Sopwith Pup 40″ 1/8th Scale

R/C Scale Model Instructions

CONTACT INFORMATION

The Sopwith Pup was designed by
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Prototype by Chris Goodchild

Manufactured and Distributed by:

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Web Site: www.aerodromerc.com

Sopwith Pup

Thank you for purchasing the 1/8th scale Sopwith Pup model for electric flight.

THE MODEL

A semi scale adaptation of the Sopwith Pup, this model is designed to be easy to build and exciting to fly.

Sopwith Pup Finished Model

Model Specifications

Scale:	1/8
Channels:	R/E/A/T
Wingspan:	40"
Wing Area:	550 sq in
Weight:	30 oz ready to fly
Power System:	AXI 2217/20
Prop:	10x7
Wheels:	Balsa & plywood, Neoprene foam tires
Airfoil Type:	Flat bottomed
Cowl:	Built up balsa and plywood
Covering:	Litespan or Polyspan
Decals:	Available on the website

BUILDING THE MODEL

Before Starting

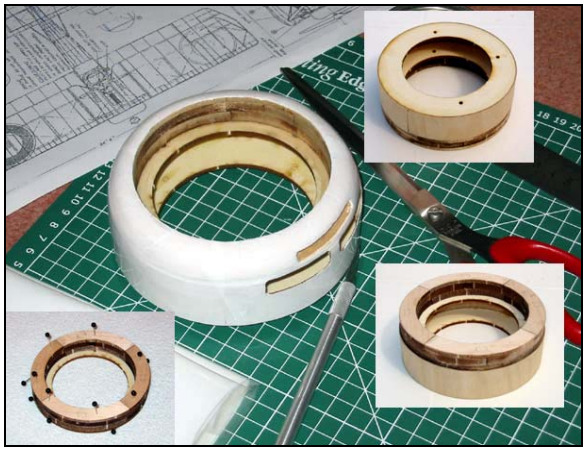
A note about the photos: The photos were taken of an earlier version prototype and the parts supplied may look slightly different from them. Also the model has been upgraded to include a dummy motor to house a brushless outrunner. However, the concepts illustrated are the same.

COWLING

The cowling is of built up construction using C1 and C2.

Assemble the Cowling

Construct front cowl ring by wrapping C1's with 1/32" thick plywood. The grain in the plywood should be parallel to the short axis. To reduce weight, the inner C1 may be shaved or sanded down after cowl construction is finished. Align the inside of the parts for proper construction. Glue two C2s in three pairs and laminate together. Then glue them to the previously assembled C1s and plywood. Sand the C2 balsa to shape.



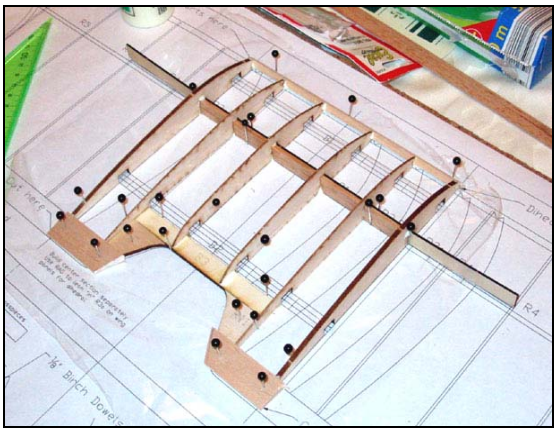
Cowl Assembly Detail

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 filler after it has dried.

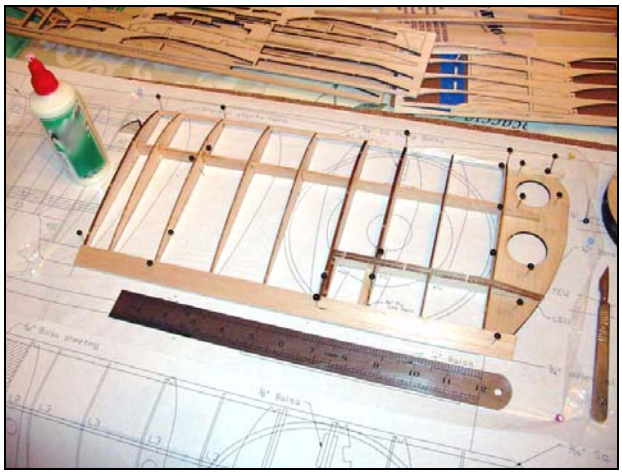
WINGS

Wing Construction

Pin down, over the plan, the t/e, spars and wing tip, gluing as required.



