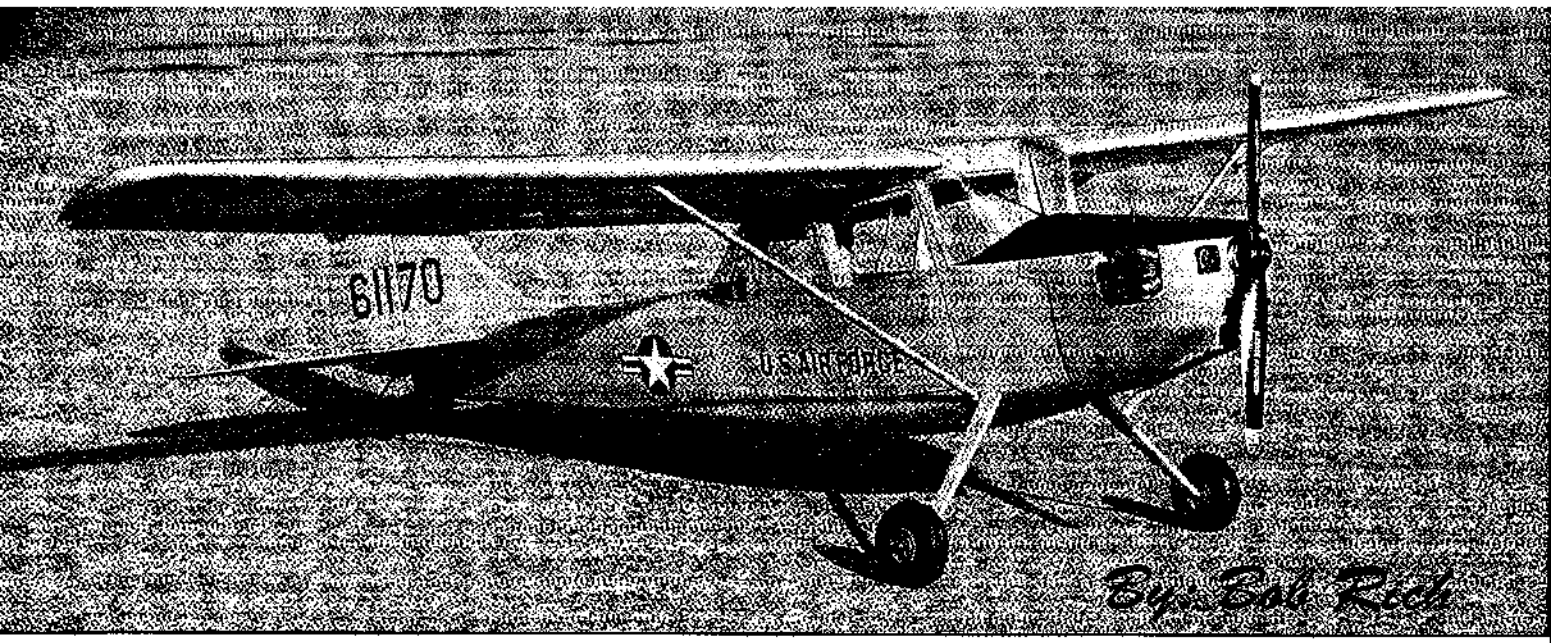


By Bob Red

CESSNA O-1E/L-19 BIRD DOG

At 1/6 scale, this beautiful Bird Dog will fit both your budget and your car; for .40-.70 power.

I have always liked the lines of the Cessna L-19 Bird Dog and enjoyed building several of the Berkeley Models kits for 1/2A free-flight. Now it's time for a bigger one for R/C. I found there are no plans for a larger one, other than beautiful Quarter Scale planes. I don't have the room to build that size, but a 1/6 scale looked just about right, so here it is.

The Bird Dogs were used during WWII and went back into production in June 1956, and used by the U.S forces, French, and Canadians. They were also made in Japan under license from Cessna.

The only difference between the Army L-19 and the Air Force O-1E is the color scheme and the kind and placement of some of the antennas.

This plane is a size that is easily handled, transported, and easy to build. Anyone who has built several kits and can cut out the parts should have no problem building this plane.

An engine from a .40 2-stroke to a .70 4-stroke will fly this plane with ease. If you want a plane with a larger engine or want to fly faster, why don't you build a pattern plane instead of the O-1E? A scale airplane should fly like a scale airplane.

CONSTRUCTION

Start the construction with the fuselage, it's easy to build and will get you in the mood to build the rest because your fuselage looks so good; besides, you need it to finish the wing anyway.

I used Super Jet for all of the construc-

NAME
CESSNA O-1E/L-19 BIRD DOG
Designed by:
Bob Rich
TYPE AIRCRAFT
Sport Scale
WINGSPAN
72 Inches
WING CHORD
10 Inches (Avg.)
TOTAL WING AREA
714 Sq. In. (Approx.)
WING LOCATION
Top of Cabin
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Tapered
DIHEDRAL, EACH TIP
2 Degrees (1-9/16")
OVERALL FUSELAGE LENGTH
53-1/2 Inches
RADIO COMPARTMENT SIZE
(L) 6" x (W) 6" x (H) 5"
STABILIZER SPAN
24-3/8 Inches
STABILIZER CHORD (inc. elev.)
6 Inches (Avg.)
STABILIZER AREA
144 Sq. In. (Approx.)
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
10 Inches
VERTICAL FIN WIDTH (inc. rud.)
9-1/4 Inches (Avg.)
REC. ENGINE SIZE
.40 2-stroke to .70 4-stroke
FUEL TANK SIZE
10-16 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4-5
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail. (Flaps Opt.)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply, Lite Ply
Wing	Balsa, Spruce
Empennage	Balsa
Wt. Ready To Fly	88 Oz. (5-1/2 Lbs.) Dry
Wing Loading	17.7 Oz./Sq. Ft.

tion except where epoxy was needed.

