CURTISS F9C-2 "Sparrowhawk"

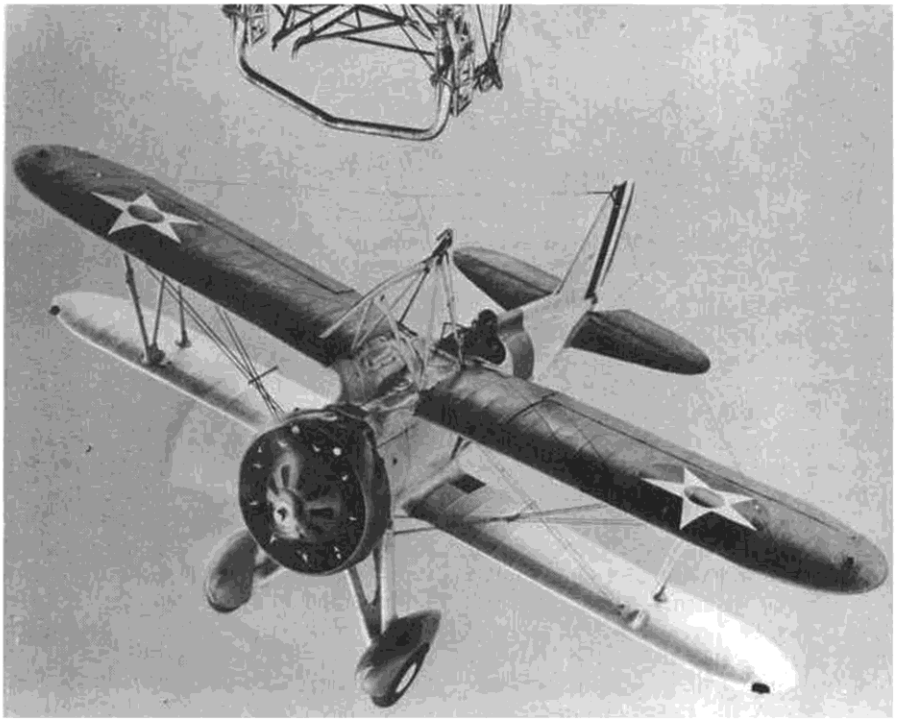
By CHARLIE SMITH . . . Designer of the popular C/L-R/C Curtiss 'Shrike' (July '74 MB) brings us another military aircraft from that great between-the-wars Golden Era of aviation. Though the 1-1/2" scale model was built for C/L only, only slight modification and a .40 engine would make it a fine R/C scale project.

American imagination and ingenuity produced this fighter plane, one of the most exciting and unusual planes to fly with the U.S. Navy. The colorful Curtiss F9C-2 Sparrow Hawk's specifications and performance for the times were impressive; 25'-5" wing span, 20'-7" in length, gross weight 2784 lbs, and powered by a 438 H.P. Wright R-975E3. At $23,000 each, the national debt hardly jiggled. Its top speed was 172 plus mph. With its landing gear removed and an external 30 gal. fuel tank added, its speed was increased to 200 mph, with an operational radius of 255 miles.

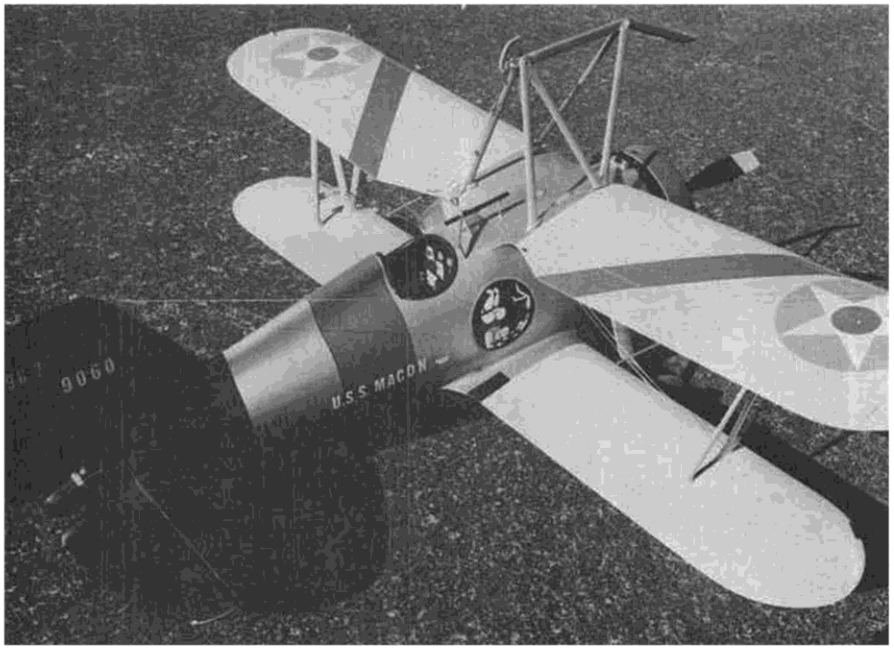
This cool little one-seater was primarily designed to fly from and return to the airships ZR-4, USS Akron, and ZR-5, USS Macon. However, the Sparrow Hawks could make carrier landings with the installation of an arrester hook. A few of them flew from the carrier USS Lexington.

