A Control-line model of a dirigible-borne single-place fighter

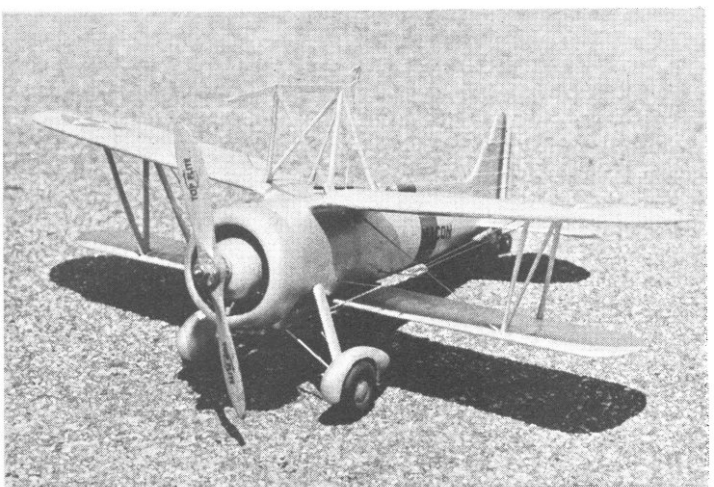
by Capt. David H. Brazelton

Left: Capt. Brazelton and the "Sparrowhawk." An authentic color scheme of yellow and silver makes the model a gem.

CURTIS F9C Sparrowhawk

● For those who like historical aircraft, here is a model of a little airplane that performed great deeds. It is a shame that its exploits are so little remembered because they were the basis of many present-day experiments in launching and retrieving aircraft from an airborne platform. The "Sparrowhawk" was standard equipment of both the dirigible "Macon" and "Akron." This model is patterned after the aircraft carried aboard the "Macon." The "Akron" model differed in coloration and included full wheel-pants and aircraft-carrier hook. Both aircraft were each armed with one .30 calibre Browning machine gun.

So, if you have an .09 setting around and want to build a model that looks good on the shelf, and in the air, get your knife and some balsa and let's go!



Control-line Scale fans will go for the strong construction the author has put into this nifty version of an almost forgotten type of fighter aircraft.

TAIL: Elevator and rudder are cut from ⅛" balsa and sanded to streamline shape. Cut the rudder loose from the vertical stabilizer along the heavy line and cement them back together with the rudder offset to the right, as shown in top view. Bend the 1/16" music wire elevator interconnect-wire to shape and solder the control horn as shown. Cut the elevators loose and slit the leading edge to insert the interconnect-wire flush. Cement the interconnect wire in place and cover the leading edge with silk. Hinge the elevator to the stabilizer using your favorite hinging method. We prefer alternating cloth strips. Bend a 1/16" wire pushrod, about 6" long, to fit through the horn and hold it in place with a small washer and solder. Sweat a 1" piece of 1/16" i.d. brass tubing half way on to the end of the pushrod, so that you have about ½" of tube to accept the other end of the pushrod.

WINGS: Lay out the leading and trailing edge and wing tips of the upper wing. When the cement has dried, crack the leading and trailing edge just outboard of the 5th rib from the tip. Lay the ⅛" x ¼" main spar in place and prop up the tip so that it comes flush with the top surface of the spar. Place the ⅛" square rear spar in place and crack it at the same place as the leading trailing edge, so that the outboard edge can be kept flush with the bottom surface of the edges.

Cement the 1/32" x ¼" strip to the

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SPARROWHAWK

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trailing edge of the rear spar as shown. Pin the 1/8" x 1/4" aileron leading edge in place but do not cement. The ribs are not shaped until they are assembled in the wing. Cut strips of 1/32" x 3/8", long enough to fit the rib positions. It is easiest, in the area of the aileron, to make one strip 3/8" wide between the rear spar and the leading edge, and another strip 1/4" wide for aileron ribs. Notch those strips for the leading edge main spar and rear spar and cement in place. Do not cut the trailing edge for the aileron until the ribs have been shaped.

When the wing assembly is dry, remove and shape the ribs with sandpaper and knife as if it were a solid wing. The plans show only the right half of the upper wing. To build the left half, draw the wing on a thin sheet of paper and reverse. Set in the 1/16" sheet fillers for the interplane struts.

The lower wing is built in the same manner as the upper wing except the ribs are 1/4" wide. The center-section of the lower wing is planked with 1/32" sheet. The 1/16" sheet filler at the struts is laid on top of the spar. You will probably have to crack this filler at the spar to enable it to follow the rib contour.

FUSELAGE: Start construction by splitting a 2" x 3" x 14 1/2" balsa block

in half, lengthwise, and tack-cement it back together, with the straight outside faces together. Mark the side and top views onto the block and cut it to shape with a coping saw. Then, with a long-bladed knife, carve the fuselage to the crossections shown. With a little care, the upper wing roots can be carved integral with the fuselage. If not, the roots can be added with a ½" square block carved to shape. Sand the fuselage to a smooth finish and give it 2 coats of clear dope.

Separate the halves and carve each internally to about the contour shown. The thinner you can work the walls, the lighter your model will be. Give the interior two coats of fuel-proof dope and install desired cockpit detail. Cut the firewall, and bellcrank mount from plywood and fit them into the lower section. Drill all holes for mounting of the engine and fuel tank in the firewall, and fasten blind nuts before mounting.