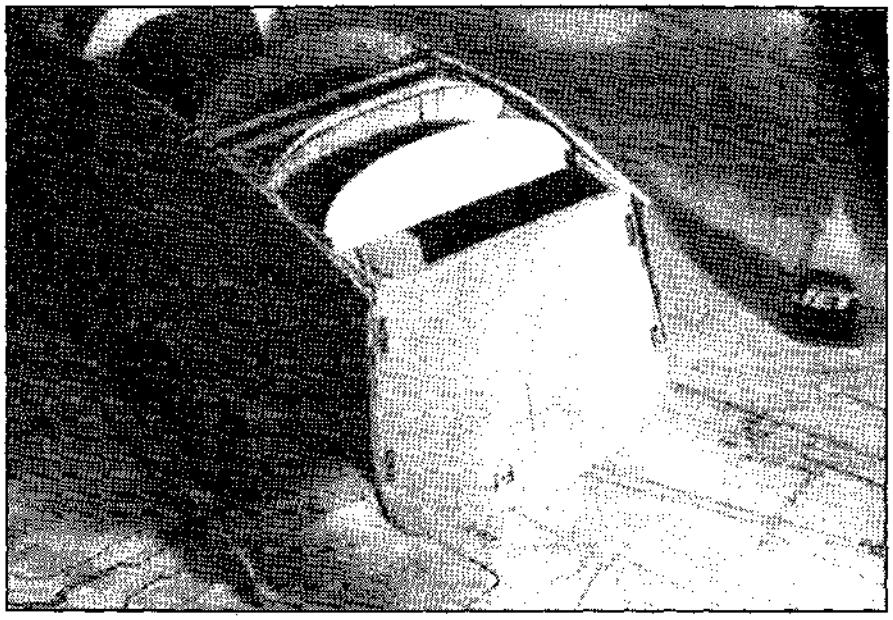
When selecting the 1/8" sheet lite ply, try to get flat pieces with no warps, and big enough for both fuselage sides so the bends will be the same and help to keep the fuselage square.

It may take a little more time and work to make the fuselage slots and former tabs, but it's worth the effort when you put things together.

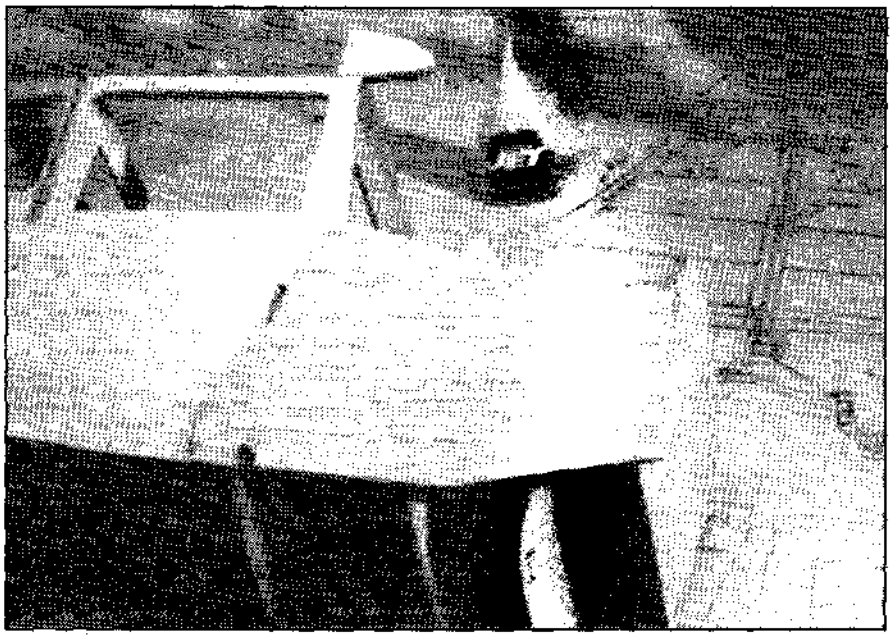
After all of the fuselage parts are cut out, glue the doublers in place. I'm sure I don't have to mention to make one right side and one left side.

Test fit the formers in their slots in the fuselage sides without gluing, make any corrections that are necessary at this time for a proper fit.

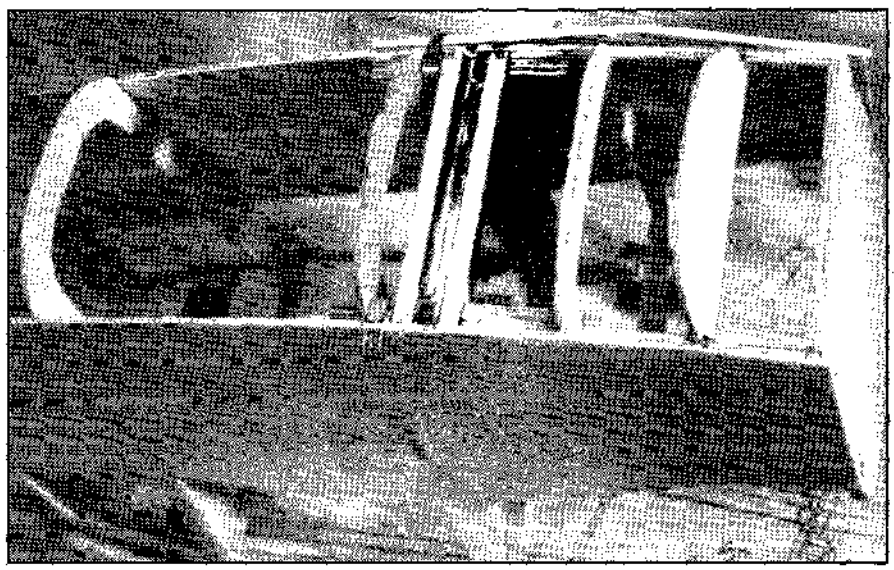
With former F-4 in place, make a mark on the doubler at the rear of F-4. Draw a line on the outside of the fuselage on the upper



