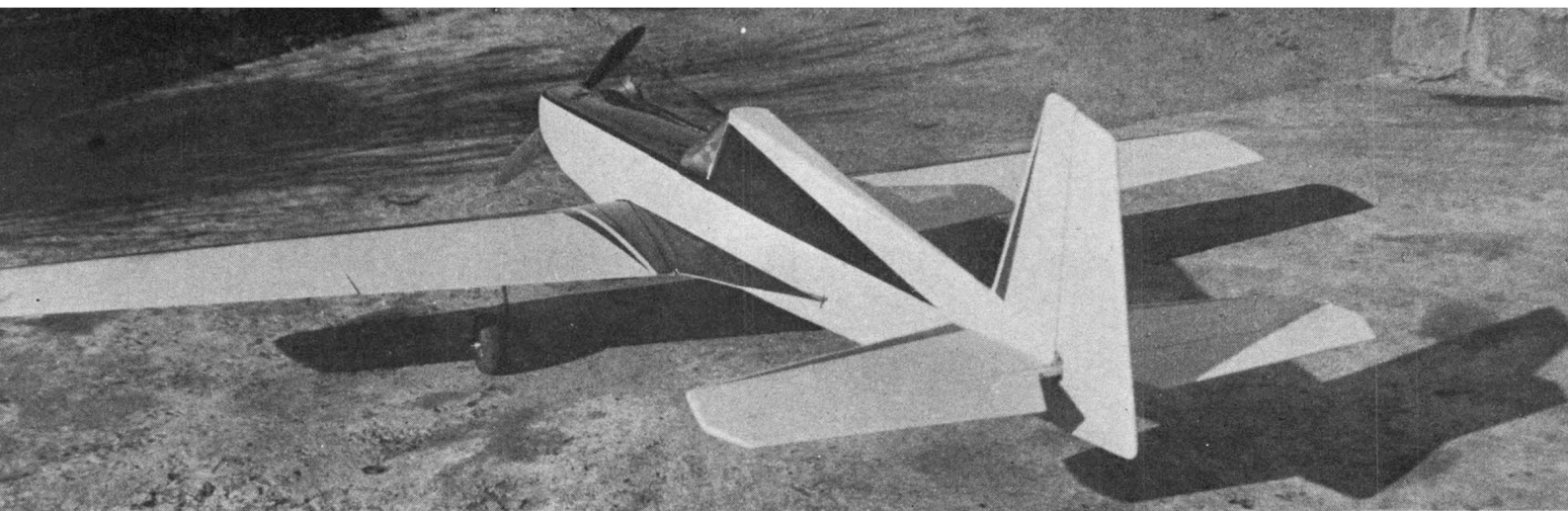




Montana Duster

Semi-scale Class-C pattern plane may be built in six hours using foam-cardboard wing and simplified balsa fuselage.

SIMON DREESE

AFTER flying two Kwik-Fli II's and a Chipmunk, I was amazed at the flying abilities of the lighter weight Chipmunk at 5 lbs. as compared to the Kwik-Fli's at 6 lbs. 8 oz. Considering their weights and aerodynamic differences, I set about to design a new airplane. With the arrival of the new pattern for 1968, and being a Montana farmer, I felt that a plane designed around the Colair Agiwagon and the Piper Pawnee would make a good machine.

My second thought was that the new plane could be made using the most popular sizes of wood, and to get the most out of the wood for the money. A good, low-cost exceptional machine would draw public acceptance. The Duster is designed for quick, cheap building. It is capable of the Class C pattern without pilot strain. My aircraft has these features: 58 to 60" foam wing covered with cardboard, with built-in ailerons and wide-tread landing gear and no dihedral except that provided by the bottom of the thickness-tapered core. The leading edge

can be straight, or swept back $1\frac{1}{4}$ ". The fuselage resembles the profiles of the Agiwagon and Pawnee, as does the rudder shape. The stabilizer is reversible—for connected, conventional elevators or a Mooney-type swept-forward hinge-line elevator.

Materials: Three sheets of $\frac{3}{8} \times 3 \times 36$, one sheet $\frac{1}{4} \times 4 \times 36$, three sheets $\frac{3}{16} \times 4 \times 36$, one block $\frac{1}{2} \times 4 \times 8$, one sheet $\frac{1}{16} \times 4 \times 7$ plywood, $\frac{1}{4}$ plywood firewall, Celastic for fillets, contact cement for covering wing core, and three sheets of Scott's 12-point coated-stock cardboard which is coated on both sides.

Six-hour building schedule

1) Cut out fuselage sides, doublers, and tail extensions. Sand to match, then glue nose doublers on with quick-setting epoxy. Glue tail extensions and doubler with Titebond. Put formers F2 and F3 on one side, being sure they are perpendicular to the side.

