

Bristol Scout Type D

R/C Scale Model Instructions



CONTACT INFORMATION

The Bristol Scout Type D was designed by
Peter Rake and modified by M.K. Bengtson

Manufactured and Distributed by:
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BRISTOL SCOUT TYPE D

Thank you for purchasing the Bristol Scout Type D model for electric flight.



Finished Model by M.K. Bengtson

THE MODEL

Although intended to be fairly easy to build, this model is not intended as a basic trainer. It is aimed more at the pilot who has gained some flying experience with either trainers or ARF models and would now like to build something more scale like. Not that she is in the least difficult to fly, if you know what you are doing, but she is just too fragile, like ANY scale model, to withstand the average novices learning curve.

Looking at her in more detail, she is not, and was never intended to be, 100% accurate scale. Although she conveys the atmosphere of the original aircraft well, certain changes have been made in order to keep her easy to build and a pleasure to fly. Let's face it, what use is a model that is both complicated to build and one that you are afraid to fly. I'll leave you to build those ones later on in your modelling career.

Keeping the easy to build idea in mind, this model has been designed as a one-piece structure for rudder, elevator and motor control. There are several reasons behind this, but the main one is that light models fly better than heavy ones. Being one piece, the model avoids the extra weight of fixings required for a demountable set up, and omitting the unnecessary complication, for this type of model, of ailerons not only makes her lighter, but easier to build too.

POWER SET UP

The motor plate shown on the plan is intended to use what is probably one of the cheapest geared 400 units

around, the Mini Olympus gearbox. Used in conjunction with a decent 6 volt 400 motor and 7 or 8 600 AE Ni-Cad cells it will provide your model with a satisfying, and mildly aerobatic, flight performance. A propeller of between 10x6 and 11x7 and a 15 amp rated ESC completes the power package.

R/C GEAR

Bearing in mind the need to save weight in order to get the best from your model, you are going to need lightweight radio gear. Fortunately this is no longer the expensive task it once was. Mini or micro servos and receivers are readily available these days, and all are very reliable. So, one three or four function mini receiver and two mini or micro servos are all that are required to control our miniature Bristol Scout. Check with your local hobby shop to find out what is available in your region.

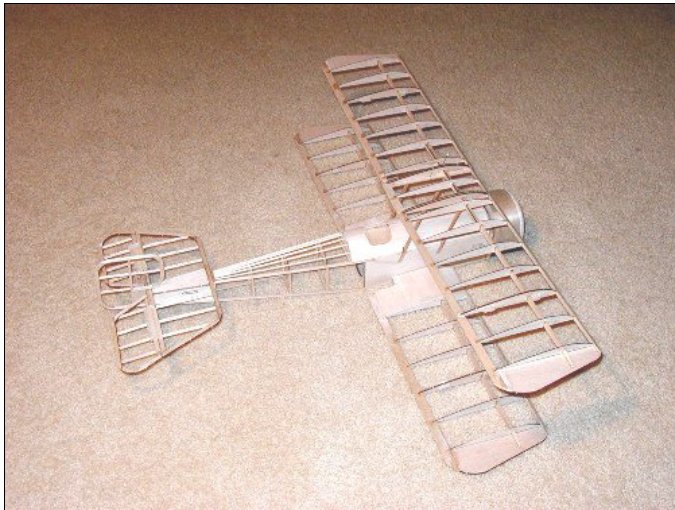
SPECIFICATIONS

More than 110 laser cut parts

Scale:	~1/9
Channels:	R/E/T
Wingspan:	34.5"
Wing Area:	397 sq in
Weight:	21 oz/10 oz minus battery and ESC
Power System:	Designed for Speed 400 with Mini-Olympus 2.33:1
Prop:	10x6
Wheels:	Balsa & plywood, Neoprene foam tires
Airfoil Type:	Flat bottomed
Cowl:	built up balsa and plywood
Spinner:	N/A
Covering:	Balsa & Litespan , Polyspan or Clearfilm
Decals:	Available on website

BUILDING THE MODEL

Since this model is aimed at the less experienced builder these instructions will be quite detailed in order to ease them into this exciting and enjoyable branch of the hobby. However, no doubt some of you will already be quite used to building this type of model, so please bear with us. Even so, I would strongly recommend that you familiarise yourself with the way the model goes together before starting construction. Some of the techniques used may even surprise you.