Six F9C-2s were assigned to the Navy's USS Akron in September of 1932, and flew with her until April 1933. None of the "Sparrows" were on board because of foggy conditions when the USS Akron was destroyed in a violent storm off the East Coast of the U.S. The six F9C-2s were then assigned to the USS Macon, commissioned in June 1933. The Sparrow Hawks made their first hook-up in July of 1933. Usually, four of the Hawks, with four pilots and fifteen mechanics, operated from the Macon. However, a fifth F9C-2 and pilot were added in 1934. This fifth Sparrow was kept on the trapeze in the ready position, while the remaining four were hung from monorails in the four corners of the 58 x 70 foot hangar inside the super-ship Macon.

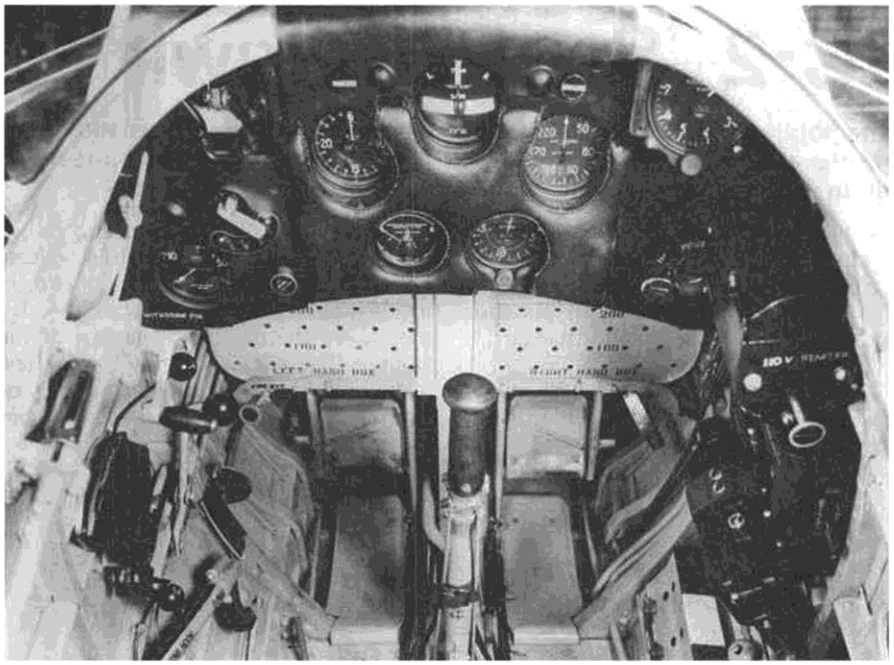
Extraordinary airplanes and pilots made this unit work. Imagine, with no landing gear, you had no place to go but back to "Mama." Then, while waiting your turn to hook-up and be drawn up inside, you could hook onto a stationary bar, called the perch, to the rear of the trapeze. The F9C-2 Sparrow Hawks flew all kinds of missions, hook-ups and drop-offs without a single accident, from



Super close-up shot of the 'Sparrow Hawk' doing its thing . . . hooking up to the lowered trapeze of its mother airship. A scale modeler's delight, the F9C-2 is loaded with detail goodies.



A flying rainbow; black tail, grey fuselage, yellow upper surface of top wing, all other wing surfaces silver, green band, green cowl, green pants, green section leader stripes . . . and insignia!



Ya say ya want cockpit detail? Tell ya what we're gonna do! Bureau of Aeronautics photo tells it all. Boarding house reach wasn't necessary. Very cozy.

1932 to 1935.

At dusk, on February 12, 1935, the USS Macon was struck a fatal blow by heavy wind gusts off Big Sur, Calif. Her upper fin, weakened previously while flying over Texas and due for overhaul, gave way and broke into girders, pieces of metal, and canvas. The flying pieces of metal pierced her three aft helium cells and the great USS Macon settled slowly into the Pacific and sank. So did four of the colorful F9C-2 Sparrow Hawks. A great loss to aviation and the lighter-than-air branch of the Navy. If they had had radar to warn of weather fronts, maybe the super airship concept would still be an active part of today's aviation.

Two parasite F9C-2 Sparrow Hawks were scrapped during 1936. The first experiments of hooking up to airships were done with a Curtiss XF9C-1, serial number A8731. This plane is different in some respects to the -2, mainly smaller fin and rudder, higher thrust line and no spats. The Navy converted it to an F9C-2, sometime in 1932, and it flew along with the six F9C-2s. The Curtiss company built an XF9C-2 at their own expense and this plane was later picked up by the Navy, reworked and given the number 9264. These are the facts as far as I can make out. One Curtiss F9C is not accounted for; maybe someone could help me on this. The Curtiss XF9C-2 number 9264 can be seen at the National Air and Space Museum. If you see it, check the tail. From my pictures it could be an F9C-1, with spats.