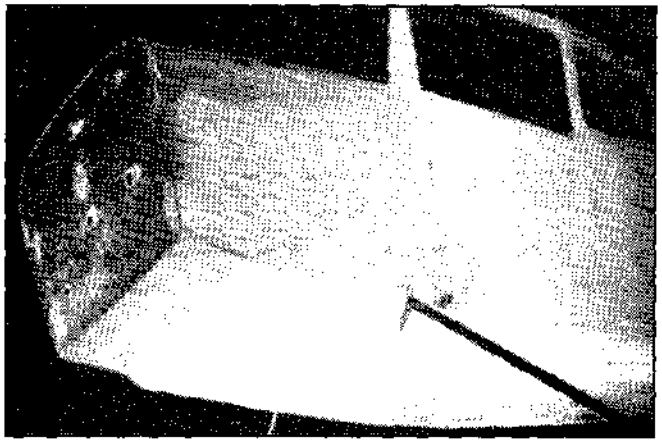
Nose section, all formers in place.



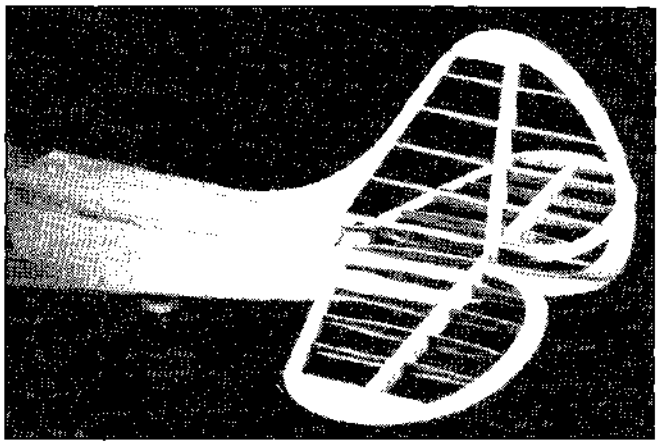
1/8" sheet balsa added to nose to F-3.



1/8" sheet balsa feathered to plywood side. Strut mounts added.



Nose section completed with landing gear and bottom planked.



Tail test for fit.

part and at the rear of F-4.

With a razor saw, make a cut on the line on the doubler almost through the doubler. On the outside of the fuselage, scribe the line with an X-Acto knife blade. Make the scribe mark deep enough so the fuselage side just to the rear of F-4 can be cracked and bent so the cabin top can be bent to meet F-5.

Install F-2 to one of the fuselage sides, making sure it is perpendicular to the fuselage side.

Install F-3 perpendicular to the fuselage side. Install the fire wall perpendicular to fuselage side.

Glue the other side to the installed formers. Make sure everything is square.

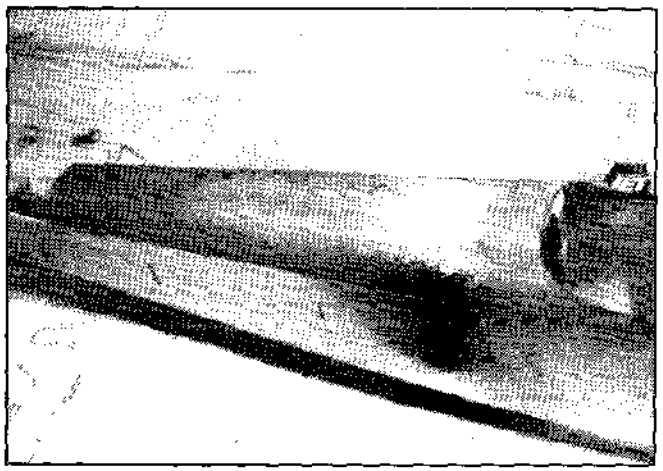
Glue F-4 and F-5 in place, draw the cabin top to F-5 at the top.

Install formers F-6 through F-10 but do not glue. Hold them in place with rubber bands around the fuselage. When everything is square and true, glue the formers in place.

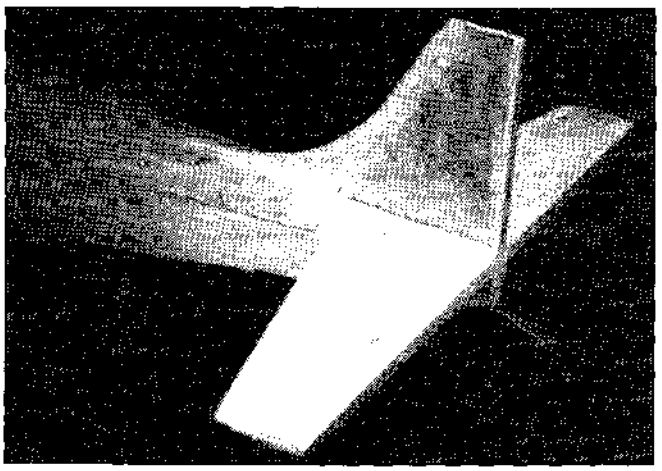
Cut and fit the 1/4" ply landing gear mount and the wing hold-down mount. Groove the landing gear mount for the two 3/16" landing gear wires to fit. If you have no way to cut the groove, the piece may be made from three pieces of 3/16" aircraft ply.

Drill the 3/16" holes in the mount block so the wire is next to the 1/8" doubler. Don't forget there is a right side and a left side. If you used 1/4" ply for the L.G. mount, glue a piece of 1/16" A/C ply on top of the gear mount for added strength. Mount the landing gear with landing gear straps. Then remove and set aside for now.

