

# CONTESTER



**Designed by John Cook  
Plans and Text by Al Cook**



**John Cook spotted a Peanut Scale plan of this homebuilt and immediately decided it was his next R/C project. An easy 1/4 scale project that will bring much satisfaction with the end product.**

If you would like a 60 powered, 1/4 scale aircraft that is easy and economical to build, looks super flying or standing, is very maneuverable yet takes off and lands at near walking speed — read on!

This model started as a peanut scale plan in the March 1981 issue of Model Aviation. John scaled up the plan, designed, built, and covered the aircraft. At this point "The Old Man" took over for the paint job.

Construction is straightforward "balsa butchering," with only the nose gear requiring a little metal work.

Please follow construction sequence faithfully and assembly will be problem free.

## CONSTRUCTION

### Fuselage:

Thick cyanoacrylate glue is used for nearly all construction.

Build two sides of 1/4" square and 1/4" x 1/2" balsa over the plan (don't forget the wax paper!). Build each side in three sections: Station (1) to Station (2), Station (2) to Station (3), and Station (3) to tail. Fill in front and center sections with 1/4" sheet balsa as shown, leaving open area under wing. Sand all sections on the outside with a wide, flat sanding block. The basic fuselage box is assembled upside-down over the plan. Make sure your building surface is perfectly flat! First build the center section, joining the sides together with 1/4" square cross members as shown. Make sure this section is square with sides and ends vertical. Now, sand an angle on the rear of the front sections to match the side taper, and assemble to the center section. Note that the 1/4" x 1/2" balsa cross members at the top and bottom are set back 1/4" to allow the firewall to fit between the sides. Assemble the rear section in the same manner. When the basic box is completed, remove from plan.

Make the firewall from 1/4" plywood; chamfer edges as shown. Drill and install blind nuts for your favorite 60 size engine mount. Engine can be fully cowled if inverted, but we personally don't think it is worth the hassle — ours is side mounted. Glue the firewall between the 1/4" sides and against the 1/4" x 1/2" back-ups. Sand 3/4" triangle stock to match the angle of the fuselage, sides, and firewall and glue in place.

Make up three 3/8" x 3/4" x 6 1/2" hardwood pieces for main gear and wing strut attachment. Drill and glue all three pieces in place, make up 1/8" plywood doublers and glue in place.

Bend 3/16" nose gear piano wire. Make up the three 1/4" plywood nose landing gear mounting components. Use epoxy to sandwich the three pieces and 3/16" wire together. Epoxy

### ABOUT THE AUTHORS

John, the son and designer of "The Contester," is 32 years of age and has been modeling for over 22 of these years. He was active in U/C at first and has been in R/C for about 17 years. He is an innovator, preferring to design his own models. If he builds a kit, it always ends up modified in some way. John also flies Ultra Light Aircraft, at this time a "Pterodactyl," and, yes — it has been modified.

Al, the father, and the painter of "The Contester," is 56 years of age and has been building models for most of that time. He was building solid model airplanes at 6 years of age, and has built U/C, F/F, cars and boats. His first R/C model was a boat in 1956. His latest model, a Balsa U.S.A. "Aerobatic Pro" is his #55 R/C aircraft. Some were kits, some were from plans, and some were his own design. He is retired from Bell Canada after 37 years as a telephone man. That's why he has had the time to draw up these plans, write the accompanying article, and help his wife Marie, with household chores.

### CONTESTER

Designed By:

John Cook

TYPE AIRCRAFT

1/4 Scale Homebuilt

WINGSPAN

65 Inches

WING CHORD

15 1/4 Inches

TOTAL WING AREA

991 Sq. In.

WING LOCATION

Shoulder Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

1 Inch

OVERALL FUSELAGE LENGTH

57 Inches

RADIO COMPARTMENT SIZE

(L) 12" x (W) 6" x (H) 6"

STABILIZER SPAN

29 3/4 Inches

STABILIZER CHORD (inc. elev.)

10 3/4 Inches (Avg.)

STABILIZER AREA (inc. elev.)

303 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

11 3/4 Inches

VERTICAL FIN WIDTH (inc. rud.)

9 1/2 Inches (Avg.)

REC. ENGINE SIZE

60 2-Stroke

FUEL TANK SIZE

10-12 Oz.

