Sopwith Camel 1/9 Scale 39.2″

R/C Scale Model Instructions

CONTACT INFORMATION
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Sopwith Camel 1/9th Scale

Thank you for purchasing the 1/9th Scale Sopwith Camel model for electric flight.

THE MODEL

The 1/9th Scale Sopwith Camel, this model is designed to be easy to build and exciting to fly.

Model Specifications

More than 350 laser cut parts

Scale:	1/9
Prop:	10x6
Channels:	R/E/A/T
Wheels:	Balsa & plywood, Neoprene foam tires
Wingspan:	39.2"
Airfoil Type:	Flat bottomed
Wing Area:	460 sq in
Cowl:	Built up balsa and plywood
Weight:	~28 oz ready to fly
Power System:	AXI 2217/20
Designer:	M.K. Bengtson

BUILDING THE MODEL

Before Starting

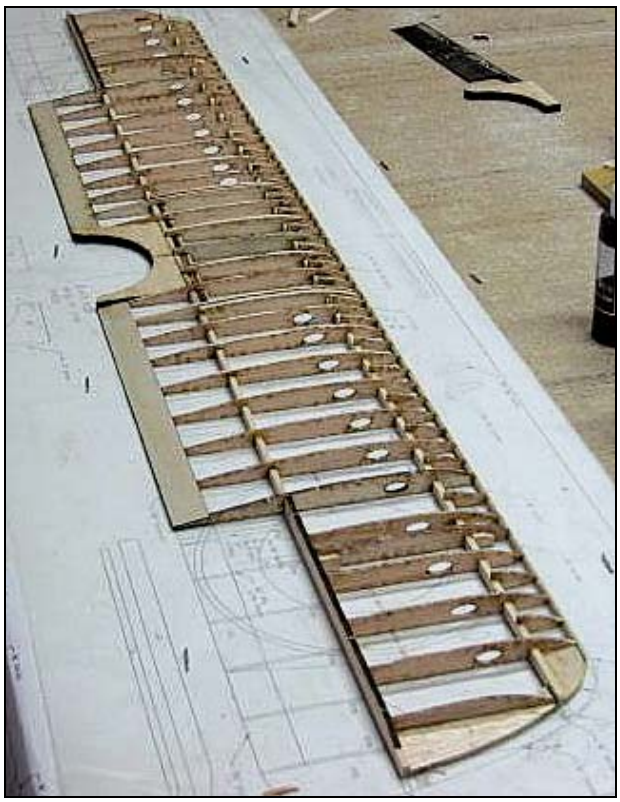
A note about the photos: The photos were taken of a prototype and the parts supplied may look slightly different from them. However, the concepts illustrated are the same.

The Sopwith Camel prototypes were built by Sam Leonard and Tim Kwasny. The following is a compilation of techniques from them and other builds. AerodromeRC appreciates the contributions of these two builders.

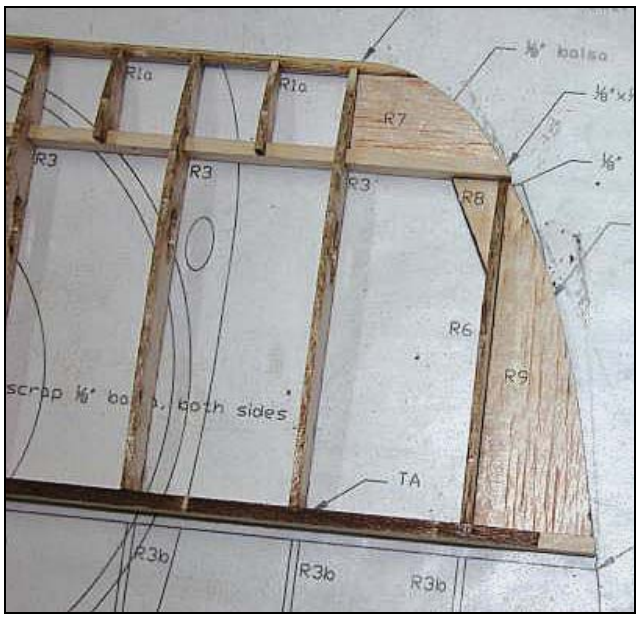
WINGS

Build the top wing in one piece. Note that the trailing edges are 1/32″ plywood and are supplied in the kit. The leading edges are 1/8″ diameter wood dowels. Mini ribs are also included. Put small scrap pieces of 1/8″ balsa on the notches in the ribs that accept the IP struts to serve as reinforcements and as a base for covering later.