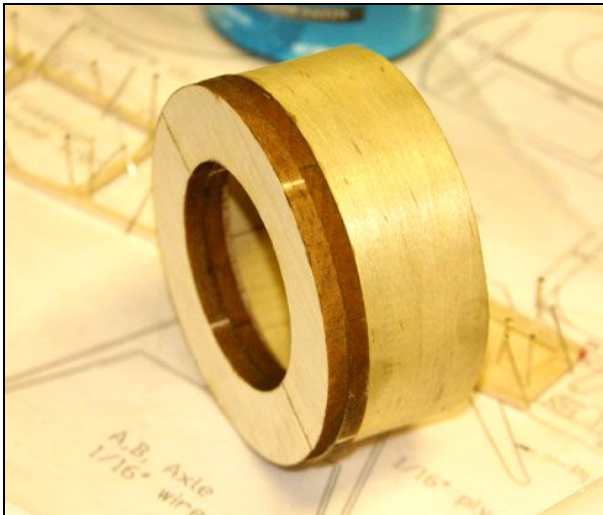
Assembled Ready for Covering

COWLING

We'll begin here since it is a nice easy job. Also because while glue is drying elsewhere you can be getting your cowl sealed, sanded and primed.

ASSEMBLE THE COWLING

Construct front cowl ring by gluing 4 C1's making sure that the joints are not overlapping.



Cowl Detail



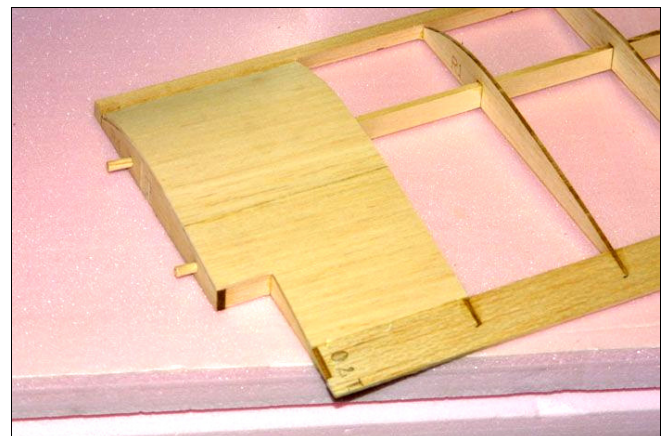
Cowl Detail

Wrap the strip of 1/32" ply (a good substitute is 1/32" basswood, easier to bend with grain running the short way) around former C2, gluing with cyano as you proceed. Make sure that the edge of the ply aligns with the former all the way round. Do NOT glue the ends of the ply strip together yet. Slip the other C2 into the cowl to aid alignment, and trim off any excess ply. Glue the second former in place and use a piece of scrap ply to help join the ends of the ply ring. Glue it inside the cowl. Now you can add the front cowl. Once all the glue is dry, trim and sand the front cowl to shape and sand the cowl overall.

Sand Cowling to Shape

The cowl should now be sealed, sanded and primed until no wood grain is left showing. Try not to add too much weight during this process. Only cut away the bottom of the cowl after you have the fuselage structure to use as a guide

WINGS



Bottom Wing Sheeting

Begin the wing assembly by notching the t/e for the ribs and adding the 1/4"x1/8" gussets around the strut positions. Now, pin down, over the plan, the t/e, l/e, spar and wing tip, gluing as required. Making sure that you are using the correct ribs for the wing you are building, glue all the ribs in place. Use the angle template (RAG) to lean in the root ribs of all four wing panels to allow for dihedral and allow to dry completely. The only difference between the top and bottom wing panels, other than the strut locations, is that the root rib of the lower panels needs to be cut down, as shown, and a piece of 1/8" balsa added. This will provide the correct wing cut out. Sheet the root bay of the bottom panels, and trim and sand the wings to shape.

