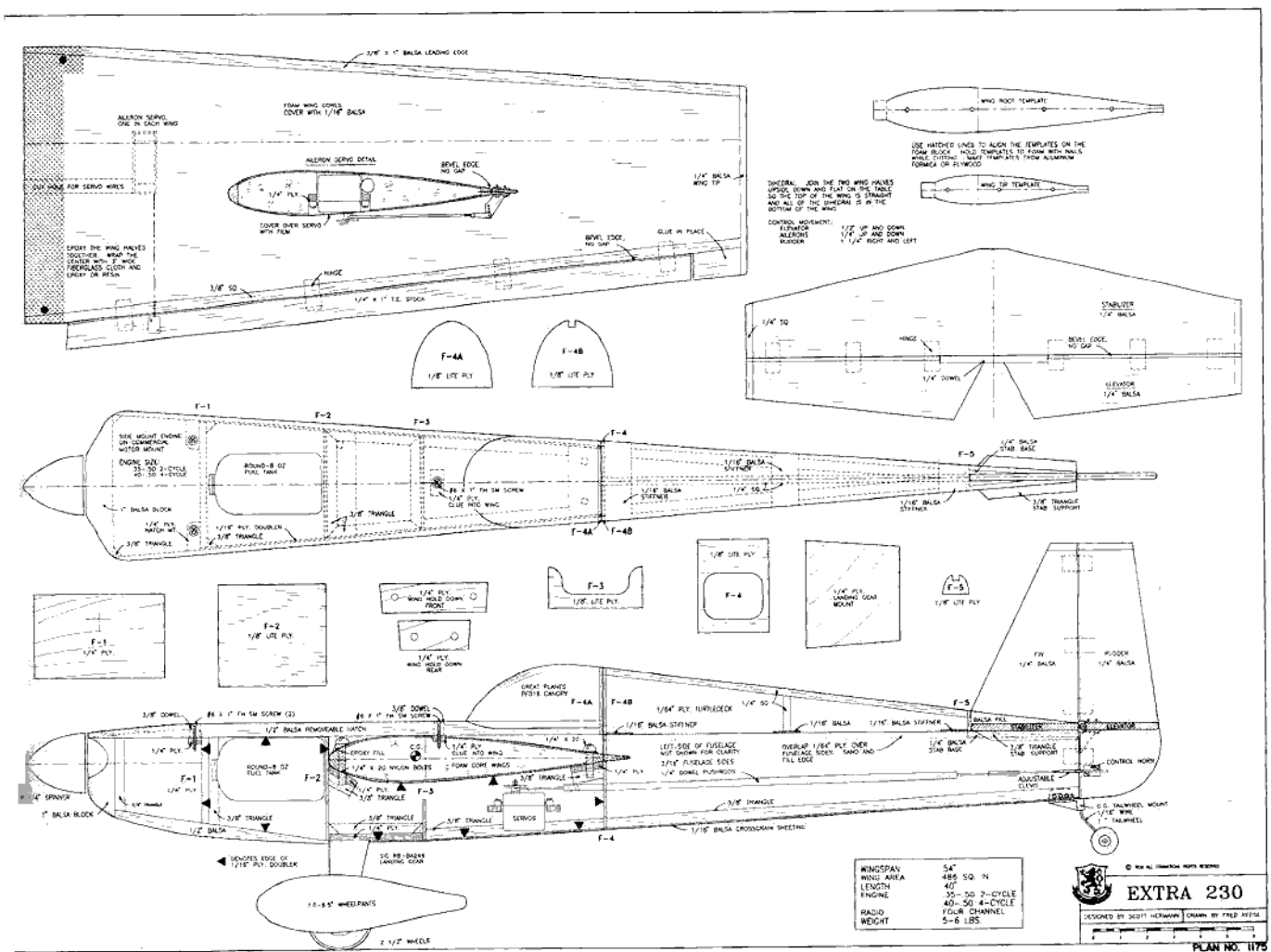


Completed fuselage, ready for carving and sanding to shape.

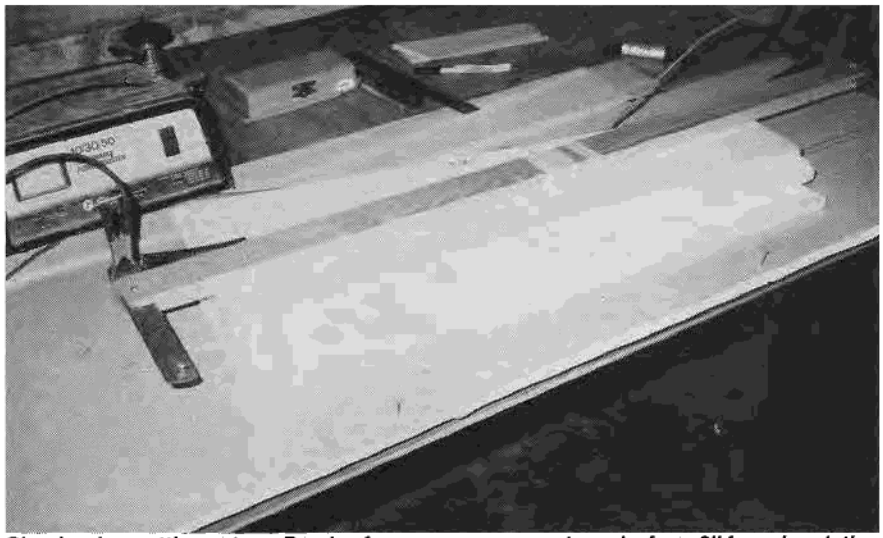
each side beginning just behind bulkhead F-3. Trim the rear edge of the tri-stock to the shape shown on the top view of plan.