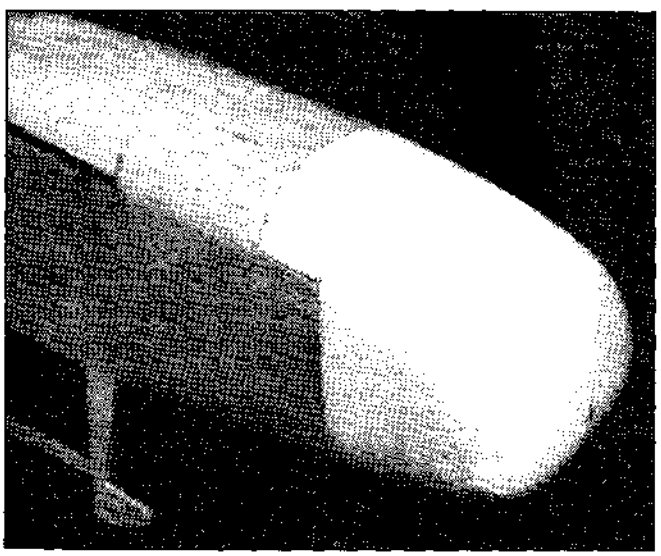
Epoxy the wing mount in place.



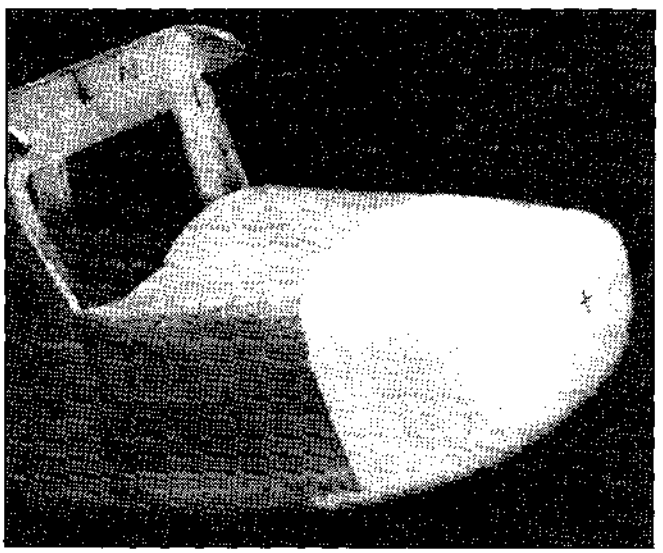
Plywood turtledeck.



Tail sheeting added and glued in place.



Styrofoam shaped as form for fiberglassing.



Styrofoam shaped as form for fiberglassing.

Decide now if you are going to use 1/64" or 1/32" ply for the turtledeck. Install the 3/32" sq. balsa strips on top of the fuselage sides. Inset them so the turtledeck ply ends up flush with the fuselage sides. Use the pattern to mark the ply turtledeck. Cut it slightly oversize so it can be trimmed to fit.

If you are using 1/32" ply for the turtledeck, wet it with water or Windex with ammonia to make it easier to bend. Glue the turtledeck in place.

Make the wing strut mounts from 1/4" x .032" brass. Install the strut mounts just ahead of former F-3.

Cut out the 1/8" aircraft ply tail wheel mount and install the blind nuts. Install the mount in the fuselage.

Add 1/8" sheet balsa to the fuselage sides from the fire wall to F-3. Round the sheeting at the fire wall and taper at the rear. Feather the sides to the lite ply at F-3.

When you have decided on the engine, it's time to drill the engine mount holes. The down thrust is built in so all you have to allow for is the 3° right thrust. I use the Goldberg engine mounts, they are easy to use and strong.

My Saito 65 is side mounted. Part of the head comes out of the cowl but that's a minor sacrifice.

Drill the holes for the fuel tubing and throttle control.

Install the blind nuts for the engine mount.

Make the provisions for the rudder and elevator controls. I used NyRods and installed the outer tubing in the tail area.

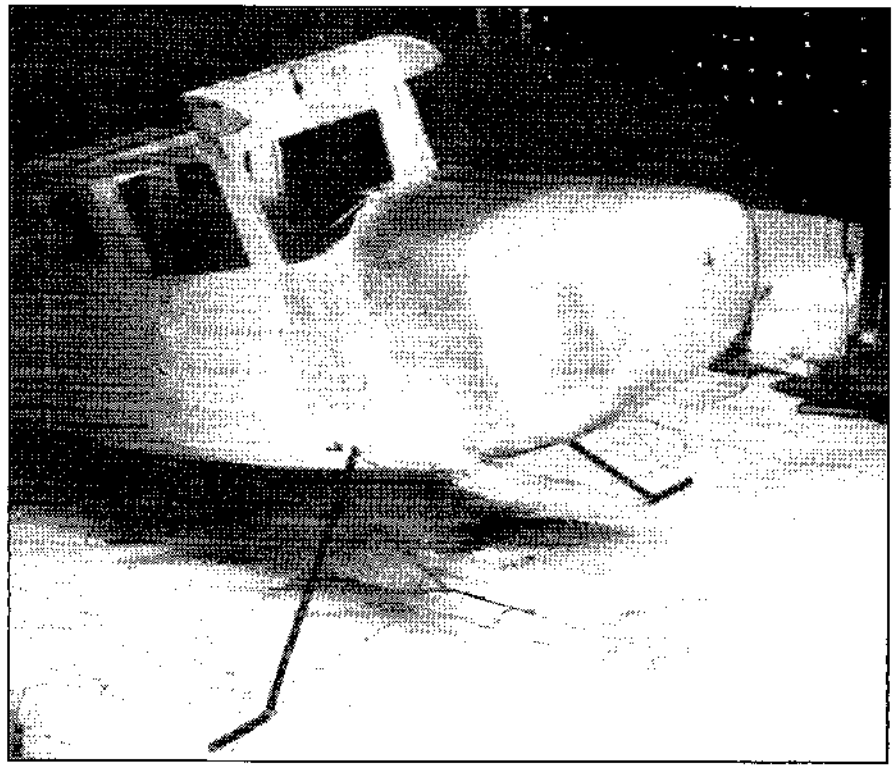
Install a couple of 1/8" lite ply pieces for the fuel tank mount, allowing room for some foam rubber under the tank.