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

5

CONTROL FUNCTIONS

Rud., Elev., Ail., Throt., Flaps (Opt.)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa & Ply  
 Wing ..... Balsa, Spruce, & Ply  
 Empennage ..... Balsa  
 Weight, Ready To Fly 154 Ozs. (9 Lbs. 10 Oz.)  
 Wing Loading ..... 22.4 Oz./Sq. Ft.

is used to ensure wire will not wobble around in mounting. Remove 1/4" square cross braces from the fuselage at the nose gear location Station (2) and install the nose gear assembly in place. Install 3/4" triangular stock in front and back of mount.

Cover bottom of fuselage back to Station (3) with 1/16" plywood, and from Station (3) to tail with cross grain 1/16" balsa sheet. It may be easier to cut the hatch hole before the plywood is glued down. Hatch size shown is optional — it depends on how big your hands are! Fuel tank will be accessible through this hatch.

At this time make two copies of wing rib #1 from 1/8" plywood. Drill the necessary holes in the rib and use as a template for match drilling holes in fuselage sides. Accuracy is essential in this operation.

Glue the 1/4" I.D. wing mount tubes and the 1/8" plywood doublers in place. Install throttle pushrod tube, tank floor, and drill the holes in the firewall for the fuel lines.

Add the instrument panel former #2A and former #2. Glue 1/4" x 1/2" balsa on back of the firewall to provide additional gluing surface for top and side sheeting. Install 1/4" square stringers and sand to former contour. Sheet the top of the basic box between the formers with 3/32" balsa — cross grained. Then add 3/32" sheet to the sides and top to complete the front deck.

From former #6 to tail, fill in between sides with 1/8" balsa sheet to provide for fin base. Add 1/8" x 1/4" balsa fin alignment pieces to back of former #6. Install turtledeck formers #3, #4, #5, and #6. Add 1/4" square stringers then sand them to former contour. Sheet top only with 3/32" balsa. Add 1/8" x 1/4" balsa braces (inset as shown) to prevent bowing stringers between formers when covering is shrunk. Cut 3/8" slot for fin in top sheeting from just behind former #6 to tail post. Add 1/8" sheet to fuselage sides where NyRods will exit.

Now is a good time to put in servo mounts, NyRods, and nose gear steering linkage. Aileron servo, on removable mount, can be sorted out later when wing is on. Run a length of NyRod along inside of the fuselage for the receiver antenna.

The engine cowl can be built of balsa sheet as shown on plan, or perhaps of fiberglass. Set aside for now and let's have a look at the tail feathers.

### Fin and Rudder:

Outline the fin and rudder over the plan with 1/16" x 1" sheet balsa. Note: Sheet at bottom of fin rises to first 1/4" square. Place 1/16" plywood at rudder bottom for horn mount. Now build 1/4"

**Early stage of framework. An easy model to construct.**

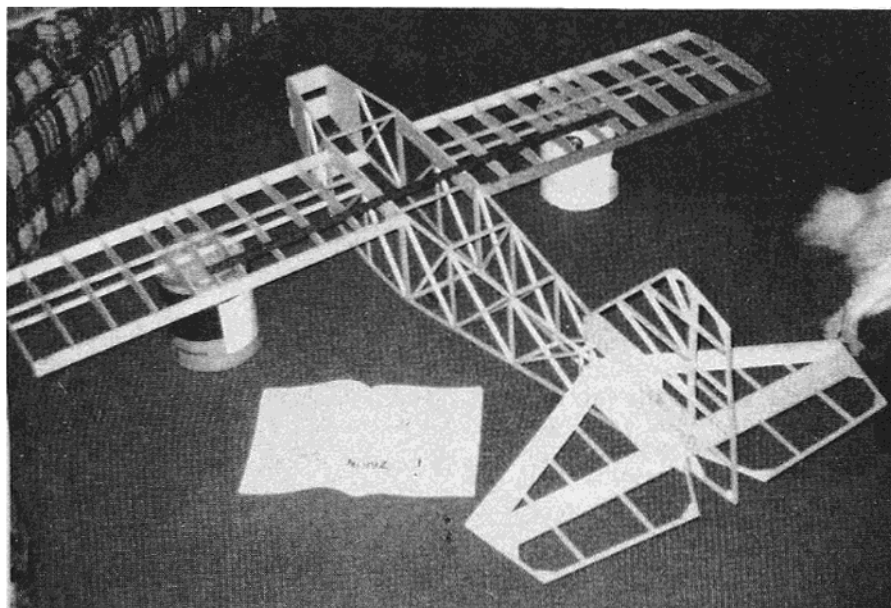
square and 1/4" x 1/2" balsa framework on top of sheet. When this is done, duplicate 1/16" sheet on top of framework, and fin and rudder are complete. Sand the leading edge and top of fin, top, rear, and bottom of the rudder to round shape. Sand front of rudder to V shape. Mark location and cut slots for four hinges. Install the rudder horn temporarily.