Build the ailerons and sand the leading edge to shape. Choose a rounded shape for center hinging or a bevelled shape for top hinging.



Here is the wing tip.

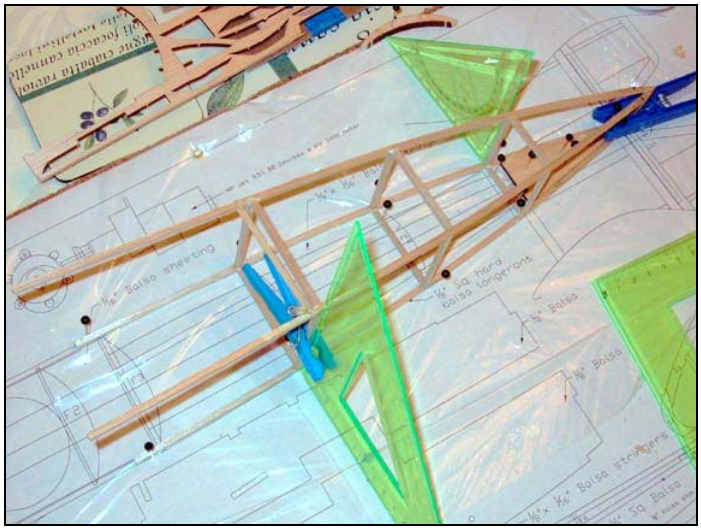


Aileron servos are attached with short threaded rods to the ailerons. Aileron servos are fit in servo compartments located in the lower wings with the supplied 1/32″ plywood servo covers. Route servo wires through holes in lower wing ribs. Use a "Y" wiring harness connector to wire the servos to a single radio connection. Alternatively, two RC channels can be used when mixed electronically. If differential aileron throws are desired, rotate each servo horn forward about 20 degrees, while maintaining the neutral position of the aileron. This should counter any adverse aileron yaw.

FUSELAGE CONSTRUCTION

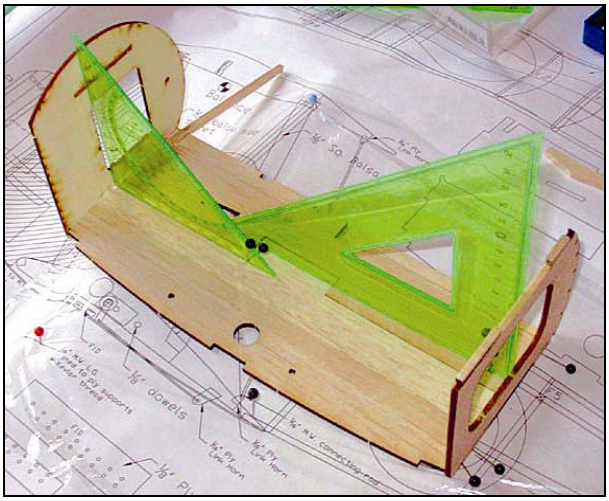
The fuselage is built as two separate box structures, the front sheet area and the rear built up section, which are then joined over the plan. This system not only keeps each stage simple, but it also helps to ensure a straight fuselage. Some modelers prefer to build each side completely on the plan and then join both halves over the top view. Both systems have their advantages and drawbacks. The following is the front/back method.