The F9C-2 that I modeled was number 9060, from the USS Macon. The identification color is willow green with a blue-black tail. All the metal surfaces are planked and sheeted, while the fabric covered structures are simulated with silk. The lower wing has negative dihedral built in, and all of the fillets are made from K&B micro-balloons. Building and assembling the fuselage requires that the stab, fin and lower wing be built first. However, this should not pose any real problem in building this model.

You will need some odds anc ends to build this plane, so look around . . . like .015 aluminum roof flashing, a "Wear-Ever" 7 inch frypan No. 28017, a 2 lb coffee can, some broken props (12 x 6 Rev-Ups do well), and some canned beer. Drink the suds and save the cans. Besides keeping the environment uncluttered, they make fine material for cockpit details, and are light. Also get some film and take pictures of your construction for your presentation.

FUSELAGE

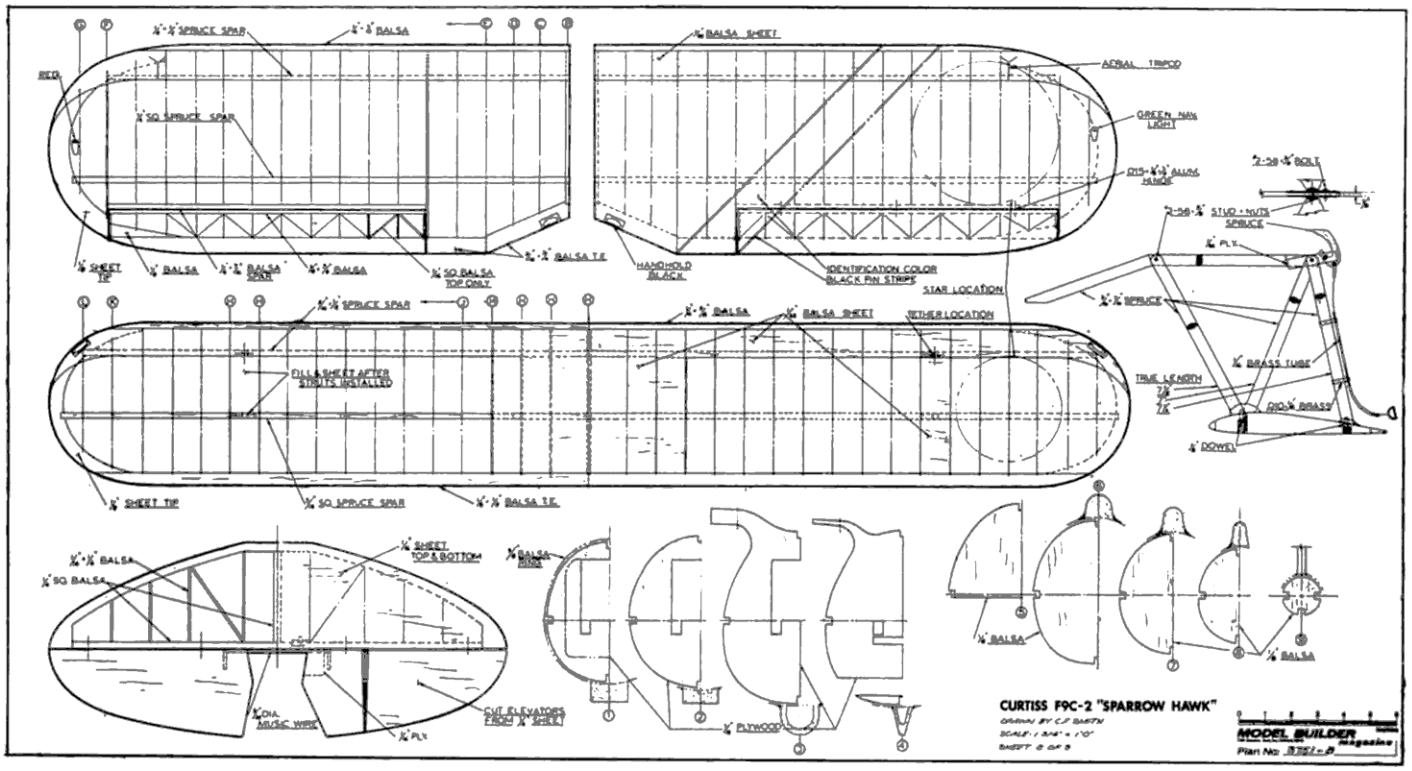
Cut out bulkheads Nos. 1 to 9, using proper material, and sand to a smooth contour. Cut the maple 3/8 x 1/2 motor mounts to length. Assemble bulkheads 1 to 4 with the mounts. I used epoxy here, and at the other stress points that will be noted. The rest of the assemblies were glued with Ambroid.