2) Cut stabilizer parts out and glue. Align elevator pieces and glue. Mark center of stab's trailing edge and draw a line 90 degrees to its center for aligning R1. Sand

These views show that appearance is combination of several monoplane agricultural aircraft, aerodynamics from most past multi-stunt planes, yet simplified assembly. Note Mooney-type stab.

R1 lightly and glue to the stab, being sure it is vertical to the stab surface and square with the trailing edge.

3) Cut and glue F9s and F13s together; glue R2 and R3.

4) Cut wing cores. Drill holes for wire. Notch out holes for bellcrank and landing gear slot on bottom of core.

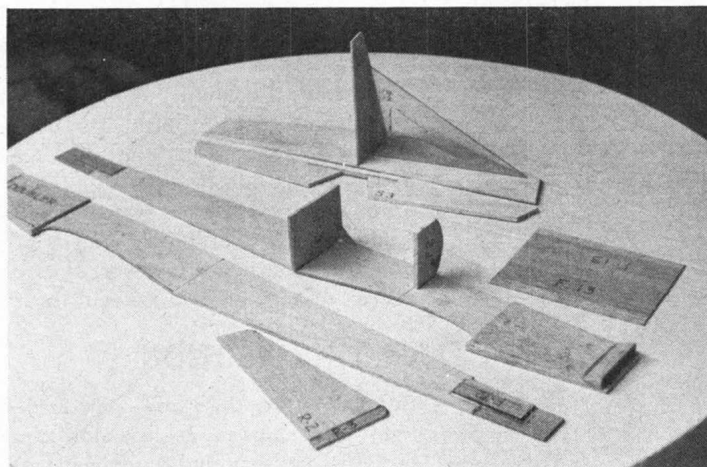
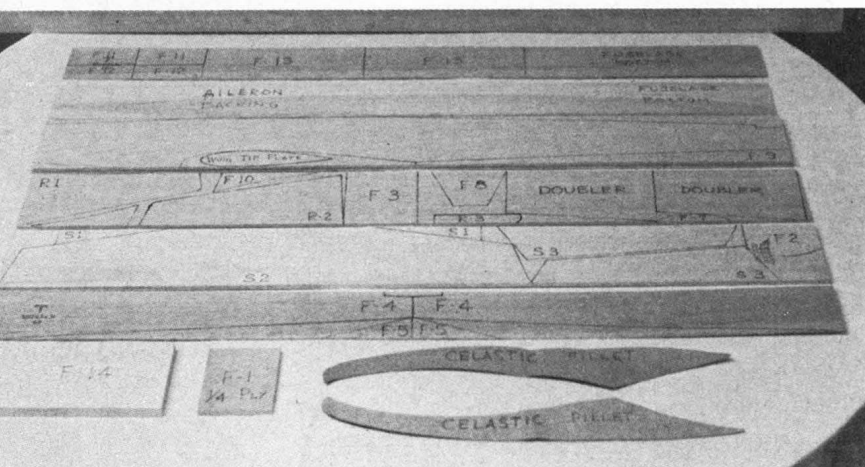
5) Make up bellcrank assembly. Put wire in core and pull it out of crank hole 4", making a short 90-degree bend at the end. Put on bellcrank assembly, slide back in, and glue with Titebond.

6) Slide a soda straw over piano wire at center of core. Glue a piece of scrap $\frac{1}{4}$ plywood on back of landing gear plates at mounting hole, then install gluing with quick-drying epoxy. Lay wing pieces aside to dry.