OPTIONAL AILERONS

The Bristol Scout had 4 ailerons. While not necessary for this model, aileron installation details are shown on the plan. Ailerons are constructed by cutting the ribs and trailing edges as shown. The ailerons shown on the plans are using wing mounted micro servos and servos installed in the bottom wing with servo extensions feeding into the fuselage. Servos lie on their side inside the wing on 1/32" ply sheeting in the bottom of the wing. The servo arm extends through an opening in the ply. A standard music wire connection is made to control horn placed in the aileron. Lower ailerons are connected to the top ailerons with music wire and control horns. The materials for ailerons not supplied in this kit.

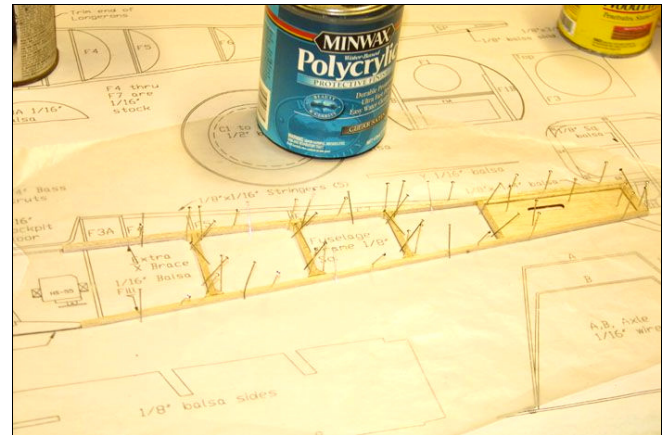
CENTRE SECTION

Pin down the l/e and t/e, add the wig ribs, dihedral brace and 1/8"x1/4" strips check that the ribs are upright and allow to dry. Trim and sand to shape and then add the top wing panels. With the c/s pinned firmly to the board, glue each wing panel in place snugly against the c/s with the outermost rib packed up 1/2" from the board. Ensure that the wing assembly is straight along its' length and that the dihedral brace is held firmly against the spar while the glue dries. Another very light sand and you have all the major components of a Bristol Scout.

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 of the Right Side of the Fuselage



Fuselage Construction Detail

Begin by building two rear fuselage frames over the plan and allow to dry. Select hard balsa or basswood for the longerons. Build one frame and let it dry, then turn this over and build the other frame on top of it. Now they should both be identical. Use some thin polythene sheet between the assemblies to prevent them sticking either to the plan or to each other.

Push Rod Exit Panels

Add the push rod exit guides, as shown and join the two frames over the plan with cross braces and the tailskid mount. Check, check and check again that this and ALL other structures remain perfectly straight and square.

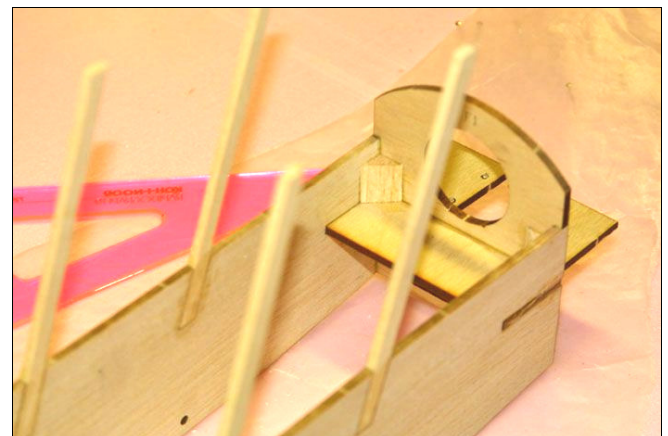
Front Side Panels over the Plan

In a similar fashion make the two front side panels over the plan, making sure that the c/s struts are firmly glued and that both sides are identical.