Top Wing Center Section



Top Right Wing Panel

Bottom Left Wing

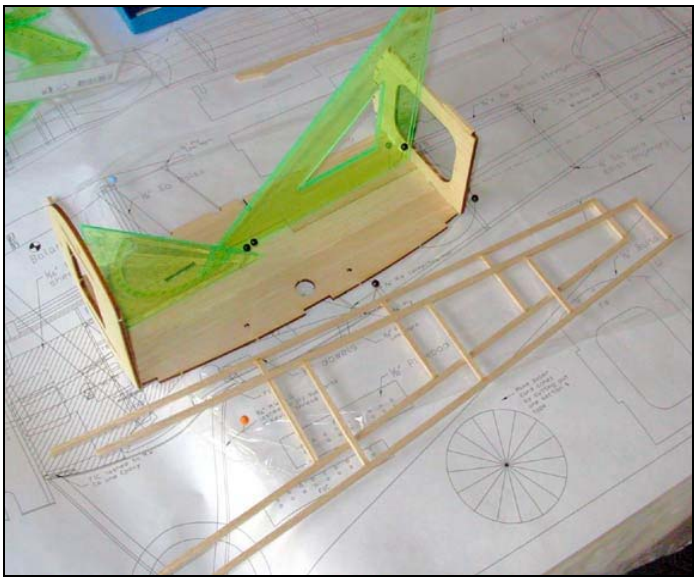
Add the wing tips and align the front tip along the center of the leading edge. Sand the leading edge stock to be rounded and meet the ribs.
The leading edge of the aileron is rounded over with sandpaper to make the aileron movable with a minimum gap. The trailing edge of the wing in that section is left flat.

FUSELAGE CONSTRUCTION

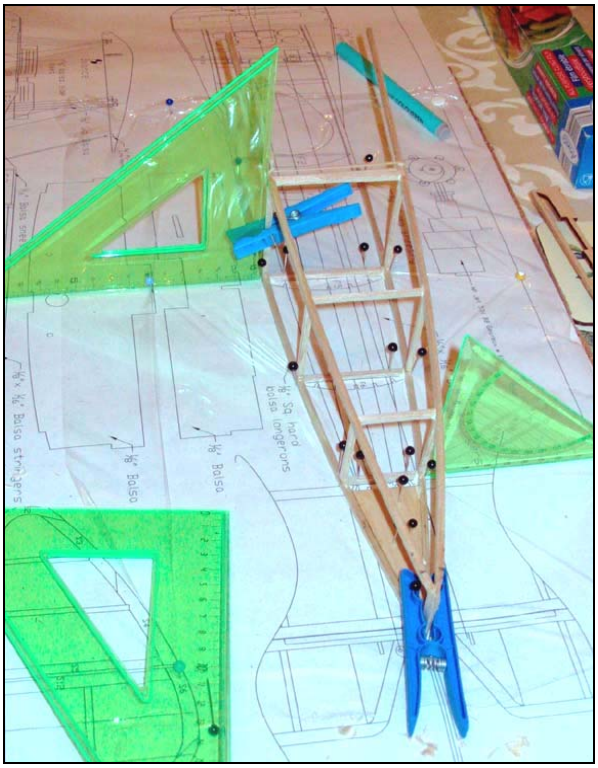
The fuselage is built as two separate box structures, the front sheet area and the rear built up section, which are then joined over the plan. This system not only keeps each stage simple, but it also helps to ensure a straight fuselage.

Building the Aft Section of the Fuselage

Begin by building two rear fuselage frames over the plan. Select hard balsa or laminated balsa for the longerons.