Glue the side 1/4 sq. balsa stringers and when dry, install the balance of bulkheads to station No. 9. Note that these stringers go all the way to bulkhead 9. Check that this assembly is straight to the top view. Install top 1/4 sq. balsa stringers, install and glue 1/16 sheet elevator floor between 8 and 9. Glue only at the bulkheads 8 and 9.

Now careful . . . Glue 2 strips of 3/32 x 1/4 balsa strips the full length, 1 to 9 on both sides of the fuselage, starting at the middle of the 1/4 sq. Cut out the 1/4 sq. stringers between 8 and 9 and install the elevator assembly. Install the fin.

Now plank with 3/32 strips of balsa from the side stringer, up and around the top. Install the control line plywood plate and bellcrank assembly, with epoxy, between No. 3 and 4 bulkheads. Glue the lower wing in place, using the wing block between No. 3 and 4. Use epoxy at these points.

Install the landing gear assembly. Note the front 1/8 strut is allowed to float. Install lower 1/4 sq. stringers. Install elevator push-rod from bellcrank to elevator. Be sure that it moves freely. Now mount your engine and install the throttle rod. I used a Sullivan "Gold'n Rod" for these and secured the outer case with G.E. Silicone cement at each bulkhead. Install fuel tank stop and

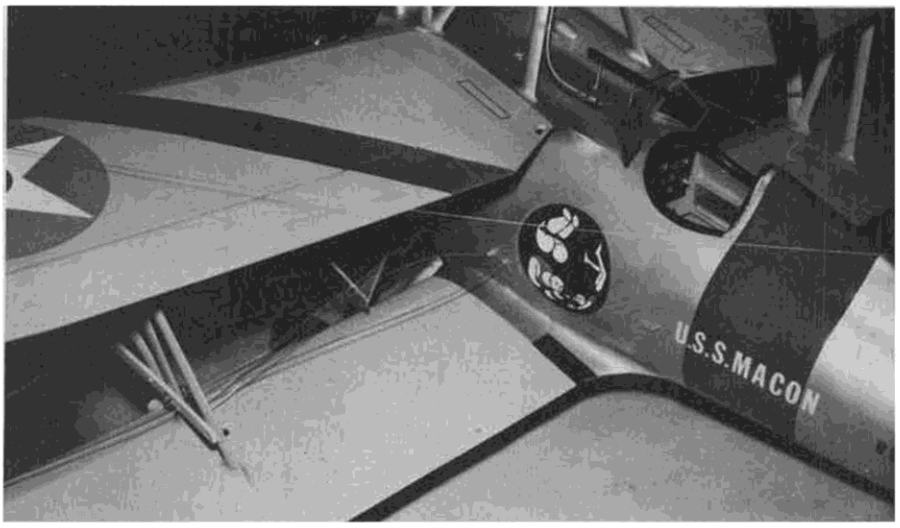


cockpit floor. Then finish planking fuselage. I used the lead out wires supplied with the Roberts bellcrank. Where they come through the fuselage side, use 3 pieces of 1/8 dia. x 3/16 long brass tubing for guides.

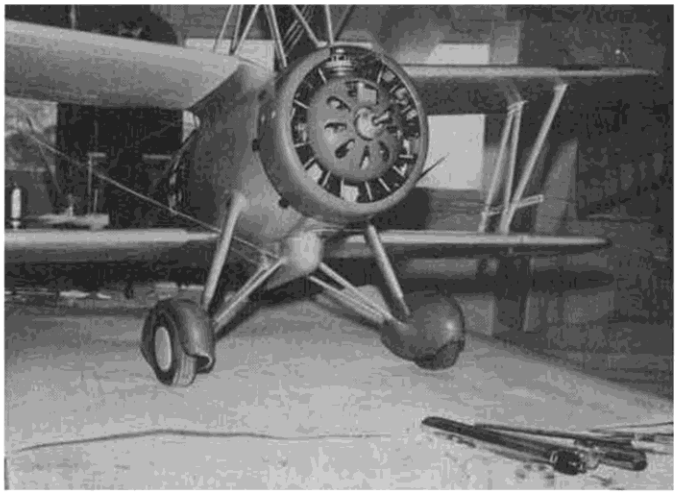
Rough sand where planking glue has dried. Glue wing fairing blocks as shown between No. 1 and 3 bulkheads and between No. 4 and 5. Preshape and sand before installation. Note the shape from bulkhead sheet. Install tail wheel assembly and fit tail block and glue in place. Install preshaped head rest block which goes from bulkhead No. 6 almost to No. 9.