**Stab and Elevator:**

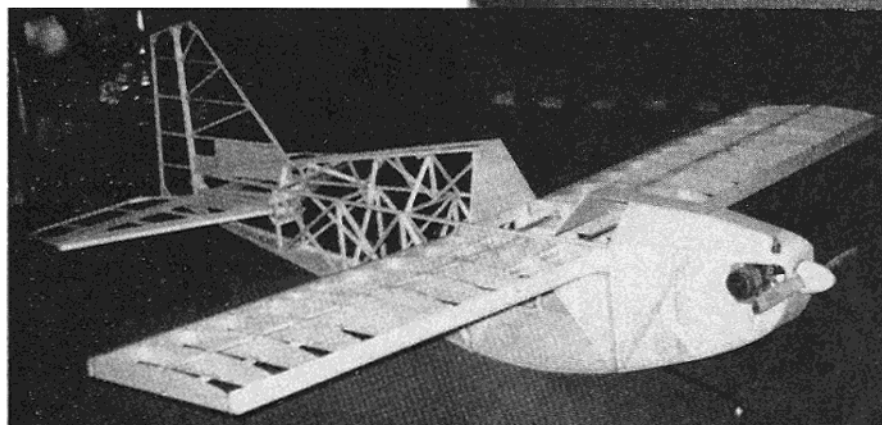
These are built the same way as the fin and rudder. A real snap! Eh?

**Wing:**

With a little prefabrication, the wing and separate aileron can be completed in one operation. You will need that dead flat surface you built



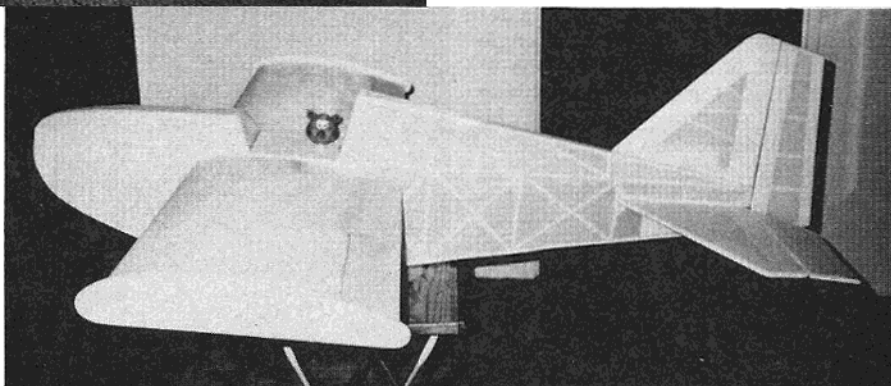
**Another view a little farther along. Has unusual nose gear which is available from designer.**



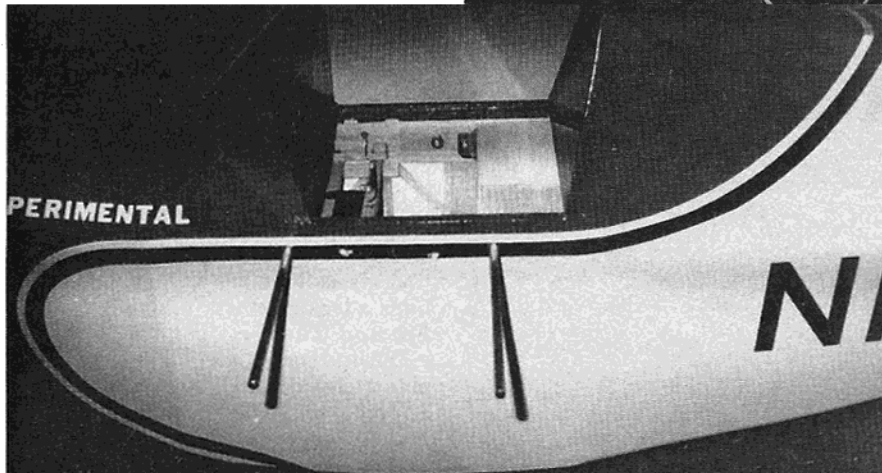
together the bottom sheeting over the plan. Note that sheeting does not go under leading and trailing edge. Make aileron sheeting separately. Cut out 1/16" sheet at strut mount and aileron horn mount locations, and replace with 1/8" plywood. Install a 4-40 blind nut in the strut mount before you glue it in place. Glue the bottom spruce spar (1/8" x 1/2") to the sheeting. Place temporary 1/16" shims under