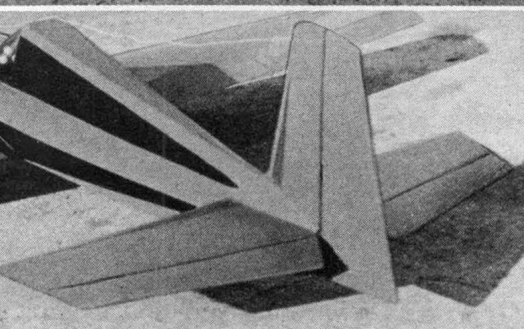
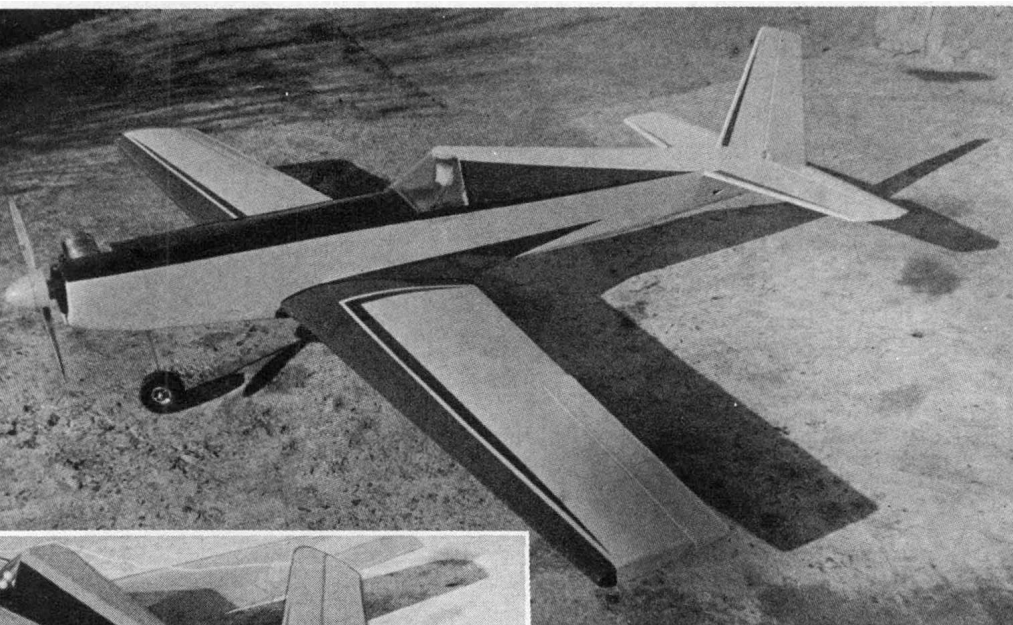
7) Put the two fuselage sides together, checking with triangles. Be careful, because at this point you are starting alignment of the craft and establishing the thrust-line.

8) Mark and drill motor-mount holes. Also, mark nose gear block holes if used and install on firewall.

9) Firewall now can be installed, if fuselage is wrapped with tape in the area of F3 and F2. Be sure to check its alignment before gluing. Mark center on top of firewall, F2 and F3. Use a piece of string twice the length of the sides and, starting with a pin in the center mark of the firewall and centering over the other two marks, pull in the rear of the fuselage and center by use of the string. Now add two $\frac{3}{8} \times \frac{3}{16}$



Using patterns supplied, cut out balsa economically as shown. Six-hour assembly starts with fuselage doublers, sides, bulkheads.



strips in rear of fuselage.

10) Stab assembly now may be sanded and installed. Checking with triangle to be sure it is placed at 90 degrees to sides, and using the string wrapped around R1 and back up to center of firewall for centering, pin assembly at rear to match fuselage end. Mark, remove, apply glue, and assemble; then check again to be sure it is straight.

11) While tail group is drying, add F8, then $\frac{1}{2}$ " block over fuel compartment. Glue on F7. Wet F13 assembly and glue on. If care is taken, F4s can also be added now and F5s.

12) Put assembly aside and continue wing construction. Sand lightly over landing gear blocks so they match core.

13) Lay out cardboard paper and lay wing core on it, rolling the core from trailing edge to opposite trailing edge, mark $\frac{3}{4}$ " larger than needed to cover, and cut out sheeting. Be sure to mark center lines on core and matching lines on the paper. If you want a stronger wing, a covering of cardboard about 6" long at center and 3" long from the tip end, can be added to the leading edge of the cores before

finishing to cover. This adds some weight but does make a strong, hard leading-edge wing.

14) Be sure to cover bench area where spraying of contact cement will be done. Spray the wing core and covering material. Touch the core to the paper first with the leading edge centered along the center of the cardboard. Press core down onto the covering to the trailing edge. Then repeat the position with the leading edge down, and press the core down onto the covering for the other side of the wing.

When you have worked about half of final side down, lay it over, and add a $\frac{1}{8}$ to $\frac{3}{16}$ bead of Titebond along trailing edge of core. This will give you a hard edge when dry. Complete the smoothing down of paper in this position. The extra width of the cardboard at trailing edge will hold glue in place till dry.

15) After covering second core, trim paper on ends of first core and add tip plate with Titebond, and do same with second core.

16) Add bottom sheeting to body and bolt motor on firewall. Add the $\frac{1}{16}$ plywood nose bottom plate, and 3x1 nose blocks around motor. Sand lightly, top of F4 and add F9 assembly. Fuselage is complete and ready, after drying, to shape and sand.

17) Shape wing-tip plates and trim off waste cardboard on trailing edge, then measure out and draw on ailerons. Cut them out and back them with $\frac{3}{32}$ sheet. The open end of aileron and wing is coated with Titebond. You will be able to feel

the wing tip edge of the bellcrank hole, and from it, judge where to cut the hole for the aileron wire going to the horn. Glue in aileron horn after making hole for hook-up wire in wing. I've found the "living" hinge material, cut $\frac{5}{8}$ to $\frac{3}{4}$ " long x $\frac{1}{2}$ " wide, works the best. Use toothpicks for keepers, shoved from the top of the wing down until you can feel them touch the bottom covering. Punch the hole first with an ice pick, then fill the hole with Titebond and shove the toothpick in. Trim it off later.