Begin by building two rear fuselage frames over the plan and allow to dry. Select hard balsa or laminated balsa for the longerons. Add diagonals for a rigid structure. Repeat with the other side. Some builders build the second side over the first to insure they match perfectly. Be sure to use wax paper or Saran Wrap between these or you'll not be able to get them apart. Join the sides over the top view of the plan and add the cross members and tail skid mount. Check and check again to insure that the structure is square and straight or you will end up with a banana fuselage. Finally add the wedge shaped horizontal stabilizer supports. Wait until the front fuselage is joined to add the turtle deck formers and stringers.



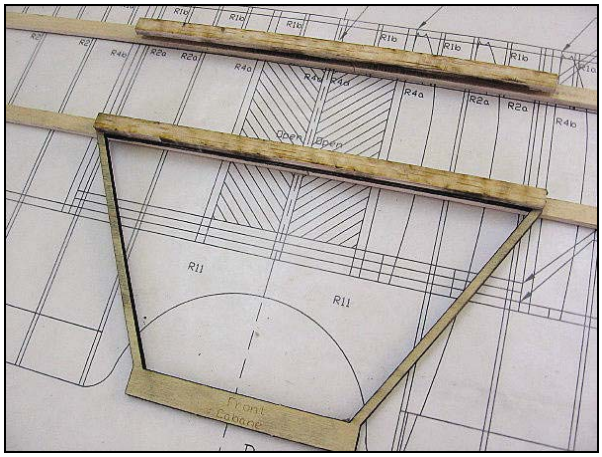
Build the front half and decking

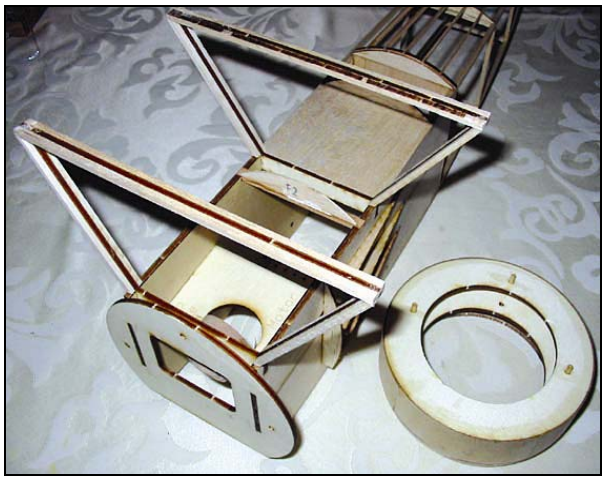
Lay the front sides on the plan and glue them together. The alignment notch insures that they mate properly. On the outside surfaces glue the 1/32″ plywood doublers. Use a heavy weight and slow setting glue like epoxy. If water based glue is used, warping may occur so allow the glue to dry under the weight. Join the sides with the front F1 and back F5 formers and 1/8″ ply undercarriage mount cross members. Add the decking and top formers, and carefully trim to size and fit 1/16″ sheeting. The side cheeks can be added after the front and back of the fuselage are joined. Small pieces of 1/8″ balsa are added next to the cabane struts before covering. The machine gun area or the Camel's Hump is made from laminated laser cut 1/4″ balsa sections J1 through J5. Glue them together as shown on the plan and sand to a nice smooth shape.

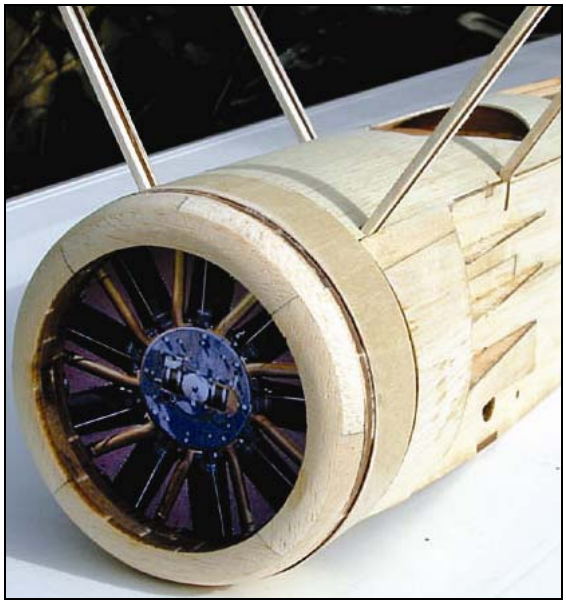


Cabane Struts

The cabane struts are fashioned using balsa fairings on laser cut 1/8″ thick plywood formers. The formers are designed to make alignment of the top wing easy. The top of the cabanes form a bar that fits into slots in the wing. Balsa, bass or scrap plywood can be used to fair the cabanes.