Mark Former Positions and Position Motor Plate

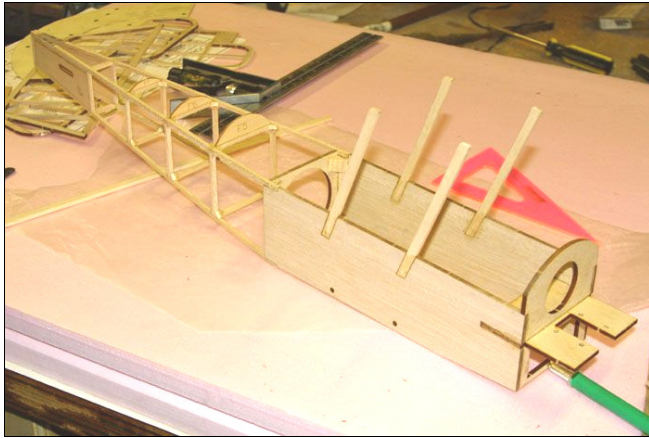
Mark the former positions and the position of the motor plate onto the inside of each panel and join them with F1, the motor plate, F1A and F3,

Glue in Center Section Struts



Center Section IP Struts

Position the assembly over the plan, and once again make sure that it is straight and square. This is even more important with this assembly since the alignment of the c/s struts depends on it.



Joined Fuselage

Adding the Undercarriage Plates

Once dry, remove from the board and add the 1/8" liteply u/c plates. The c/s struts may now be trimmed and sanded to a streamline section.

Adding the Sheet Cockpit Floor

Add the 1/16" sheet cockpit floor and join the front and rear boxes. Again, work over the plan and make sure the assembly is both straight and square.

Assembling the Fuselage Sides Together -- Cracking "Y"
Glue pieces F1B and Y in place on the fuselage sides, cracking Y to follow the line of the fuselage side.

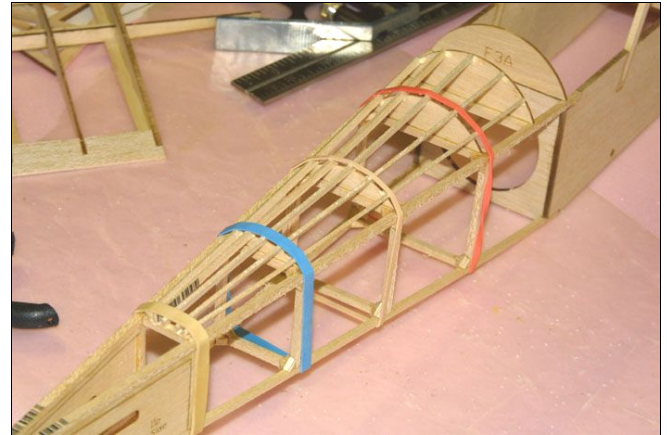
Side Sheeting

Check that the face of F1, F1A and F1B is completely flat so that the cowl will fit well, and trim parts Y to match the line that the side sheeting will take.

Fitting the Radio Gear and Trimming the Rear of the top Longerons

Fit both the 1/8" and 1/16" fill pieces at the rear of the radio bay and trim the rear of the top longerons to provide the positive incidence required for the tailplane.