WING

Cut out ribs as required. Lay out spruce spars as per plan, assemble and glue. The lower wing is made in two halves. Glue leading edges in place. Notch the trailing edges 1/8 deep as required,

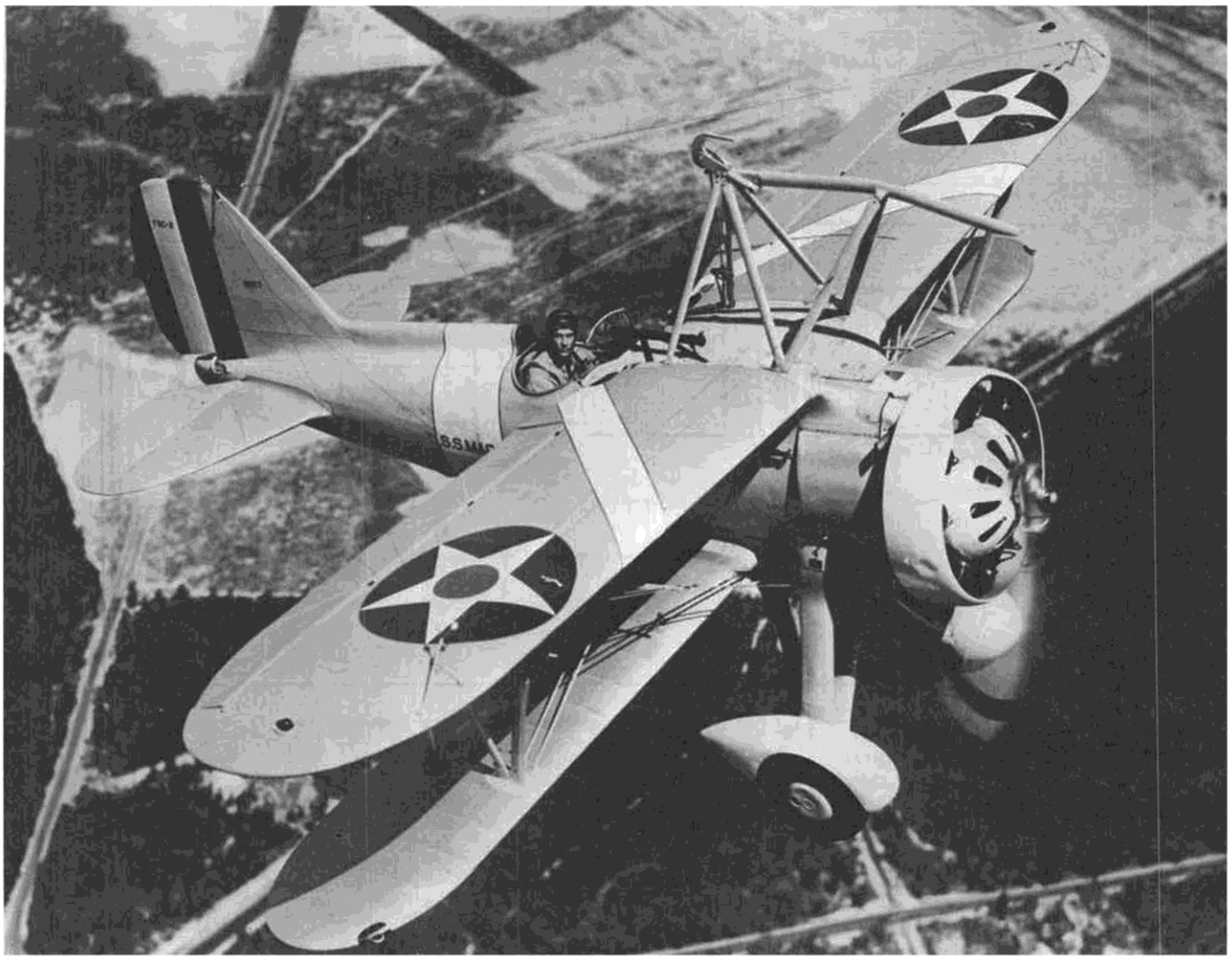


Note ailerons in upper wing only. Bottom wing has slight negative dihedral (anhedral), possibly to improve chord/gap ratio. Portions of wings covered after assembly. One-piece airplane.



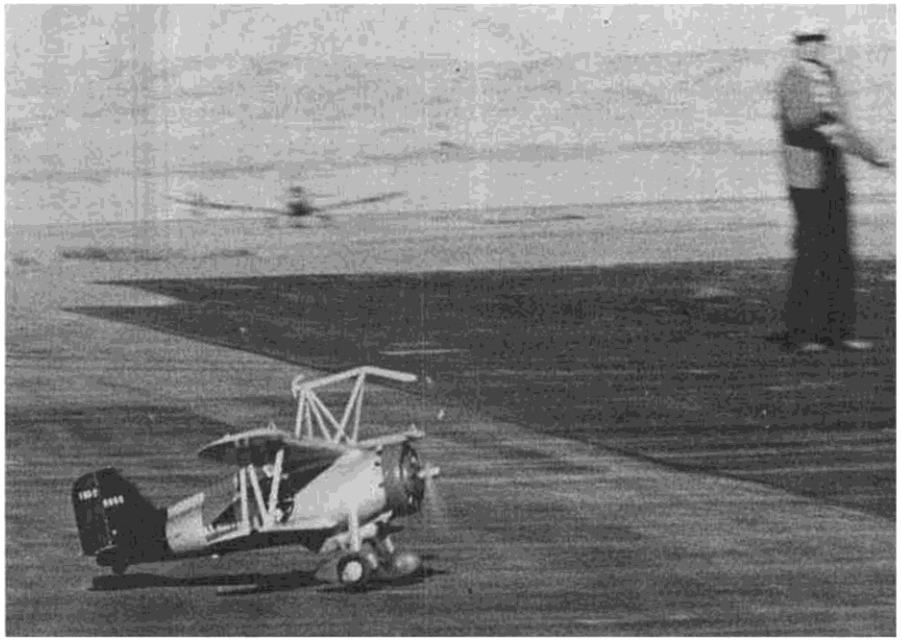
Close-up of engine detail. Charlie explains all about making it in the text . . . pots, beer cans, and all. Let's play "Find the Enya!"