Build the Two Rear Fuselage Frames Over the Plan

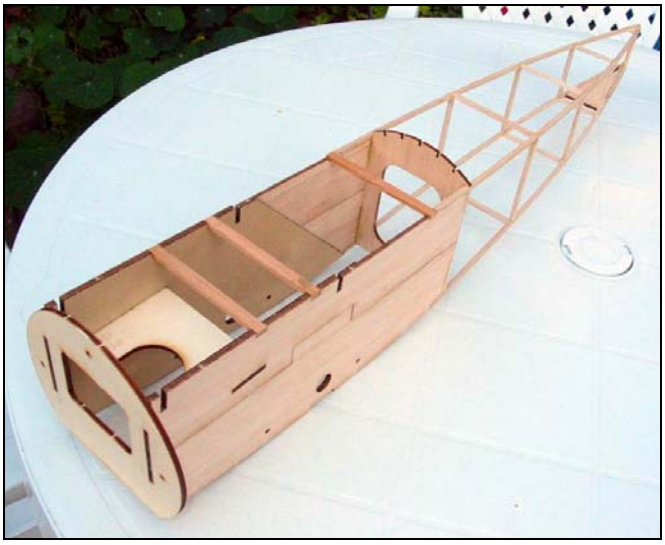


Join the Two Frames over the Plan

Join the two frames over the plan with cross braces and the tail skid mount. Check, check and check again that this and ALL other structures remain perfectly straight and square.

Building the Front Section of the Fuselage

Front Box Detail

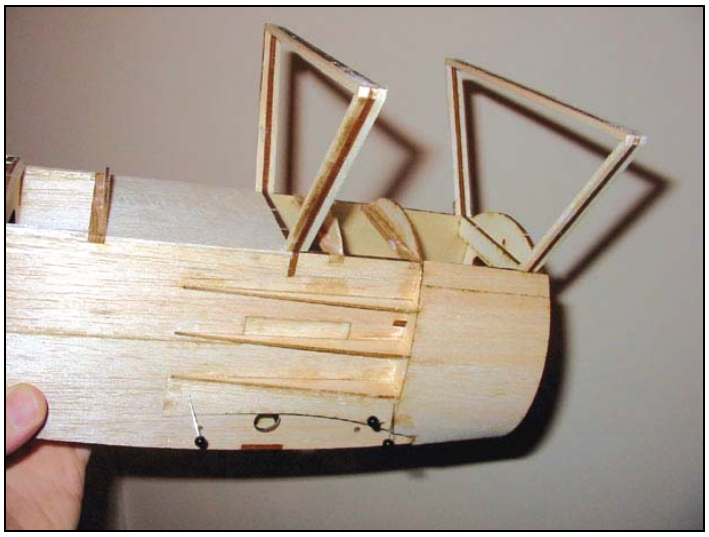


Basic Frame Complete

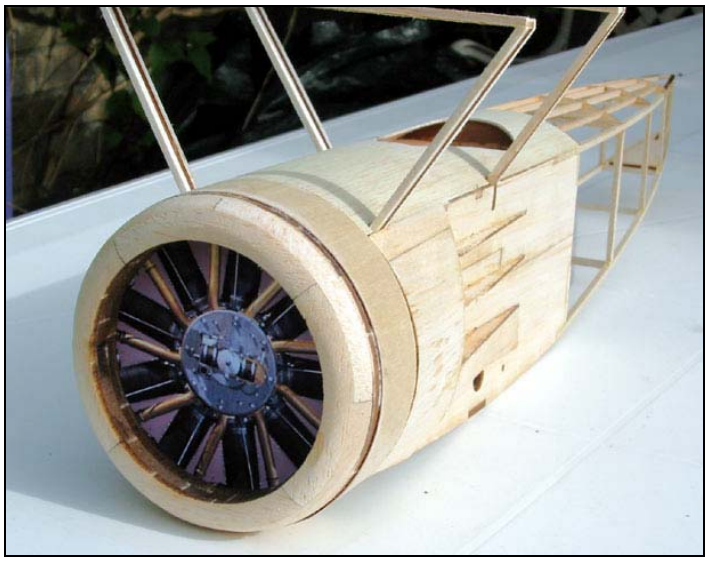
The front box is made from 1/8″ balsa sides reinforced by an internal 1/32″ plywood doubler.