Now it's time to plank the bottom of the fuselage with 3/32" balsa. If you use pieces about 3/8" wide, it's easy to follow the contours.

Paint the nose area inside the fuselage with epoxy glue, thinned with rubbing alcohol to fuelproof the area.

Now plank the top of the nose section with 3/32" balsa.

Rough sand the fuselage to smooth out the high spots and slight dips. Now it's beginning to look good. Fill any little boo boos, nicks, or whatever with Model Magic and sand smooth.



Fiberglass cloth laid up with epoxy resin.

When you are through admiring the beautiful fuselage, you can start on the tail pieces.

Starting with the rudder and fin, lay out the 1/4" x 1/2" pieces and the trailing edges. Don't forget to put the shims in place. Cut to fit the 1/2" x 1/8" and 1/2" x 1/16" rib pieces, tip and leading edge pieces, and glue them in place. When dry, sand the parts to an airfoil shape.

The stab and elevators are made the same way.

Now is the time for a major decision: If you are going to make the tail surfaces scale-like, with corrugations, or just cover them as is.

If you are going to cover them as they are, then trim 1/16" off of the stab center section 1/8" ribs and cover the center section with 1/16" balsa for added strength.

If you are going for the scale look, then trim 1/16" off of all of the ribs and inlay 1/16" balsa sheet on all of the surfaces. The Bird Dogs are all metal so the extra effort was worth it for me.

Sand the tail surfaces and trial fit the tail to the fuselage.

Shim the stabilizer to match the incidence shown on the plans. The stab must be parallel to the wing (top of the fuselage).

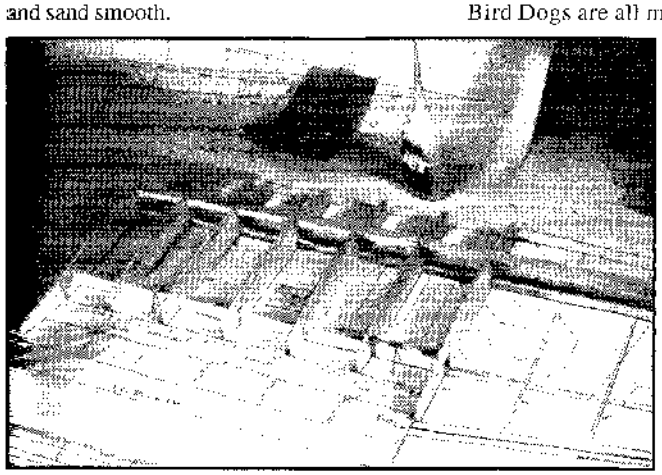
Hinge the tail surfaces but do not glue the hinges in place until the plane is covered. I used the small Klett pinned hinges throughout.

Install the 3/32" wire joiner to the elevator halves.

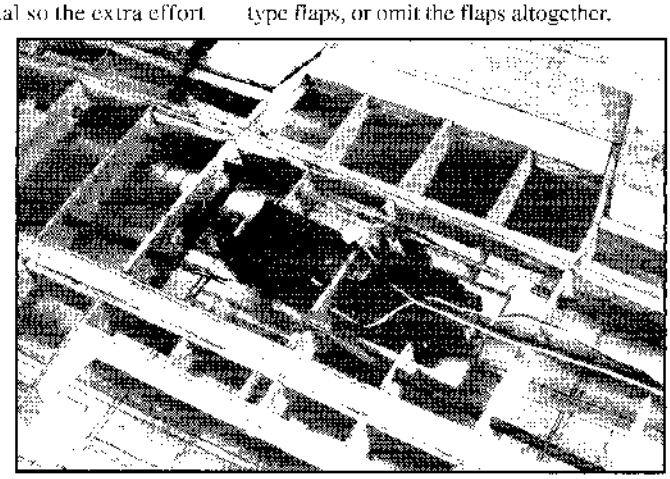
Now it's time to start on the wing. The wing is not hard to build, but if you follow the instructions it's a lot easier and it will come out right and true. Wings are better that way.

The wing should be made in sections to get the proper angles, and don't forget to allow for the 1/16" balsa sheeting where necessary.

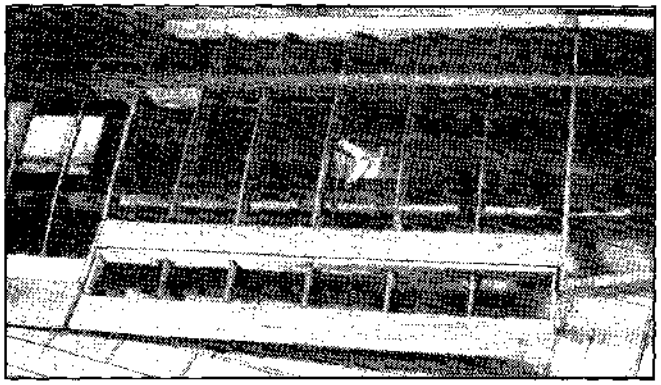
Major decision time again, you have three choices: scale type flaps, conventional type flaps, or omit the flaps altogether.



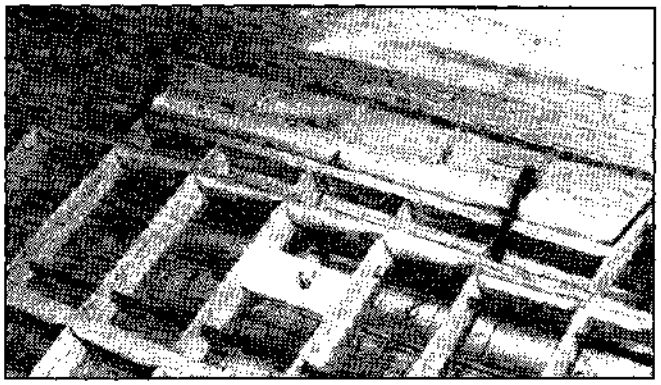
Right wing section.