There's the Enya! Note exhaust ring. Fuselage is strip-planked over bulkheads. Shroud (foreground) is made from balsa.

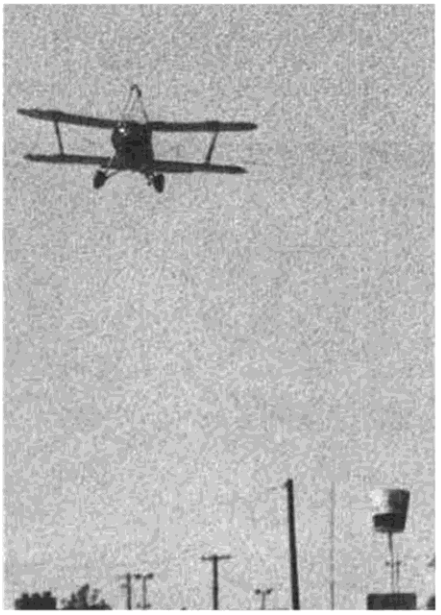


Not much bigger than some of today's home-built biplanes, this F9C-2 pulls in close for a great photo supplied by the Navy Department, National Archives. Anyone know the pilot? B/n had white stripes, fuselage band, pants, and cowl (note dent). Looks like Langley Field in the background.

glue in place. Cut out wing tips of 1/8 sheet balsa and install. Use 1/8 inch blocks to raise it in position on the spars. Trim the spars to the tip ribs and tip. Glue the 1/32 leading edge sheeting as shown. To make the tip curve and transition, wet with warm water before gluing. The strut filler blocks are not installed in the lower wing but the sheeting is. Remove wings and sand smooth. Cut out hand holds as shown and sand smooth. Cover the under side of upper