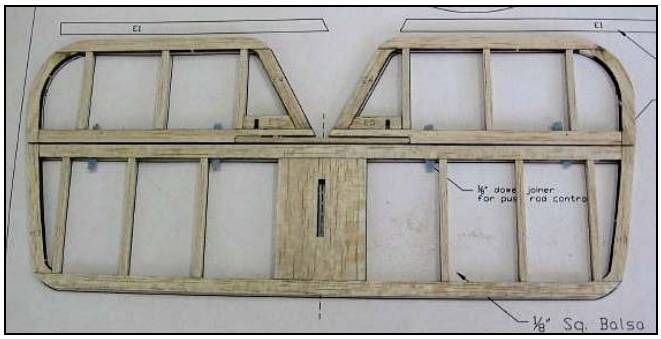




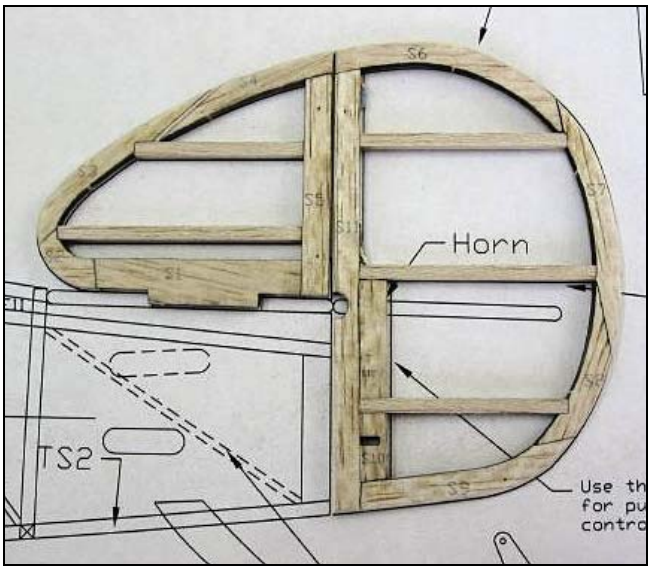
TAIL SURFACES

Lay out and glue parts of the tail surfaces on the plans.

Elevator and horizontal stabilizer

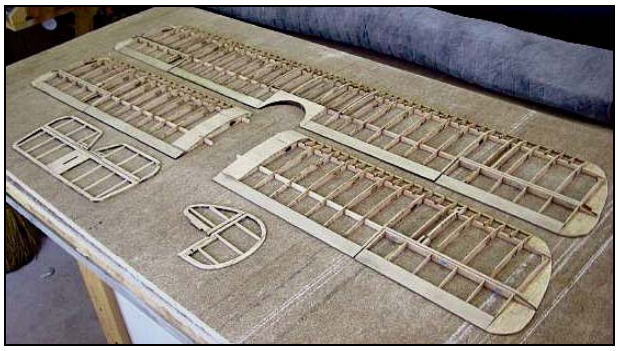


Rudder and vertical stabilizer



Sand the tail parts, rounding off all edges. Don't add the horns or hinge the surfaces until after covering is complete.

Wings and tail feathers.