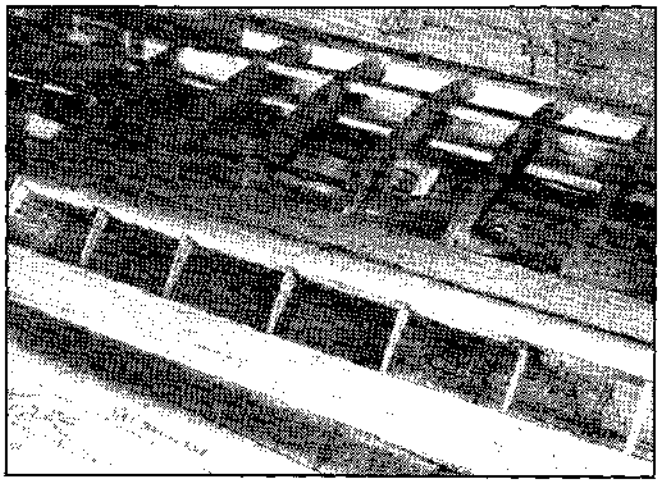
Aileron and flap servos mounted.



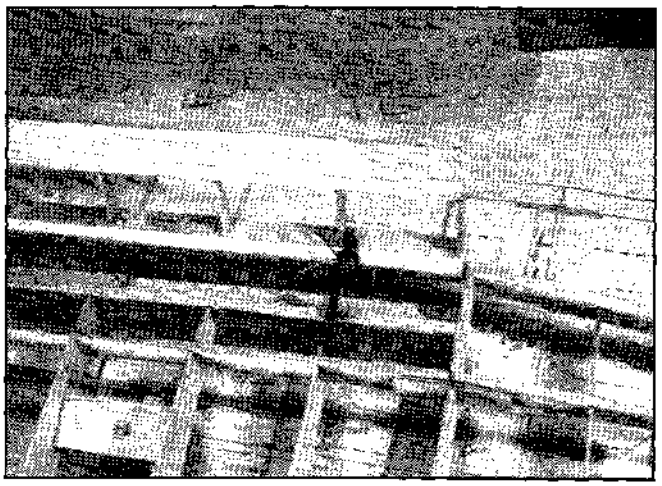
Top view of right flap.



Flap, bottom view.



Flap partially deflected.



Flap full deflection.

If you are omitting the flaps, build the wing using full length ribs in place of R-4s and R-5s.

For conventional flaps add 1/4" x 1/2" wood like the aileron installation using the lower flap line as a guide. These flaps would hinge at the bottom.

For scale flap action, follow the plans and instructions.

Lay out one of the sections using the R-4 ribs, the #3 and #5 ribs, the main spars and the rear spar. Glue in place.

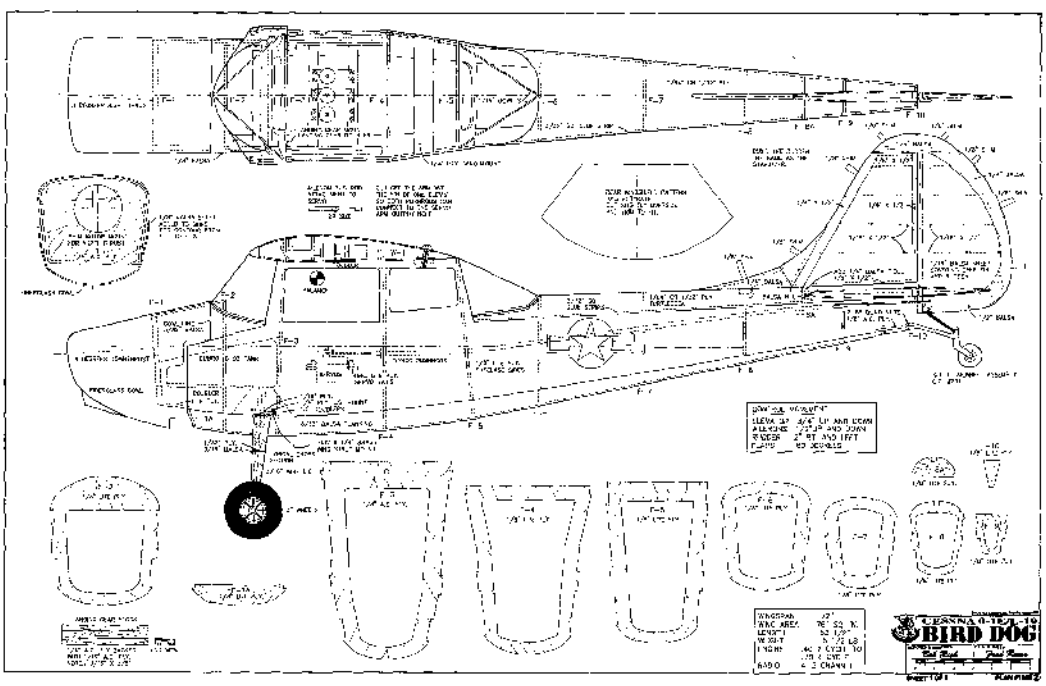
Put ribs #6 through #13 in place and tack glue to the top main spar only. Now turn the wing over and lay the main spars flat on the building board. The leading edge and trailing edge will be raised off of the board.

With a razor saw, cut the lower main spar, just outside of rib #5, about halfway through. This allows the top of the wing section to lay flat when the lower spar is glued in place, make sure it does lay flat. Crack further if necessary. Glue securely. Glue ribs.

Taper the 1/2" x 3/16" rear spar from rib #5 to the tip from 1/2" to 1/4" and install by tack gluing.

Turn the wing over and add the leading edge and the 1/4" x 1/2" balsa piece for the aileron mount by tack gluing.

Cut the flap mount block, curve the cut to match the aileron hinge detail on the plans. Make this very accurate so the flaps operate correctly and smoothly.



