BY **GERRY YARRISH** PHOTOS BY **GERRY YARRISH & SAL CALVAGNA**

The 1/4-scale Sopwith Camel has an accurate outline and simplified construction to speed building time.

Sopwith Camel

A classic 1/4-scale British icon of World War I

Viewed by many as the British airplane that best defined air combat during World War I, the Sopwith Camel is one of the best-known fighters to come out of the Great War. First introduced at the end of 1916, it was a replacement for the Sopwith Pup, and about 5,500 Camels were produced. Perhaps the most famous Sopwith Camel pilot of all was Canadian Captain Arthur Roy Brown, who was credited with shooting down Manfred von Richthofen, the Red Baron. Controversy over this continues today and was one of the reasons I chose the Camel as a building project.

I wanted a semiscale model with the strength and building ease of a sport flyer, so I started with Wylam drawings and used CAD to simplify most of the structures. I also replaced the thin, undercambered airfoil with a more pilot-friendly flat-bottom wing. If you've built a kit or two, you'll have little trouble with the Camel.

CONSTRUCTION

Everything can be easily made with basic shop tools, but to save time, there is also a laser-cut wood kit available from Arizona Model Aircrafters. The wheels and machine guns are from Williams Brothers, and the custom pilot bust is the work of Lyle Vasser of Best Pilots. The 20-ounce RotoFlow fuel tank is from JL Products, fitted with Tygon fuel tubing from Nick Ziroli Plans. The 10.5-inch radial-engine cowl is available from Fiberglass Specialties, but it does have to be cut down a bit in length. The lower wing panels plug into place over an aluminum wing tube from TnT Landing Gear Products. I designed the Camel around the Zenoah G-38 gas engine, but the engine you choose will determine the placement of the firewall.

The bottom aileron servos are installed in the wing panels and 2-56 slave rods connect the bottom ailerons to the top ones. The entire cockpit and machine-gun hump section comes off in one piece to provide access to the radio and the fuel tank. It's held in place with rare-earth magnets. The engine cowl is also secured with several large magnets, and two sheet-metal screws prevent the cowl from shifting while flying.

TAIL SURFACES

The tail feathers are built directly over the plans. The tips are cut from sheet balsa and are shimmed up to center them with the leading and trailing edges. The center section is made with an upper layer of 1/4-inch balsa glued onto a 1/8-inch

SPECIFICATIONS

Model: Sopwith Camel
Scale: 25% (1/4-scale)
Wingspan: 84 in. (top and bottom)
Wing Area: 1,073.39 sq. in. (top); 1,015.07 sq. in. (bottom); 2,088.46 sq. in. (total)
Weight: 20 to 25 lb.
Wing loading: 22.06 oz./sq. ft. @ 20 lb.
Length: 56 in.
Engine req'd: 30 to 40cc gasoline
Radio req'd: 4-channel (rudder, throttle, aileron, elevator)

Gerry poses with his Camel after a successful flight at the Long Island Skyhawks' Dawn Patrol event.

lite-ply base. This allows the four 4-40 bolts holding the tail to the fuselage to sit flush with the top surface. Standard Du-Bro pinned hinges are used throughout. The vertical fin is held in place by two 2-56 screws and blind nuts in the fin's bottom rib. The rudder's bottom hinge uses a removable pin so that the entire tail assembly can be removed in one assembly.

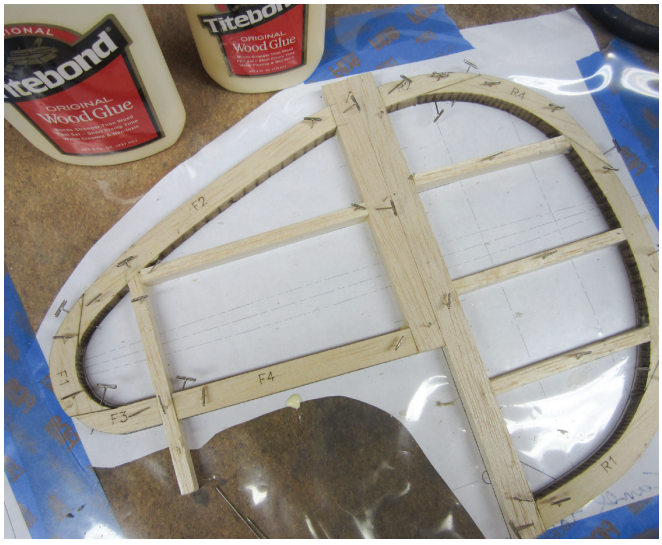
FUSELAGE

Made with four lite-ply sides, the fuselage has balsa longerons in the corners. The wing-saddle doublers, vertical members, firewall supports, and the forward formers are all glued in place before joining the sides together. The top and bottom pieces fit between the sides and are flush with the upper and lower edges. Lightly tack-glue the parts together, using rubber bands to hold the assembly together. Install the aft formers, check the alignment, then permanently glue all the joints. I use Zap CA glue and Z-Poxy throughout. Glue the top aft formers and the stringers in place between the cockpit and the horizontal stabilizer.