**Contester covered with Super Coverite and ready for painting.**

the fuselage on (and the wax paper!). Use the plywood rib as the template to cut other ribs from 1/8" balsa sheet. Note that the wing mount tube position varies slightly on ribs #1, #2, and #3 for 1" dihedral. Make two extra aileron ribs for each wing. The bottom sheeting is shown on right wing drawing. Lay out and glue



**Wing plug-in rods, neat servo hook-up arrangement accessible from cockpit.**



the spar where there is no sheeting. Prefab wing trailing edge at aileron and aileron leading edge. Glue ribs #2 to #11 in place, making sure that they are vertical. Add wing trailing edge at aileron. Glue in aileron leading edge and ribs. Using dihedral gauge, glue plywood rib #1 in position.

Make and install 1/8" sheet spar webs from rib #1 to rib #8 with grain vertical. Now glue in top 1/8" x 1/2" spruce spar. Add 1/4" square trailing edge and sand to match ribs. Build up leading edge from three pieces as

shown on #1 rib pattern --- a little extra work, but it will be straight and stay straight! Install and secure outer NyRod. Note that the hole in rib #8 is oversized to allow flex at bellcrank. Glue and reinforce a 1" x #10 machine screw in rib #1. Make 1/8" ply wing tube reinforcements for rib #3. Install these and 1/4" I.D. aluminum wing tubes. Plug outboard end of tubes with 1/8" balsa.

Reinforce wing strut mount with triangular stock. Make up top wing skin from four pieces of 1/16" balsa sheet 4" x 30". The top skin butts

against the leading edge and covers 1/4" square trailing edge. Remove the wing from the plan, plane and sand the leading edge to shape. Make up bellcrank mount and glue in place at proper angle. Reinforce mount with triangle stock. Temporarily fasten horn to aileron and make pushrod from horn to bellcrank. Sheet between ribs #8 and #9 for pushrod exit. Now cut through top sheeting to separate the aileron from the wing. Clean up aileron leading edge and matching wing edge. Cut slots for aileron hinges (3). Now do it all again for the other wing panel. Make up 1/4" sheet balsa wing tip plates. Do not fasten to the wing until wing is covered and/or painted.

#### Final Assembly:

Remove 3/8" from the rear of the fuselage at stab location. Slide stab into slot. When you are sure the stab is properly aligned, glue it in place. Now set fin in its slot in the fuselage top and check fit and alignment. When this is okay, remove fin, put glue on bottom and front (against former #6) and slide into place. Now run bead of glue along fin-fuselage top joint. Put the rear wing mount tube in place in the fuselage but do not glue. Make two 18" long rods from 1/4" piano wire and slide these into front and rear tubes. Slide wings onto rods and fasten lightly in place with nut and washer on #10 machine screw. There should be 1" of dihedral in each panel. Turn the plane upside-down and support the wings at the proper dihedral. Now make up the wing struts from fiberglass arrow shaft. Fasten the strut to the wing with 4-40 bolt. Now mark brass at fuselage end to line up with blind nut, drill and bolt in place. When both struts are complete, turn the aircraft over and make up removable aileron servo mount. Install the servo linkage to the bellcranks. Remove the wing panels and struts (mark struts left and right). Now permanently cement the rear wing tube and the 1/8" plywood reinforcement into fuselage. Fill in open area under the wing with 1/4" sheet or 1/4" square as shown (dotted lines) on the plan.

Make up 5/32" and 1/8" wire main landing gear. Bind and solder together. Install in position with nylon landing gear straps.

Make up cockpit floor as an easily removable hatch. Prototype has 1/16" ply that slides under instrument panel, then back under headrest to lock in place. Switch and charging jack are easily accessible.

The prototype was covered with Super Coverite and painted with Tremclad spray. Tremclad is available at hardware stores. It is a rustproof paint that is also fuelproof. Tremclad can also be brushed on, is self-leveling

and dries with a nice sheen. Paint directly on Coverite — no primer is necessary.

Cut the windshield out from heavy material and cement in place with thick cyano. Use just enough. If the windshield gets smokey from cyano fumes, use a Q-tip with a little oil on it to remove, and then wipe oil off with Kleenex.