Add the 1/8" ply reinforcements at R-5. Install the 1/8" aircraft ply strut mounts, drill holes and mount 2-56 blind nuts for the wing struts.

When the wing is right and true, securely glue all of the joints and add the balsa tip.

Make the opposite wing section the same way.

Make the center section but do not make it from the main spars forward.

Lay the wing parts on the flat building board and raise the tips 1-9/16" at the main spar locations. Glue the wing sections together and install the doublers.

Mount the wing on the fuselage, locating it correctly, matching the leading edges of the wing to the cabin rib outlines. Hold the front of the wing center section plywood against fuselage

former F-3. Trial fit the 1/8" spacers between the front main spar doubler and plywood piece W1.

When everything fits like it should, glue the W-2 spacers and W-3A's in place using epoxy. Do not glue the wing hold-down dowel supports until the dowel holes are drilled and the dowel installed.

Construct the flaps, using 1/16" shims under the flap ribs to allow for the 1/16" planking.

Mount the 1/8" lite ply bellcrank supports for the flaps and ailerons. I recommend Goldberg aileron bellcranks because of the positive no slop action.

Make the flap fittings out of 1/16" plywood or phenolic.

Cut the slots in the flap mount blocks and the flaps for the fittings.

On the full-size plane, the flaps lowered to 90°; the flap movement on yours is up to you. Mine go to about 80°. I used cotter pins at the hinge points for temporary mounting so they can be taken out easily. Tack glue the fittings in place with a glue that is not permanent and try the flap action. Make any changes that are necessary to make the flaps work correctly and evenly. Mark the parts and glue them in permanently.

Make the ailerons, glue the 1/4" x 1/2" balsa to the aileron stock and fit them to the wing. The ailerons hinge at the top. I used the small Klett pinned hinges for the close fit. Make sure the ailerons work freely with no binds. Make sure the bellcranks give the proper throw.

The wing is sheeted with 1/16" balsa for the scale look and strength. Cover the bottom of the wing first in the five sections. Make sure the 2-56 blind nuts are securely glued in for the wing strut mounting.

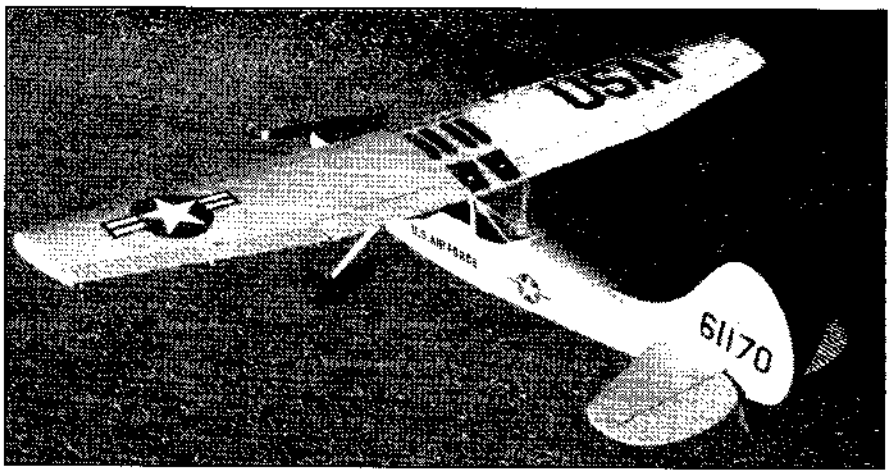
Cover the top of the wing with balsa sheeting.

I made a cowl pattern out of Styrofoam, matching the fire wall and the cowl pattern on the plans. Cover the part of the cowl that fits over the wood nose section with Saran Wrap. I used two layers of heavy fiberglass cloth and epoxy resin to mold the cowl over the pattern. *(Editor's Note: A fiberglass cowling and a clear molded windshield and rear window are available from: Fiberglass Specialties, Inc., 38624 Mt. Kisco Dr., Sterling Heights, MI 48310, 810-978-2512.)*

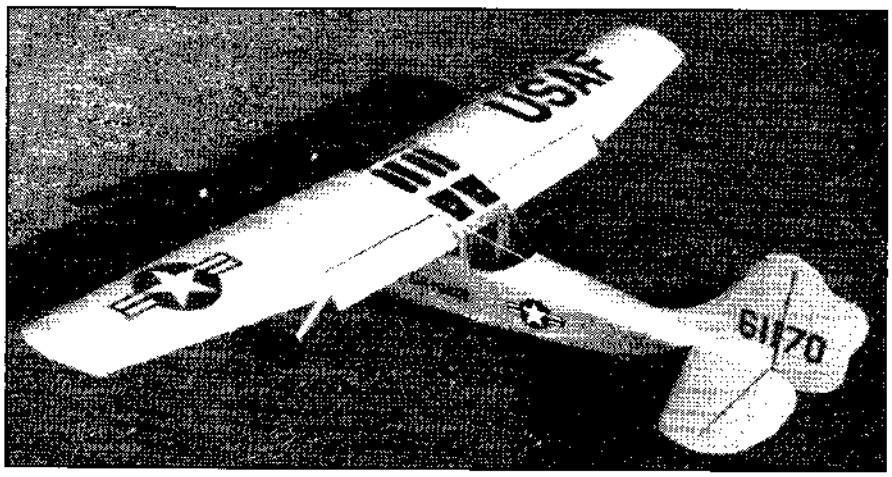
If you desire, you can build the cowl with balsa and plywood.

Install all of the radio gear and check for proper operation with no binding. My Hitec Jam Checker found a couple of places that weren't quite free enough. Remove the radio gear.