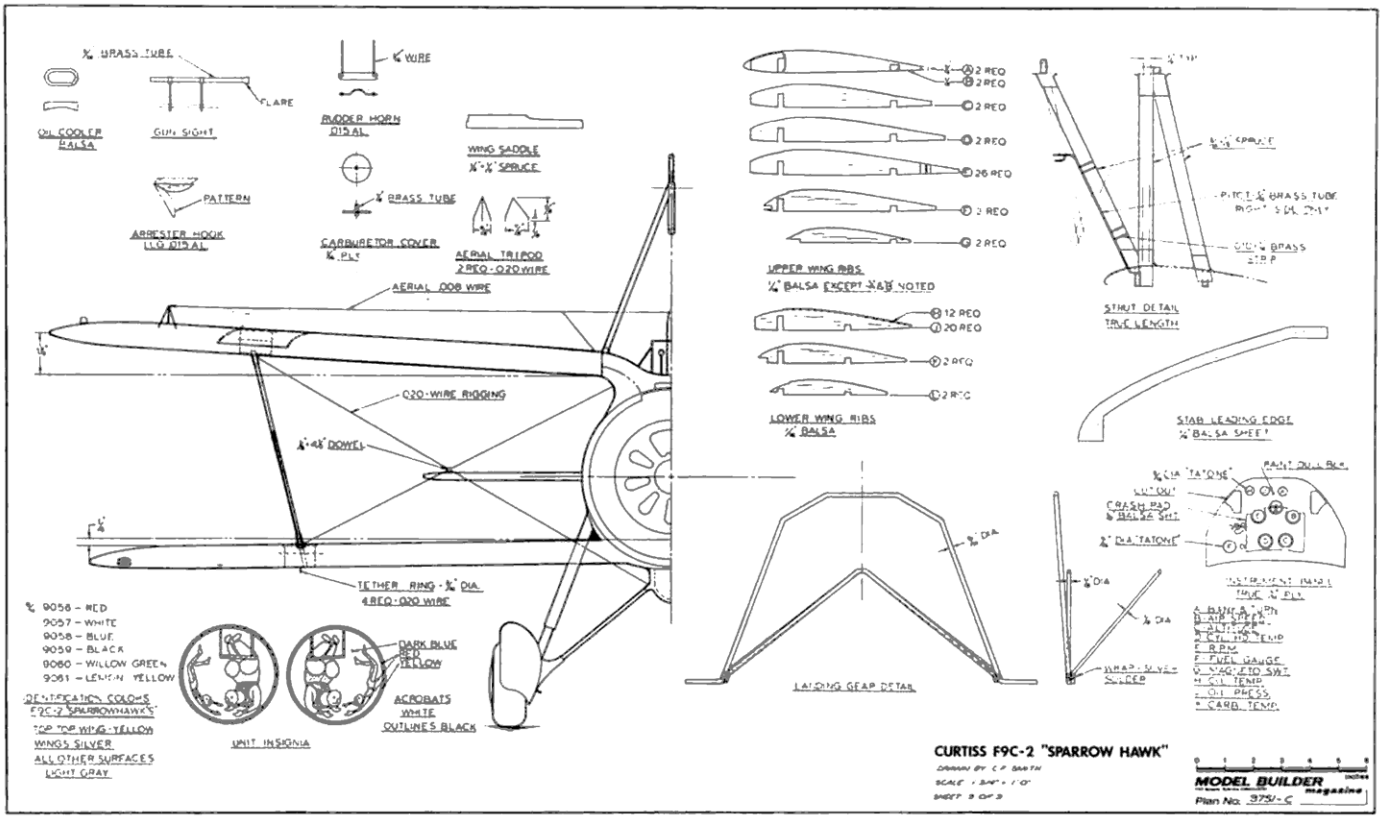


Charlie eases the 'Sparrow Hawk' off the ground. Ship is a fine, steady flier, and is easy to handle. The big Enya pulls it though windy conditions with no trouble.



Anachronism: An error in the order of time. The F9C-2 in full flight, passing over a very modern Col. Sanders bucket!

FULL SIZE PLANS AVAILABLE — SEE PAGE 80



wing panels and the top side of the lower wing panels with silk. Shrink the silk with warm water and coat with two light coats of clear dope. Glue the bottom wing halves together, installing the 1/4 inch negative dihedral. Make up the ailerons as shown. Note the 1/16 sq. balsa diagonal bracing, top side only. Cover with silk, sand smooth, and install ailerons with aluminum hinges, as shown.

FIN AND RUDDER

Build the fin outline using 1/4 x 1/2 and 1/4 sq. balsa as shown. The bracing is 1/8 x 1/4 strips. Cover with 1/16 sheet balsa. Sand to shape. The rudder is a sheet of 5/16 balsa cut and sanded to shape. Cut the tab from .015 aluminum and sand lightly. Slit rudder, glue and slide tab into place with epoxy. Wipe the joint clean with alcohol. As a matter of fact, this should be done with all outside joints as epoxy is hard to sand and will usually come up with a "blump."

STAB AND ELEVATOR

Cut out two leading edge shapes from 1/4 inch sheet balsa. This shape and 1/4 sq. balsa form the outline. Bracing is 1/8 x 1/4 balsa strips. Glue and cover with 1/16 sheet balsa. Sand to shape.

The elevators are cut from 1/4 inch balsa sheet. Sand to shape. Install 1/16 plywood plate with epoxy. Bend a piece of 3/32 piano wire as shown. Groove the elevators for the wire and install . . . glue with epoxy. Install 4 "Klett" hinges and assemble the elevator to the stab. Sand smooth and apply two coats of dope. Sand.

STRUTS

Cut and sand struts to shape. The view is true. Do not assemble. Slip the upper wing panels into position and support and pin temporarily. Fit the vertical struts into place. Check the upper wing dihedral, adjust as necessary. Glue all joints with epoxy. Install and glue the other struts in place. Glue filler blocks in lower wing. When dry, finish silking the top and bottom wing. Shrink and dope these surfaces.

HOOK ASSEMBLY

Make up the hook assembly from 3/16 x 1/2 spruce, note the true lengths. Make 2 strut assemblies. Make the bridge hook and two plywood plates. Assemble the struts, bridge, and plates as shown with 2-56 bolts. Install the hook between the plates with 2-56 bolts. The plates and hook are moveable. Install four 1/8 inch dowels and glue in place. Drill four 1/8 inch holes as shown in the top view and fit the hook assembly in place. Disassemble, sand, dope, and prime with K&B primer. Make up the handle and tube assembly and install with straps as shown. The clevis is fastened to the hook with a straight pin. Cut flush and solder.

COWL AND CYLINDER

Now get that fry pan. Take off the handle and scribe (scratch) a circle to be

Continued on page 67

"IF HE HOOKS THAT THING ON, I QUIT SCALE FOREVER!"

F9C-2 . . . . . *.Continued from page 13*

cut out of the bottom. The cowl flange is 5/16 wide. Cut the bottom out as close to the line as possible. Save this piece as we will use it later. Cut the pan at the handle mounting boss to achieve a diameter of 6-3/8 inches (approx. 2 inches). Carefully working the ring, bend to this diameter. Make a doubler of aluminum 1/2 x 3/4. Clamp the doubler and pan ring in place and bolt or rivet together. Cut the flange at the top for machine guns as shown. Drill and file a hole for the glow plug connection. File and sand all rough edges to final size. Drill and countersink for four 4-40 flat head screws as shown.