Adding the Decking

Add all the decking and formers, and carefully trim to size and fit 1/16″ sheeting. Small pieces of 1/8″ balsa are added next to the cabane struts before covering.



Fuselage Side Fairings



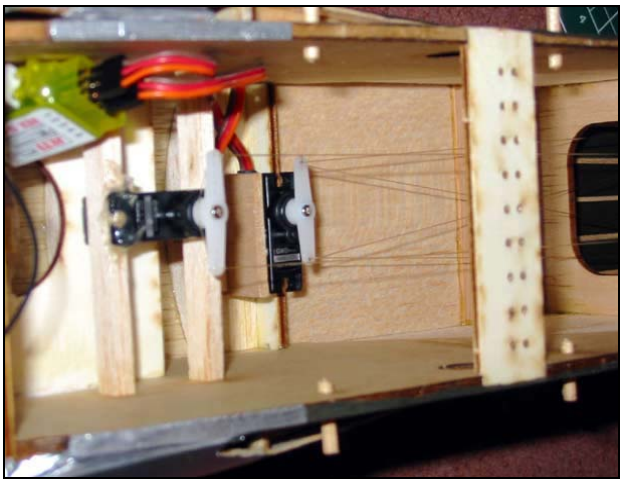
Decking Detail

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 forms a bar that fits into slots in the wing. Balsa, bass or scrap plywood can be used to fair the cabanes.

Adding the Undercarriage Mounts

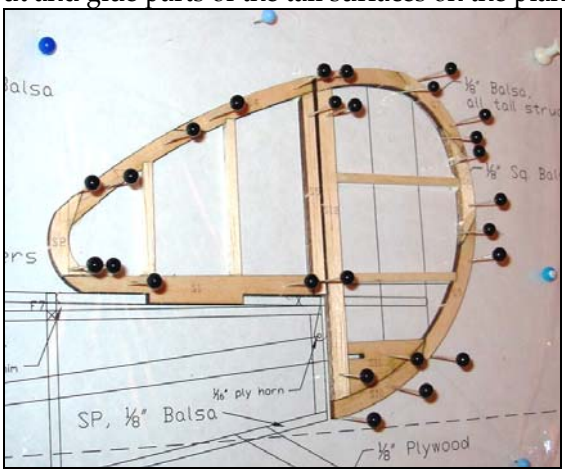
The undercarriage is mounted using Kevlar™ thread and epoxy. Laser cut plywood undercarriage mounts are glued into the bottom of the fuselage.



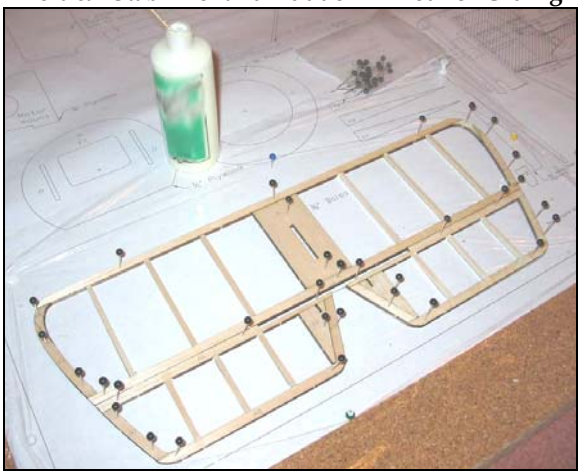
Undercarriage Detail

TAIL SURFACES

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



Vertical Stabilizer and Rudder Pinned for Gluing



Elevator and Horizontal Stabilizer Pinned for Gluing

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

LANDING GEAR

The landing gear is 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. Use Kevlar™ thread or strong carpet thread and secure the wire along the gear. CA glue in place. Adding Kevlar™ cross rigging will dramatically strengthen the landing gear.