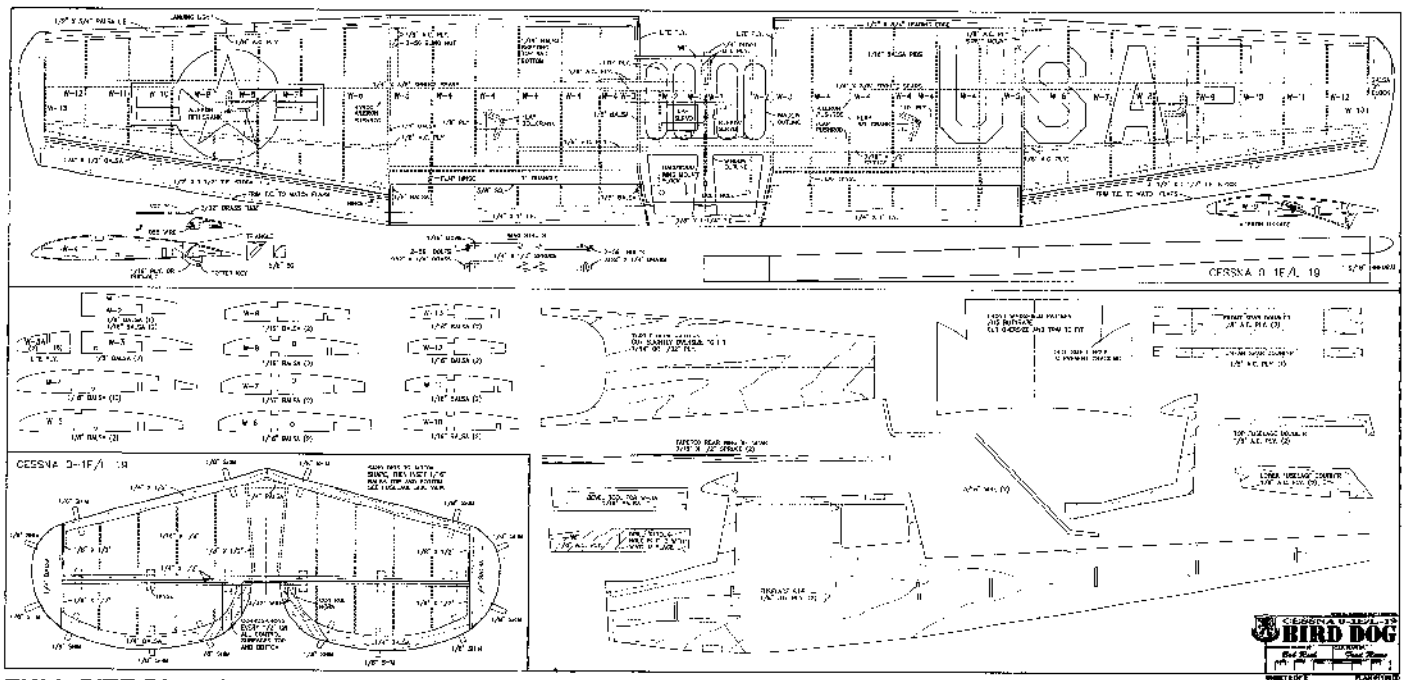
Install the front and rear windshields and side windows. RC-56 works well for this and dries clear.



Top view. Note simulated corrugations on control surfaces.



Flaps fully deployed.



FULL SIZE PLANS AVAILABLE – SEE PAGE 205

From RCModeler Apr. 1995

Now it's time for the finishing.

The color of the Air Force O-1E is a light gray so I used light gray UltraCote. I think the color is a little darker than scale, but since it's a stand-off scale it's okay for me. Use your favorite covering and finishing method.

I wanted to simulate the corrugations on the control surfaces so I thought the UltraCote would be feasible. I simulated the corrugations with string glued on with Jet glue and used a trim iron to cover the surfaces. The surfaces came out fairly well but I would not use this method again, there has to be a better way. (*Editor's Note: Sig Mfg. Co. has a simulated "Cessna" type skin detail with 1/2" rib spacing and is .010" thick plastic. This material is available under Sig Part #RPCP404. Sig Manufacturing Co., Inc., 401-7 So. Front St., Montezuma, IA 50171, 800-247-5008. Modelers Hot Line — 800-524-7805.)*

The USAF and the stars, bars, and tail numbers were cut from UltraCote Plus, the U.S. Air Force is Letraset letters protected with a thin coat of K&B clear epoxy paint.

Flying:

With everything put together, the balance checked right on. So far so good. The engine checks out, the Saito purrs like a kitten, now it's time for the moment of truth.

After a bit of taxiing on the runway to get the feel, power was applied and off it went, into the wild blue yonder as they say. It flew just like it was supposed to, great! No tendency to fall off on either wing at low throttle and up elevator. Tracking through loops was right on. After about ten minutes of enjoyment and picture taking, it happened. The engine quit. Lining up for a good dead stick was no problem except it doesn't want to come down. It wants to fly, it's an airplane. After a nice three point landing, an inspection showed that the tank clunk had come loose, split fuel tubing.

The control throws I used were: elevator — 3/4" up, 3/4" down; rudder throw limited by the tail wheel control, put in all you can get; ailerons — 1/2" up, 1/2" down.

This model is stand-off scale with some modifications made to make the construction easier and a very stable flier. Only some deviations from true scale were made so you end up with a scale looking, good flying plane.

If you build this plane I am sure you will enjoy it as much as I do mine.

Good luck and keep your wheels down on landings.

CONTEST & SHOW ANOUNCEMENTS

PUGET SOUND SILENT FLYERS
"ELECTRIC POWERED MODEL WORKSHOP"
April 1-2, 1995, Museum of Flight, Seattle Wa.
For further info, contact:
Randy Smithhisler, 1703 105th Ave. Ct. E.
Puyallup, Washington 98372, (206) 927-4672

WINNIPEG RADIO CONTROL CLUB
MID-CANADA SCALE RALLY
May 28, 1995, Winnipeg, Manitoba
For further info, contact:
Ken Kalynuk, 1 Harmon Ave.
Winnipeg, MB R3J 2P9, (204) 837-8817