18) You will be able to feel the landing gear groove; cut it out and coat area with glue for fuel-proofing.

19) Wing halves are joined by using the waste cardboard strips that are about 24" long and 6" wide. Cut them so they are 12x6. Trim the center of the cores and sand in the dihedral angle. Coat center joints with epoxy cement and put together. Next, coat the strips with glue and put two on top and two on bottom. Make this a good joint, and apply enough cement to get a good gluing job.

After assembly has set up, trim off excess paper. Put a 3x6 piece of Celastic, or glue-coated cloth, over the leading and trailing edge at center section. Seal the edge of the center sheeting with Titebond.

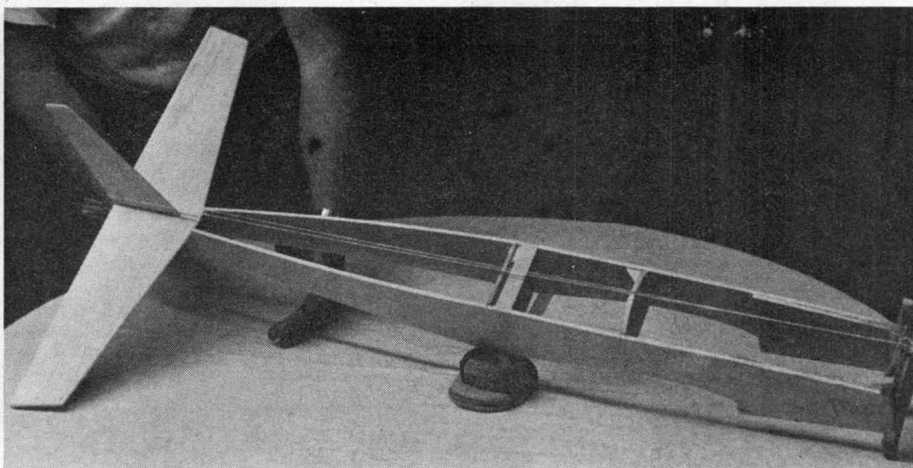
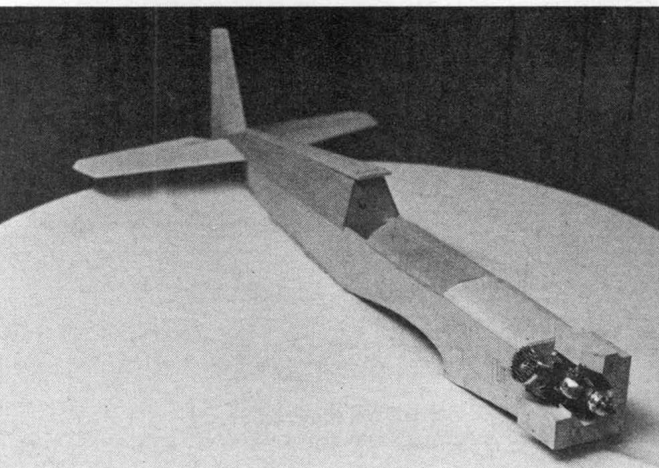
20) Decide if you want to use bolts or rubber bands to hold on your wing. If bands are used, mark on fuselage sides and drill holes; $\frac{1}{4}$ dowels are fine. If bolts are used, glue wooden blocks in body. You will note that the front hold-down dowels are held in the fuselage by a $\frac{1}{4}$ plywood former with shallow holes. The wing is matched to the body and marked for dowels and holes for the bolts then drilled. The front dowel holes are filled with glue, the dowels then shoved in, and wing is put on fuselage, bolted down and allowed to dry. For strength, two pieces of $\frac{1}{8}$ plywood are put over location at bolt holes in wing. The fillets now may be put on. They are made of Celestic.

21) To prepare wing for painting, only the wood area needs to have an under-finish.

The entire airplane can be covered and filled in one evening, followed by an evening of sanding, and you are ready to paint. I use only one coat of Hobbypoxy color and find it superior.

Spraying technique: Thin paint well, mist a light coat on wing, then fuselage, then right back to wing. I keep this up until I have used the 8 oz. of mixed paint. This is amount of paint before adding thinner. Thin about 20%.

The wing will be a little fuzzy but don't worry. When dry, wet sand with 400 then rub down entire airplane with Dupont White Polishing Compound, and away goes all fuzz and dust. Wipe most of the com-



Nose shaped with soft balsa blocks glued around engine at firewall. Most accurate fuselage and fin alignment with loop of string.