Completed Undercarriage

COVERING

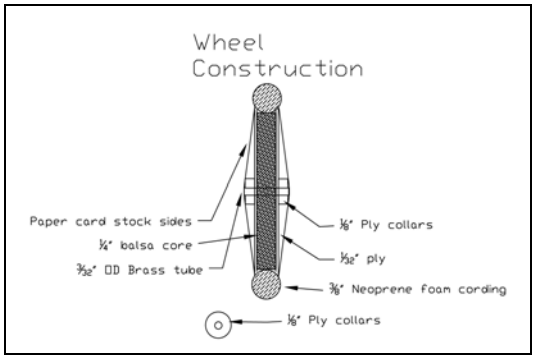
Any lightweight covering material can be used. Polyspan with dope or Minwax Polycrylic make a good choice. Litespan is also popular.

Covering the Tail Feathers

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

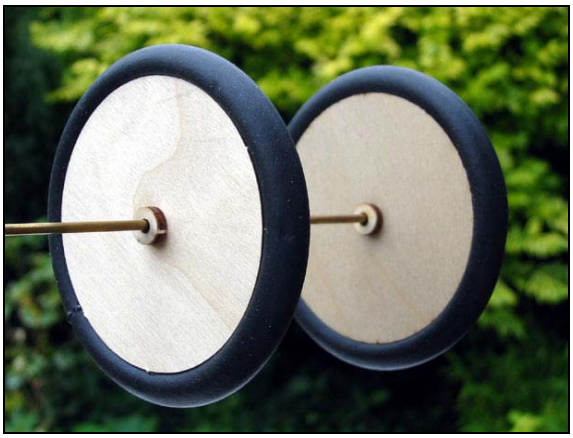
WHEELS

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.



Wheel Construction Detail

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.



Wheel Assembly Detail

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.

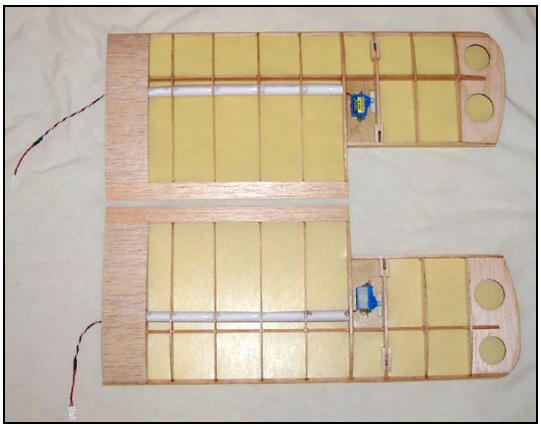
INSTALLING THE RADIO CONTROL GEAR

Servo Bay

Get the R/C gear fitted at this stage, and also the motor.

Aileron Servos

Aileron servos are mounted in wing and attached with short threaded rods to the ailerons. 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.



Aileron Servos are mounted in Wing

Battery Tray

After all the above has been placed, mount the battery tray made from 1/8″ balsa and use the battery position to balance the model as shown on the plan.

ASSEMBLY

Fitting Tail Surfaces

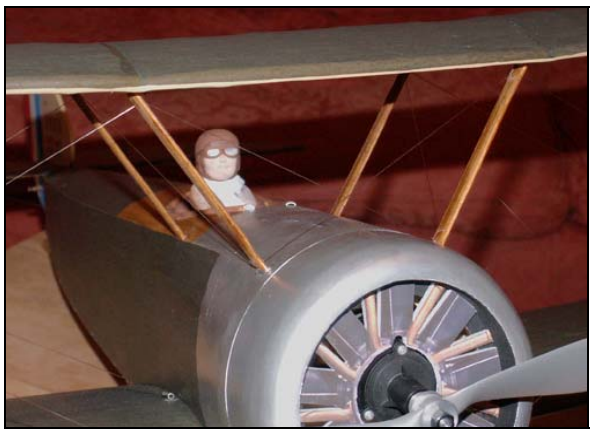
Attach the rudder to the vertical stabilizer using 1/8″ strips of CA hinges. Similarly, attach the elevator to the

horizontal stabilizer. Glue the horizontal stab/elevator assembly onto the fuselage. If using pushrods, slip the elevator control horn onto the wire pushrod end and, with the servo and the elevator centered, glue the horn into the slot. Then glue the vertical stabilizer and rudder assembly into the slot in the horizontal stabilizer. In a similar fashion as the elevator, slip the rudder control horn onto the wire pushrod end and, with the servo and the rudder centered, glue the rudder control horn into the slot.