Now align the fuselage sides upside down on the top view of plan. Glue F-1 and F-2 formers in place using 5-minute epoxy. When this sets up, epoxy former F-3 and the 1/4" plywood wing mounting plates in place. Now join the fuselage sides together along with the stab base using epoxy. Be sure to keep the fuselage perfectly aligned over the plan view in this step to assure a straight and true fuselage.

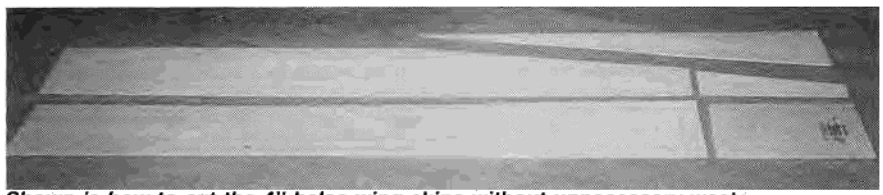
While the assembly is still pinned to the



FULL SIZE PLANS AVAILABLE — SEE PAGE 201



Simple wing cutting set-up. Precise foam cores are easy to make from 2" foam insulation material.



Shown is how to cut the 4" balsa wing skins without unnecessary waste.

board, add the 1/16" cross-grain sheeting to the bottom of the fuselage. Cut away the rearmost section of the fuselage bottom 1/4" deep as shown on the plan and epoxy the tail wheel mounting plate in place.

Cut a piece of 1/2" x 6" sheet 8¼" long and epoxy it in place for the chin block.

Now remove the fuselage from the board and epoxy the tri-stock reinforcements to the fire wall sides, landing gear mount, and wing mounting plates. Add the 1/16" x 1" upper rear fuselage reinforcements as shown on the plan.

Install the turtledeck formers F-4C, F-5, and 1/4" top stringer. Add 1/4" sq. middle upright being sure not to bow the stringer.

Cut a piece of 1/64" ply to cover turtledeck leaving 1/4" excess on each side to glue it in place. Using medium CA glue, attach one side of the plywood in place, 1/4" down onto fuselage side and pin in position. Now add glue to formers, stringer, and opposite fuselage side. Carefully wrap ply around formers to fuselage side and pin in place. This technique may seem a bit sloppy along the sides of the fuselage, but after a few quick passes with a sand block and just a bit of filler, you quickly realize how easily you can make a perfect turtledeck every time.

Cut a 6" length of 1/2" x 6" balsa and split it into two 3" sections, laminate these together to make the 1" x 3" x 6" nose block. Square up the front of the fuselage assembly and glue the nose block in place being sure to keep the upper edges even with fuselage sides.

To make the top fuselage cover, glue the upper wing saddle cut-outs to the 1/2" x 6" top block while it is aligned on top of the completed fuselage assembly. Cut and fit former F-4B and glue it in place. Reinforce the side fillers with 1/8" balsa scrap from one side to the other.

Completed airframe sanded and ready to cover. Vertical fin was salvaged from Prototype #1.

Sheeted wings with leading/trailing edges, and wingtips glued and taped in place.

Final Assembly:

Align the wing in the saddle, measuring for exact center and alignment from the rear edge of the fuselage to wingtips. When everything is aligned, drill and tap the mounting plates and secure with 1/4-20 nylon wing bolts. Cut out aileron stock to size and trial fit in place.

Measure and align the horizontal stab and epoxy it in place. Add 3/8" tri-stock reinforcements underneath the stabilizer for added reinforcement.

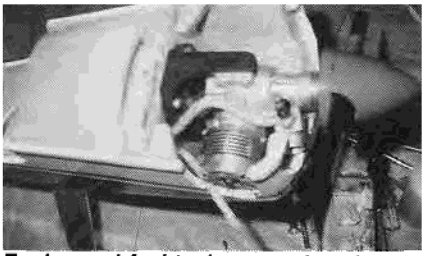
Glue 1/4" tail fairing blocks to the vertical fin and sand them to match the fuselage shape. Epoxy the vertical fin in place using a builder's triangle to keep it perfectly vertical.

Fit the engine into the engine compartment and cut all of the required openings. The engine may be mounted upright for simplicity or side mounted using an appropriate muffler or modifying the fire wall and right fuselage side to use a standard muffler.