The muffler opening is not shown on the plans as you'll have to determine its size and location from your own engine. The top forward section of the fuselage (below the hatch) has four holes for the cabane-strut wires. You will need to drill down through the upper longerons to fit the cabane wires against the inner surface of the sides. Build the removable hatch section on top of the fuselage. Tack-glue the lite-ply base in position, then glue the top formers to it. Sheet the structure with balsa and thin plywood, then remove it and install the retainer magnets. Wood tabs and screws can also be used to secure the hatch. Add the fuselage side formers and stringers, then sheet with 1/8-inch balsa. The sheeting should end just above the bottom wings, so leave it a bit oversize and trim to shape using a wing rib as a guide.

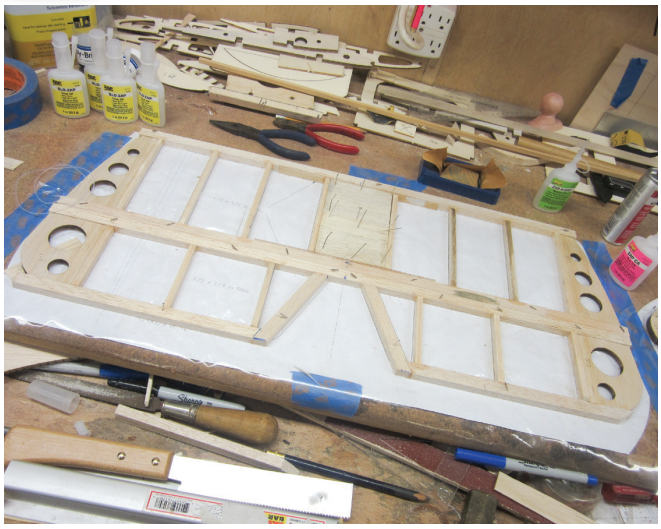
BOTTOM WING PANELS

Build each wing panel directly over the plans. Pin the bottom spars and the trailing edge (TE) sheeting in place, then glue the ribs into place. Glue the top spar into place, then fit and glue the leading edge (LE) dowel in place. Glue the half ribs between the main ribs, then add the aileron subspar strip and LE pieces, lightly tack-gluing



The fin and rudder are shown here pinned to the workbench.

The center of the horizontal stabilizer is a sandwich of balsa and plywood sheeting.



Shown here is the completed stab and elevator assembly.

Firewall, front formers, and the wing-saddle doubler are glued into place before joining the fuselage sides together.

them together. Add the aileron ribs, then fit the wing-tip parts into place. Glue the top TE strip onto the TE sheeting, trim the TE assembly to fit the wing tip, then glue everything together. Cut the ailerons free just before covering the wings.

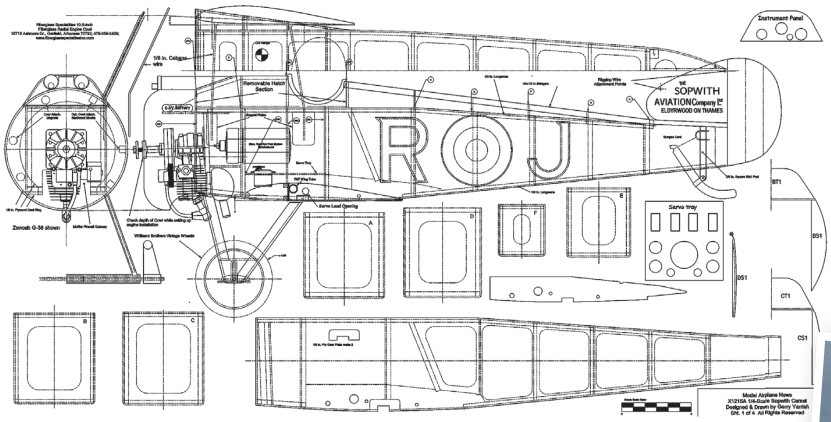
TOP WING

Build the top wing halves over the plans, then join them together. Laminate the center cutout bow from balsa strips, and glue it into place. Use a razor saw to cut a 1/8-inch-wide section out of the ribs just in front of and behind the main spars, and epoxy the plywood center braces into place with 30-minute Z-Poxy. Clamp the panels and braces together until the epoxy cures. Add the vertical-grain balsa sheer webbing to the front and rear of the main spars, then frame out the center window with lite-ply.