LANDING GEAR

The landing gear are fashioned from CA hardened 1/8″ plywood. Sand, soak with thin CA and then, securely, epoxy the gear to the model. 0.045″ music wire is used to reinforce the gear. Use Kevlar thread or strong carpet thread and secure the wire along the gear. CA in place. A shock absorbing mechanism has been designed to let the model have a little give when landing. Attach the 3/32″ music wire axle to the topside of the LG cross member with Kevlar thread and epoxy in place. Small holes are placed in this part to facilitate the lacing of this thread. Add short pieces of 1/8″ brass tubing as bearings/spacers for the wheels. Use rubber bands to act as shock absorbers but make each side exactly as the opposite site. Otherwise, the shock resistance is unequal and your model will cant to one side on every landing. Adding Kevlar cross rigging will dramatically strengthen the landing gear.

COVERING

Any lightweight covering material can be used. Polyspan with dope or Minwax Polycrylic makes a good choice, Litespan is also popular.

Decal outlines for this model are available on www.aerodromerc.com/decals in Adobe Acrobat pdf format for printing out on decal paper.

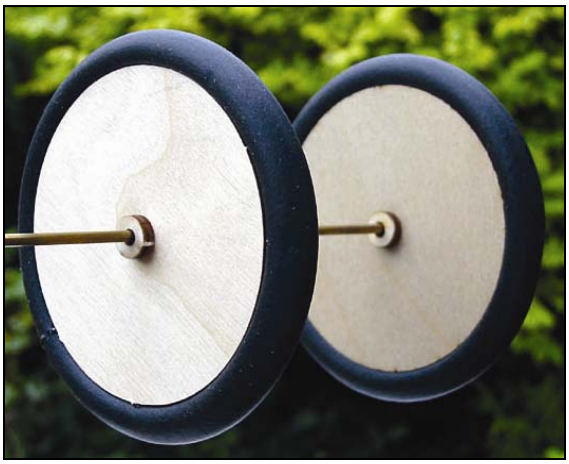
Windsock Datafile "Sopwith Camel "publication has details on placement and markings.

Available at: http://www.byrdaviationbooks.com/

WHEELS

Gluing the ply sides on the 3/8″ balsa core makes the basis for the wheels. Use the brass hub for alignment. Epoxy the hubs in place and add a sufficient amount of epoxy around the base of the hub to reinforce the connection of the hub to the ply. Plywood reinforcing hubs are provided that are to slip over the brass tubing as shown. Next, CA glue the neoprene cording together to from a "tire". Use thin CA sparingly as the CA bonds very aggressively to the rubber. Press the CA wetted ends together for an instant bond. The best way to align the ends is to glue them while they are in place on the wheel. Then attach the tires to the wheels and CA in place. A thin bead of CA around the rim makes for a secure tire.

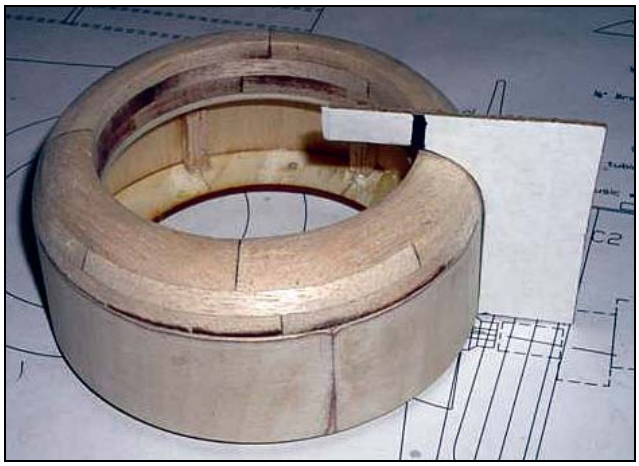
Paper cones are cut out. Use a ball point pen to score each line on the back to make an impression of "spokes". It is helpful to do this operation on a paper tablet so that the pen makes a good crease. Fold the paper along the crease lines to exaggerate the raised lines. One of the sections forming a wedge is cut out. Make cuts to the center of the circle along a pair of the spokes. Close the paper cutout to form a cone and tape the joint inside the cone.



The inside cones may now be attached to the wheels. The outside cones may be attached at this point if wheel collars are to be used. Alternatively, after installing the wheels on the landing gear, a washer may be soldered to hold the wheel in place and then the cone is attached. This method makes a very nice scale appearance.