Bend the landing gear from 1/16" music wire and assemble to plywood mount. The lower shell will have to be slotted for the strut. Cement it securely to the lower shell and firewall, and fill the slots with scrap balsa. Build the tail-wheel strut from 1/16" music wire and install it in the fuselage, apply several coats of cement. Fasten the horizontal stabilizer and elevator assembly in place. Attach the leadout wires to a small Veco bellcrank and fasten it in place on the bellcrank mount.

Drill access holes in the side of fuselage for the leadouts and protect them with small brass grommets. Install a pushrod of 1/16" wire, just long enough to slip ¼" into the brass tubing on the pushrod which is connected to the elevator horn. Establish neutral at the bellcrank and elevators before soldering the joint.

There are several commercial fuel tanks which will fit very handily, or you can make one about ¾" wide x 1" high x 1½" long. A square tank is suitable. Mount the fuel tank to the firewall.

Give the interior of the lower half of the fuselage another coat of fuel-proof dope if you are not using fuel-proof cement. Cement the vertical stabilizer and rudder assembly to the upper half of the fuselage. Cut and shape the ⅜" balsa headrest and cement it in place. Set the upper half of the fuselage right side up on a flat table and assemble the upper wing panels to the wing root. With the fuselage jigged in this manner, the wing tips should be blocked up 2½" to insure a 1" dihedral.

While the cement is drying you may build the superstructure from 1/16" pine or plywood using the true lengths shown in the sideview. The superstructure consists of 4 parts. The two sets of legs can be assembled directly over the plan and, when dry, leaned together like a tent as shown in the frontview. The guide bar is cemented on top of the support legs and the rectangular fairings are cemented to each side of the guide bar. The hook can be made from heavy card and cemented to the rear of the guide bar with the 1/32" music wire actuating rod. Finish the superstructure separately and do not fasten it to the aircraft until the wing center-section has been finished.

Fasten the streamline-shaped ⅛" x ½" balsa fairing on the main landing gear strut. Build and shape the wheel pants and install them on the axles, cement securely to the fairing. Fasten the wheels on with a soldered washer or, better yet, dig up a pair of 1½" Banner wheels. Carve ½" x ⅝" x 3⅝" balsa block and slit it for the front and rear struts. Do not cement this block to the bottom of the fuselage until the wing has been mounted. When the upper wings are dry, cement the upper and lower halves of the fuselage together. You have now reached the point of final assembly and finishing.

FINISH AND FINAL ASSEMBLY: Fill all cracks with plastic balsa, cover the entire model with Silk-Span or tissue and apply 2 or 3 coats of clear dope. For best finish on a biplane, a great deal of the finish must be put on before the wings are assembled. Give the model 6 to 9 coats of sanding sealer, sanding out imperfections every 3 coats. Don't worry about adding weight at this stage as you are removing most of the sealer in your sanding operation. Now is the time to simulate the ribs in the tail surface with thread. If you do it before you apply the sealer, you will find you can not sand these surfaces without fraying the thread. Give the model 1 coat of clear then color.

The entire aircraft is silver, except for the upper surfaces of the top wing which is a bright orange-yellow. Apply covering of the wings for the struts. at least 3 coats of color, sanding very lightly between each. Cut slots in the covering of the wings for the struts. Cut the struts from 1/16" plywood, sand to a streamline shape, and finish. You are now ready to mount the lower wing. Apply cement to both ends of the interplane struts and to the lower wing mount area. Set the struts in place in the upper wing and then mount the lower wing to the struts and the wing mount area simultaneously. Fill in the fuselage beneath the lower wing with scrap balsa and sand to shape and finish as you did the rest of the fuselage. Cement the fairing block in place and add the superstructure to the top wing.

Rigging of the model is quite simple, consisting of a double landing wire running from the top wing center-section, parallel with the leading edge, to the lower front member of the interplane strut. A double lift-wire runs from the top front member of the interplane strut, parallel with the leading edge, to the landing gear fairing block. A double lift-drag wire run from the upper end of the main landing gear strut to the upper rear member of the interplane struts. A spreader bar is placed at the intersection of the landing and lift wires and is long enough to also secure the lift-drag wires. The tail surface is full cantilever.

FLYING: It is best to fly this model off a hard surface such as a playground or parking lot, due to the small size of the wheels. We would suggest making the first flight on a very calm day on about 25-foot lines.

BILL OF MATERIALS
(Balsa unless otherwise specified)

1—⅛" x 3" x 36"		Stab, rudder, tips
2—1/32" x 3" x 36"		Ribs, planking
1—1/16" x 3" x 36"		Ribs, fill-in
1—½" x 2" x 36"		Pants, fairings
1—1" x 3" x 36"		Fuselage
1—1/16" x 3/16" x 36"	(pine)	Superstructure
3—⅛" x ⅛" x 36"		Spars
2—⅛" x ¼" x 36"		Leading edges
2—1/16" x ¼" x 36"		Trailing edges

Thread; ¼" sq. hardwood; screws; celluloid; Veco bellcrank; 1/16" piano wire; elevator horn; 1/32" piano wire; neoprene tubing, black; solder; washers; 1½" wheels; ⅝" wheel; silk; hinges; nuts and bolts; fuel-proof cement; fuel-proof clear dope; fuel-proof colored dopes; .009, or similar engine; fuel tank to suit; propeller to suit.