CABANE STRUTS

A wing-alignment jig is shown on the plans. Glue it together, and tack-glue it to the fuselage where the hatch cover fits. Once the plywood attachment plates and blind nuts have been installed in the top wing, center the wing and tack-glue it to the jig.

Bend the cabane wires to shape, and slip the bottoms into the four fuselage holes. Attach the solder lugs to the wing with 6-32 cap-head screws, and bend the barrel sections down. Cut the wires to length, and slip them into the lug fittings. Fit all four cabane wires into place, then use scrap lite-ply and Z-Poxy to capture the bottom ends against the inside of the fuselage sides. Measure the distance from each wing tip to the tail post, adjust until the distances are equal, then solder the cabane wires into the fittings. Let everything cool off, then add the 1/16-inch X-brace wires and solder them. Remove the wing, discard the jig, and clean all

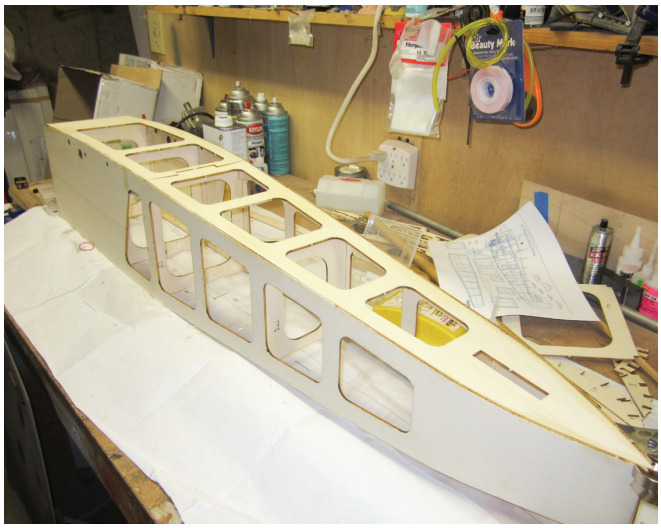


Sopwith Camel | **X1215A**

Designed by Gerry Yarrish, this 1/4-scale WW I biplane has the looks of the classic British dogfighter and the heart of a sport flyer. It is CAD-designed, and laser-cut parts are available. Easy to build, the Camel has a one-piece top wing and plug-in lower wing panels. Complete building details are available at ModelAirplane News.com/camel1.

WS: 84 in.; L: 57 in.; power: Zenoah G-38; LD: 2; 4 sheets; $29.95

To order the full-size plan, visit AirAgeStore.com



Here is the basic fuselage box structure glued together.

The lower wing panels have the cardboard tubes to mate with the aluminum wing tube that runs through the fuselage.

the flux from the solder joints to prevent corrosion.

The interplane struts are made from 3/4-inch x 1/4-inch bass wood strips with slots cut into the ends that slip over brass attachment L-brackets. Drill small holes in the long end of the brackets so that they can be secured in place with 15-minute Z-Poxy. For the wings' flying and landing wires, I used easy-to-install brass brackets, Sullivan steel clevises, Du-Bro threaded rigging couplers, and braided 0.030-inch steel fishing leader. For details, go to ModelAirplaneNews.com/rigging.

LANDING GEAR

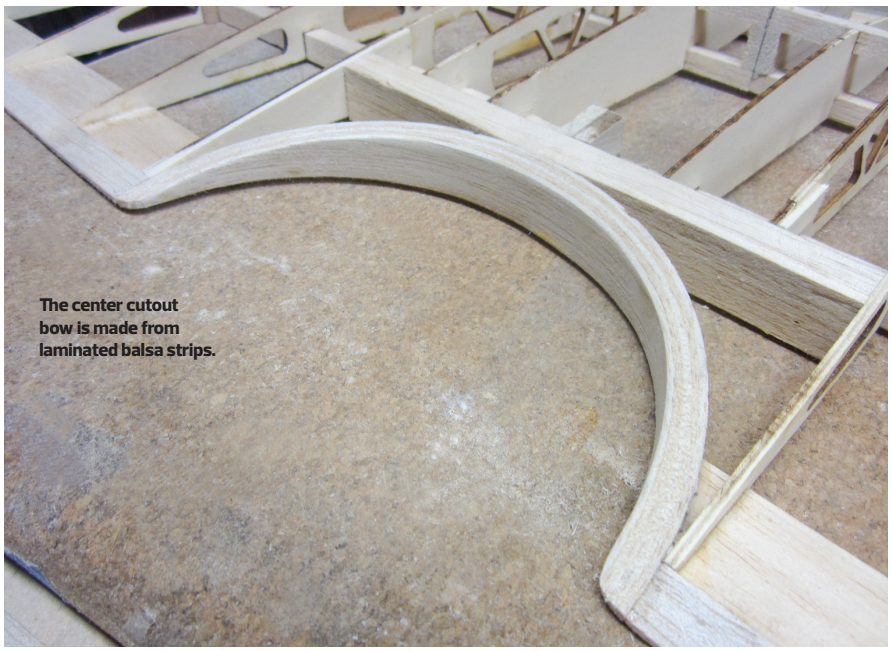
The landing gear struts are formed using music wire soldered together and covered with bass wood strips. The three-section axle provides the travel for the suspension's bungee shock cords. The tailskid also uses bungee shock cords. A complete "How To" article for the landing gear was published in the September 2015 issue of *Model Airplane News*.