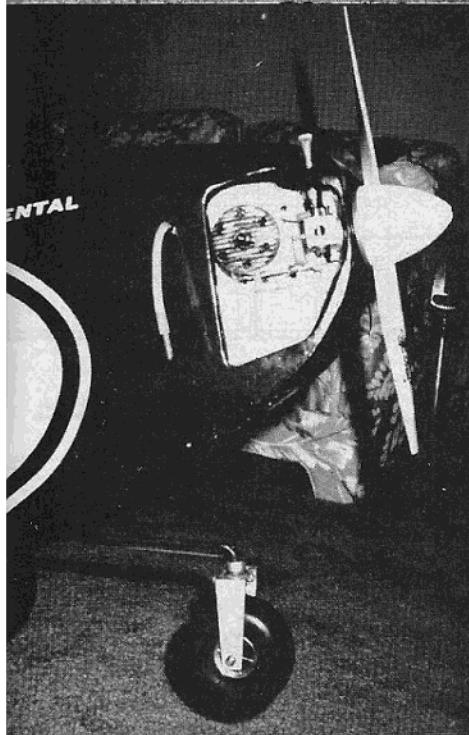
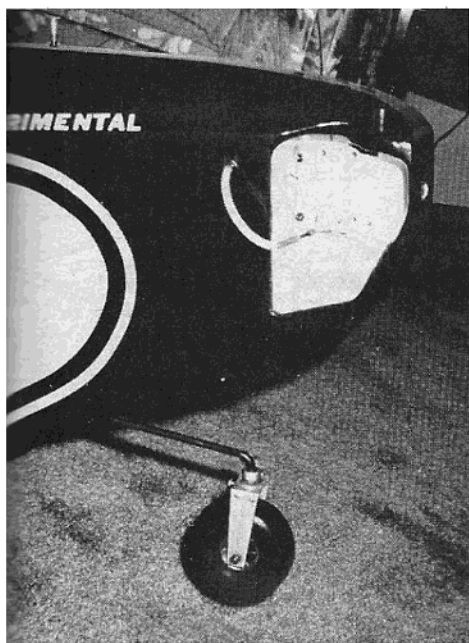
#### Notes on Hinging:

Use hinges with removable pins. Glue hinges into rudder, elevator, and ailerons. Drill and pin with round toothpicks. Now glue hinges into fin, stab, and wing. Drill and pin again. Now pull out hinge pins. After plane is covered and/or painted, replace pin with music wire of same diameter, full length of surface.

#### Flying:

The Contester hasn't any bad tendencies. It will fly at extremely low speed. Take-offs are unbelievable, as she trundles along the runway on those big soft five inch wheels, lean back on the stick and you won't believe the take-off speed until you've seen it two or three times.

Flaps, the same size as ailerons are optional — but not needed! Have fun! □



These photos show .60 2-stroke engine mounted and removed. Easy access and at 154 ozs., the .60 works great.

#### MATERIAL LIST

##### Fuselage

- 15 — 1/4" sq. x 36" balsa
- 5 — 1/4" x 1/2" x 36" balsa
- 1 — 3/4" x 36" triangle balsa
- 2 — 1/8" x 1/4" x 36" balsa
- 1 1/2 — 1/8" x 36" sheet balsa
- 2 — 3/32" x 36" sheet balsa
- 2 — 1/16" x 36" sheet balsa
- 3/8" x 3/4" 20" hardwood
- 2 — 1/4" x 36" sheet balsa
- 1/2 — 3/8" x 36" sheet balsa
- 1/16" x 8" x 20" plywood
- 1/8" x 4" x 6" plywood
- 1/4" x 8" x 16" plywood
- 1/4" x 36" piano wire
- 3/16" x 10" piano wire
- 5/32" x 18" piano wire
- 1/8" x 18" piano wire
- 1/4" x 14" I.D. alum. tube

##### Wing

- 11 — 1/16" x 4" x 36" balsa
- 2 — 1/4" x 1/4" x 36" balsa
- 2 — 1/4" x 4" x 36" balsa
- 2 — 1/4" x 1/2" x 36" balsa
- 1 x 36" — 3/4" triang. balsa
- 1/8" x 24" x 3" plywood
- 6 — 1/8" x 4" x 36" balsa
- 4 — 1/8" x 1/2" x 36" spruce
- 28" — 1/4" I.D. alum. tube

##### Stab & Elevator

- 2 — 1/6" x 4" x 36" balsa
- 12" — 1/4" x 4" balsa
- 4 — 1/4" x 1/4" x 36" balsa
- 2 — 1/4" x 1/2" x 36" balsa
- 5" — 1/4" hardwood dowel
- 1/16" plywood 2" x 4"

##### Fin & Rudder

- 1 — 1/16" x 4" x 36" balsa
- 1 — 1/4" x 1/2" x 36" balsa
- 3 — 1/4" x 1/4" x 36" balsa
- 1/16" plywood 2" x 4"