Assemble eight Williams Brothers plastic "Wright J5" cylinders and valve rods. Install six full cylinders, using G.E. Silicone. Make sure surfaces are clean. Cut the other two as shown with a hot knife and install in the same manner. Prime the cowling with K&B primer and set aside to dry.

SHROUD

This is made from balsa, either a solid block or built up of 1/2 inch sheet. Cut to rough diameter, then turn in a lathe or hand drill to the shape and size shown. Carve inside to shape. Cut cooling holes as shown. The other cut-outs are for the carburetor and needle valve clearances. The mounting straps are cut from .015 aluminum. Bend to shape and install to shroud with 2-56 nuts and bolts. This assembly is now fitted to the fuselage with the engine in place. Transfer the strap holes to bulkhead No. 1. Drill bulkhead for 4-40 blind nuts and install nuts. The assembly is bolted to the bulkhead with 4-40 cap screws. Final sand and dope to smooth surface. Prime with K&B primer.

EXHAUST RING

That coffee can that has been kicking around needs some rework. Cut the top off, making a ring 9/16 wide. Make a clip and solder to the ring as shown. With the ring overlaying the front view of the engine assembly, cut nine stacks of 3/8 brass tubing, 1-1/2 inches long, at a 45° angle. File the tubes to match the arrows shown . . . the arrows represent the tube direction in the front view while the tube is sweeping 45° to the rear. Mark each one and its ring position, then set them aside. Bend the wire support . . . solder to the ring. Cut the ring as shown between the wire support. Set the engine in position on the mounts, set the ring around engine, slide cowl mounts in position. Note the ring fits in the slots in the mounts. Fasten engine and mounts with 6-32 bolts. Center the ring to the engine center line and mount with a sheet metal screw through the clip and into bulkhead No. 1. Solder the stacks in their positions. Install the cowl assembly. Mark the stacks flush with the outer surface of the cowl. Disassemble all parts from the plane. File or sand all stacks to the marks.

Install ring assembly and solder the clips and gun tubes as shown. Clean and paint dull black.

COWL MOUNT

Using the scrap from the fry pan bottom, make the supports. Mount the maple blocks as shown. Contour the blocks to fit the inside of the engine cowl assembly. With the engine and supports in place, slip cowl in place. Transfer the screw holes to the blocks. Drill and install 4-40 blind nuts. Use flathead 4-40 bolts to install the cowl assembly.

DETAILS

Make up the details shown; carburetor heater, wind screen, oil cooler, gunsight, lights, steps, arrest lug, aerial tripods and headrest.

Prime the carburetor heater (use the brass tube for the fuel tank overflow), steps, oil cooler, arrest lug, and tripods, and install. Paint the wind screen frame, gunsight, lights and headrest. Install these after all the painting is complete.

PAINT

The F9C-2s were very colorful. The upper surface of the top wing was orange yellow. The bottom of the top wing and the lower wing were silver. The fuselage, undercarriage, hook-on assembly and struts were gray on the blue black tails (1934). Prior to 1934 the fuselage, undercarriage, tail surfaces and hook-on assembly were gray. The rudder was striped as shown. The cowl, spats, fuselage band and the section leader's "V" were as follows: b/n 9056 red
9057 white
9058 blue
9059 black
9060 willow green
9061 lemon yellow
9264 unknown

The band and "V" were outlined with a black pin stripe. I used Pactra dopes on my F9C-2, however, epoxy finishes will work also. Apply two coats of clear dope and sand the rough edges of the silk. Apply two coats of K&B primer, sanding with 400 wet-or-dry in between. The fuselage, fin-rudder and stab-elevator were metal covered, so continue priming and sanding until all silk grain is gone. Paint as desired, mask (drafting tape only) for section leader color. Apply lettering and model numbers. I mainly used dry transfers by E-Z Letter Quik-stik, Westminster, Maryland 21157.

When all painting is completed, install the lights, wind screen, gunsight, head rest, radio aerial, rudder horn and cockpit capping (black plastic split tube).

FLYING

The Sparrow Hawk should come out at about 5 lbs plus. The heavy cowl and engine accessories should bring its balance to the position indicated. However, if not, balance as required. Check the engine and get a good idle and a smooth high speed. Fuel up and fly it. Hold full up and lead the plane . . . pull full throttle. As the plane accelerates, the tail will come up and in at least 1/3 lap, she should lift off. This plane is very steady even in the wind, the 60 gives it authority. Ease off on the throttle and let her descend . . . ease off more throttle . . . slowly start holding more up. Throttle to idle and you'll have a perfect landing. Holding full up now, taxi back to your flight box. Great!

The information about the Curtiss F9C-2 "Sparrow Hawks" was gathered from the following sources:

Air Classics, July 1971, "The Great Sky Ships."
American Aircraft Modeler, Feb. 1969, "Center Fold."
Air Classic's Quarterly Review, Fall 1974, page 34.
National Archives, Washington, D.C. 20409.
Aeromodeller, April 1967, #161 Curtiss F9C-2 Sparrow Hawk. •