COVERING AND FINISH

Covered with Scale Stits fabric, the Camel is finished with Poly-Tone paint from F&M Enterprises. The covering and painting process is shown in my online *MAN* Build-Along series. I used vinyl markings from Red5 Designs, and the smaller "Petrol Tank" and "Lift Here" decals were made by Cal-Grafx. The top and side plywood panels were glued in place with Dap heavy-duty contact cement, while the front metal panels (made out of 0.015-inch FTE G-10 fiberglass sheets) were glued and screwed into place. I used rubber automotive vacuum hose for the cockpit coaming.

GEAR USED

Radio: JR XG14 transmitter with JR 821HV servos (jramericas.com); 6.6VA123 NoBS receiver battery (hangtimes.com)
Engine and muffler: Zenoah G-38 (horizonhobby.com)
Propeller: Xoar 18 x 8 and 20 x 8 (falconprops.com)
Fuel tank: RotoFlow (jlproducts.net)
Cowl: 10.5 in. Fiberglass Specialties (fiberglassspecialtiesinc.com)
Machine guns and wheels: Williams Brothers 1/4-scale Vickers, Vintage 6 5/8 in. (williamsbrothersmodel products.com)
Pilot figure: Best Pilots 1/4-scale (bestpilots.typepad.com)
Wing tube: TnT 5/8 in. dia. (tntlandinggear.com)
G-10 fiberglass sheets: FTE (franktiano.com)
Finish: Scale Stits covering and paint (stits.com)
Markings: Red5 Designs (red5designs.com)
Decals: Cal-Grafx (cal-grafx.com)
Laser-cut parts: Arizona Model Aircrafters (arizonamodels.com)
3-axis stabilization system: Bavarian Demon Cortex (demonaero.com)
Control Horns: Robart Mfg. (robart.com)



The center cutout bow is made from laminated balsa strips.

The aileron servos are installed under flush-fitting hatch covers. I used 4-40 hardware for all linkages. I used Robart control horns throughout.

I used miniature clevis ends for the tail-surface rigging wires.

IN THE AIR

The Zenoah G-38 powers the Camel nicely. The original Xoar 18 x 8 WW I Scimitar propeller from Falcon Propellers provided good climb performance, but I switched to a 20 x 8 prop to better load the engine. Smooth application of throttle is a must, but the smallish rudder does a good job of keeping the Camel tracking straight.

My radio gear is a JR XG14 transmitter, JR RG731BX 7-channel receiver, and six JR 821HV servos. The four ailerons provide positive roll rate, and turns are improved with some rudder input. Pitch control is not overly sensitive, but proper balance is important. The center of gravity is shown on the plans.

Landings are fairly easy for a WW I biplane with a fixed tailskid. Keep the throttle above 1/4 power, and fly a shallow approach angle. Line up with the runway, and when you're about a wingspan above the ground, start applying up-elevator to level off and begin your flare. Try to touch down in between a wheel landing and a full three-pointer. Like most WW I airplanes, if you land tail-high, the Camel can nose over. A low, reliable idle is a must. Once the wheels are on the ground, pull throttle to idle and use rudder to keep it straight. A little toe-in on the wheels helps prevent ground loops.

BOTTOM LINE

I'm very pleased how the Sopwith Camel turned out, and I am sure that you'll find it easy to build and fly. To see the entire building project, check out my Build-Along series at ModelAirplaneNews.com/camel1. Remember to keep the tail light.

Hold in some up-elevator as the Camel likes to land slightly nose high. If you wheel-land it with the tail high, it will want to nose over. Ground handling is good considering it is a WW I biplane with a fixed tailskid.