Pull-Pull Elevator Set Up

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.



Rigging Wire and Pilot Detail

Windsock Datafile "Sopwith Pup "publication has details on placement and markings.
Available at
http://www.byrdaviationbooks.com/

Battery hatch

Fashion a battery hatch from 1/32″ plywood

Balancing The Model

Balance the model at the point shown. It is best to position the battery to do this operation.

FLYING

Chris Goodchild's original maiden report using previous version's power system:

"Just a short note for now to let you know that this evening there was a Sopwith Pup on dusk patrol over our local school playing field!
YES SHE HAS FLOWN!!!!!!
I flew her myself, on my own so unfortunately no flying pics at the moment but she flew beautifully! This is the first model I have built where I have not had to dial in ANY clicks of trim. I had 3 flights in total using 2 950mah KAN packs and felt very comfortable with her by the end. I took some final photos at the field 'just in case' and then went through my final checklist before deciding to try a quick test hop to get the feel of things. So, I pointed her into the very gently breeze and gradually pushed the throttle forward whilst holding in some up elevator to keep the tail down. She picked up speed quite quickly and only needed a touch of rudder to correct her line before she rose off the ground. I cut the throttle and she touched down and gently nosed over onto the cowl mainly due to the grass being a tad too long. She had committed aviation!

Now to re-gather my composure, settle the nerves down and prepare for a 'real' flight. Again she headed off a great pace and was in the air in next to no time. First thing I noticed was that she was tracking straight and true in the air without the need for even one click of trim on any control surface! (That's a first for me!). She was flying beautifully and I throttled back to about 1/3 to maintain altitude while I did a few circuits to get the feel of her. The 480 motor in a 4:1 gearbox and 10x7 APC slow-fly prop were providing 'bags' of power. I got to a reasonable height and tried some stall test, which were very un-dramatic with no signs of dropping a wing. I then cut the power to see how rapid the decent was, well one word says it--GLIDER! She literally glides at a very shallow

angle and remains utterly controllable. I was expecting a fairly rapid decent but not at all, great!
I decided to try a couple of practice approaches and eventually settled her down on the ground again with just a gentle nose over, which I began to feel I could control with more elevator in the final touchdown stages. I reckoned I was about 4-5 min's into the pack which seemed to have plenty left so I did another take off and a few more circuits before feeling the edge had gone from the battery and bringing her back down to change to pack 2. This landing did end in a nose over again but was even gentler and very nearly didn't go over at all.

Onto pack 2. Take off was easy again and I was really getting the feel of things now. I was even brave enough to try my first loop with her so up to a safe height and put her into a slight dive to pick up some speed when all of a sudden the battery hatch decided to part company and flutter down to the ground. Never mind, lets try that again, back around, back into a shallow dive and over she goes, beautiful and with plenty of power in reserve. I flew around for maybe 8 minutes or so (I forgot to take my timer) and did some lovely low slow fly-bys whiles wishing I had someone to photograph/video them. Then it was time to prepare for the last landing of the day. This time I concentrated hard on my elevator control and managed a perfect 3 pointer with a gentle roll out, I was grinning like a Cheshire cat.

When home I recharged the packs, which took about 650ma and 750ma respectively, which meant I was in the right ballpark for bring her in. Now I can't wait to go fly her again and hopefully I will be able to get a camera person along to share the spectacle of a Sopwith Pup on dusk patrol.

This is a great kit from a great designer and one that flies beautifully. "

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:

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

Finished Model

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