Sand the fuselage to its sleek shape and add the 3/8" dowels to the top block mounts as shown. These inserts will keep the mounting screws from sinking into the top block. Sand and trim the rear of the top block to match the canopy. Cut and fit the canopy until you're satisfied with the fit.

Cover the plane with anything you like. Both prototypes were covered and trimmed with Goldberg UltraCote. The more you strive to make this plane look like a real aircraft, the more satisfying the final result will be. Add the main gear and the canopy.

After covering, hinge all of the control surfaces with thin Sig Easy Hinges and seal



Engine and fuel tank compartment, very accessible.

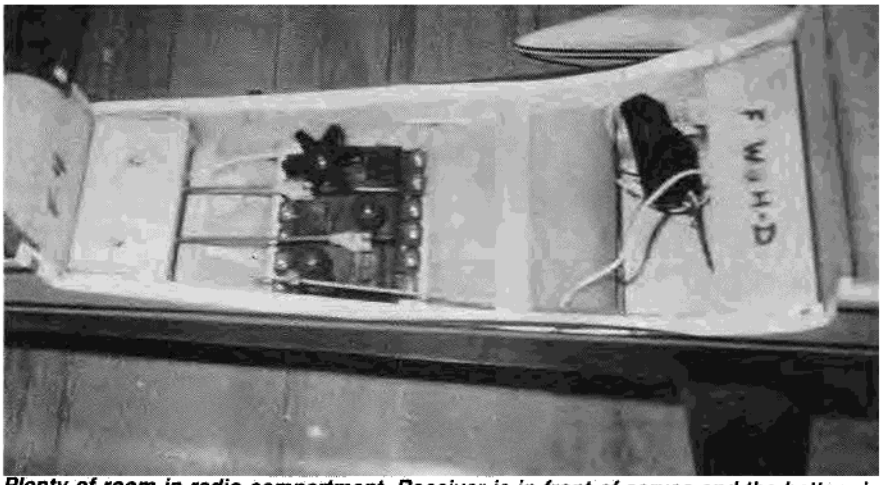
all of the hinge gaps with 1/2'' wide ribbons of covering ironed into the gaps.

Fuelproof the engine and tank compartment with epoxy or resin. Paint a little resin over the edges of the covering in the engine compartment to keep the fuel from creeping under the covering edges.

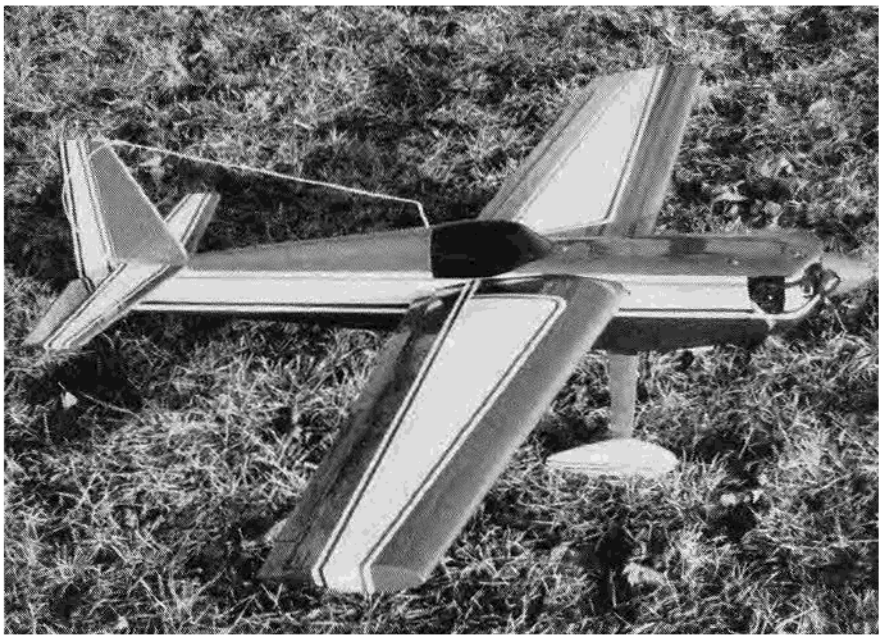
Install your tank, radio, and engine and balance your model at the point noted on the plans. Add lead weights to 1/4'' ply tail wheel mounting block if needed.

Flying:

Be sure to check for the proper C.G., control throws, and directions. Take-off is very easy off of a hard surface. Advance the throttle slowly and feed in rudder if needed. This is one of the best handling taildraggers I have ever flown. Ground handling is perfect on hard surfaces. On grass fields take-offs are a bit harder, due to the small wheels, but all it requires is back pressure on the stick during the take-off roll to keep it from nosing over. After some speed is built-up, relax the elevator until you break ground. Have fun building and flying this aerobatic sportster. □



Plenty of room in radio compartment. Receiver is in front of servos and the battery is located behind them for the proper balance.



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