COWLING

The cowling is of built up construction using C1 and C2. Construct front cowl ring by gluing 2 C1's making sure that they are overlapping completely. Make a cardboard template from the plan as a guide for sanding the balsa into shape.



The cowl should now be sealed, sanded and primed until no wood grain is left showing. Baby (Talcum) powder in clear dope makes an excellent balsa sealer. Talcum powder mixed in white glue makes excellent filler for gaps or gouges. Sand down after it dries.

Fitting Tail Surfaces

Attach the rudder to the vertical stabilizer using 1/8″ strips of CA hinges. Similarly, attach the elevator to the horizontal stabilizer. Glue the horizontal stab/elevator assembly onto the fuselage. Then glue the vertical stabilizer and rudder assembly into the slot in the horizontal stabilizer. Since the Camel has a very short nose, pull pull tail surface controls are mandatory.

Aileron Servos

After assembly, connect top ailerons to bottom ailerons with 1/16″ music wire pushrods. Connect them to the small 1/16″ plywood control horns fitted in the top of the bottom aileron and the bottom of the top aileron.

Fitting the Rigging Wires

Use strong thread or Kevlar® fishing line or elastic beading cording to simulate rigging wires. Use small screws, fishing hook eyes, straight pinheads or small eyelets to attach the lines. These "wires" can add a degree of strength to your model.

Battery hatch

Fashion a battery hatch from 1/32″ plywood

Balancing the Model

Balance the model at the point shown. Choosing a larger battery is preferred to adding lead.

Here is Tim Kwasney's in the bones shot of the Camel.

And a front view

FLYING

Here is an excerpt of Tim's maiden:

"Well after much delay and frustration I finally had the maiden flight of the Camel this morning. I am very happy to report that it is no longer an organized pile of balsa wood, it is an airplane. Its final all up weight came in about 36 oz. with having to add about 6 oz of lead to the nose. I am using the AXI 2808/20 with 3cell LiPo's and 8X5 prop. I should probably use a 10" prop but I was worried about overheating the motor. The plane flew very well but seemed like it could use a little more power so I will try the 10X4 prop I started with and see if there is any problems with heat. There was a light breeze and it handled the wind fine. "

AND

"Take off was nice and smooth, the plane tracked straight and true on the ground and was airborne in about 30 ft. at ¾ throttle. I climbed out at about 20 degrees until about two mistakes up and then did a couple of turns around the field. The plane flew nice and stable and the turns were smooth without any adverse yaw. I needed just a little up elevator trim and it was flying pretty much hands off. Like I said in my earlier post I felt it was a little under powered because it seemed to struggle a little heeded into the wind up at the higher altitude. I tested the stall and it dropped its nose a little faster than I expected but recovery was a piece of cake. I think I will take a little of the weight out of the nose on my next flight and see how it dose. There was no sign of dropping a wing. I did a few landing approaches before I got it lined up and then brought it in with about ¼ throttle, I cut throttle at about 4 ft. and let it settle in. I need to secure the battery better because I bounce a little on the landing and the battery popped out and caught under the wheel and caused the plane to nose over. No damage except for a little scrape on the cowl."

The model should ROG on grass, pavement or hard surfaces. The model may require coordinated turns using both ailerons and rudder control. This is due to adverse yaw. Halving the aileron down throw may reduce the yaw. This effect can be accomplished by rotating the control arm of the aileron servo forward about 20 degrees.

Let the model gain altitude slowly off the runway. Applying too much up elevator at slow speeds risks a stall. Make your turns gently as tight turns risk tip stalling in any model. Don't expect the elevator to make the model climb. Think of the elevator as a device to change the attitude of the model. The wing and airspeed ultimately make the model climb. Often down elevator applied at stalling can avoid a major crash. The most important details for proper flight operations are:

- CG location. Tail heavy models never fly well or at all.
- Down and right thrust
- Straight and non warped wings

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