Adding the Decking and Stringers

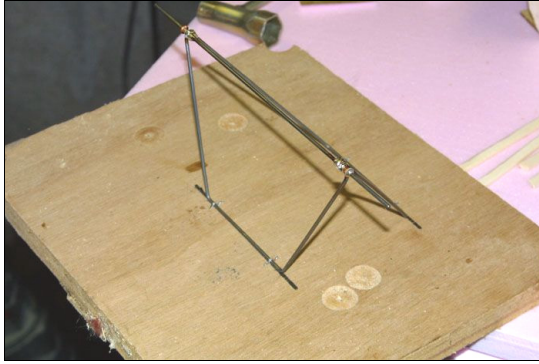


Stringers

Add all the decking and stringer formers, including the piece of 1/8" square at the front of the tailplane, and carefully trim to size and fit all 1/16" sheet decks. Sheet the sides of the Bristol Scout, using PVA adhesive (white wood working glue). Do the top in one piece, using 4" wide sheet. Cut out around the struts and cut out a rough, under size, cockpit. Slit from the rear of the cockpit to the back edge and glue it onto the fuselage with slow setting glue (PVA). The cockpit cut out and the slit will enable the back part to take up the smaller radius over the formers. Get it all pinned into place, with the back parts overlapping, and cut through them both along the c/l. Now they should meet nicely when you pin them down. Rim the ends level with the formers, don't worry that it isn't exactly the width of the cowl. Once it is all dry and add the side sheeting. Butt another piece of sheet against the top sheeting and mark the line that the back should take - in line with the c/s strut. Make the sheet a little over length at the front. Sand a taper onto the inside edge of the back end, and glue it in place. It will take the curve well. Once dry, trim to exact size. Repeat for other side. I find using the slower setting glue helps get it all pinned in place. Add the side fairing sheet pieces and the stringers before giving the fuselage a good overall sanding.

Bind and Cyano Undercarriage Legs in Place and Solder them to Axle

Make a jig to assemble the U/C music wire. The final jobs on the fuselage are to bind and cyano the u/c legs in place and bind and solder them to the axle. However, it results in a neater job if the bottom of the fuselage is covered before drilling the holes and binding the legs in place.



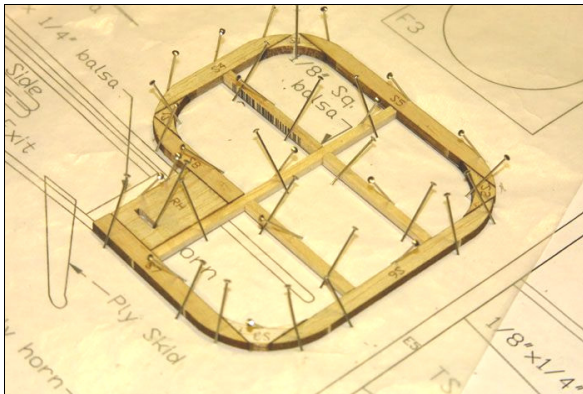
Undercarriage Jig

Undercarriage Leg Fairings

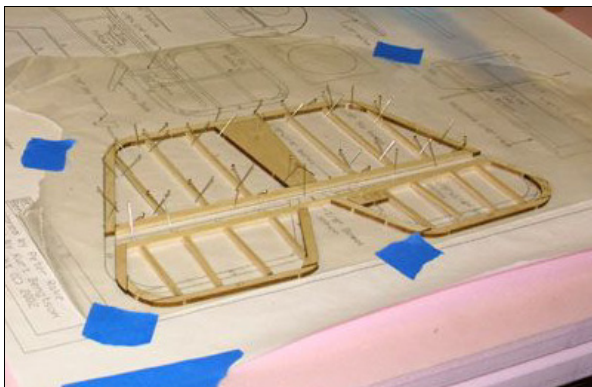
Now add the u/c leg fairings and use the fuselage to determine how much of the cowl should be cut away.

TAIL SURFACES

Lay out and glue parts of the tail surfaces on the plans and construct any necessary parts from 1/8"x1/4" balsa stock. Use 1/8" square balsa for inner structures.



Rudder



Horizontal Stabilizer and Elevator

Join the elevators with the 1/8" dowel joiner, and then sand the tail parts overall, rounding off all edges. Don't

add the horns or hinge the surfaces until after covering is complete.

COVERING

Almost any lightweight-covering medium will be fine for the Scout, but avoid anything that is likely to warp the structure. Litespan is a very good choice since it is very lightweight, doesn't shrink too aggressively and comes in just the colours we need. Although paint should be kept to a minimum in order to save weight, normal hobby enamels will take well to Litespan.

If you intend to add extra detail to your model, be very careful not to overdo things. A little detail can very quickly add a lot of weight. A pilot figure is an absolute must though.

Downloadable decal outlines on-line at
<http://www.aerodromerc.com/decals.htm>

WHEEL ASSEMBLY

Balsa ply sandwich

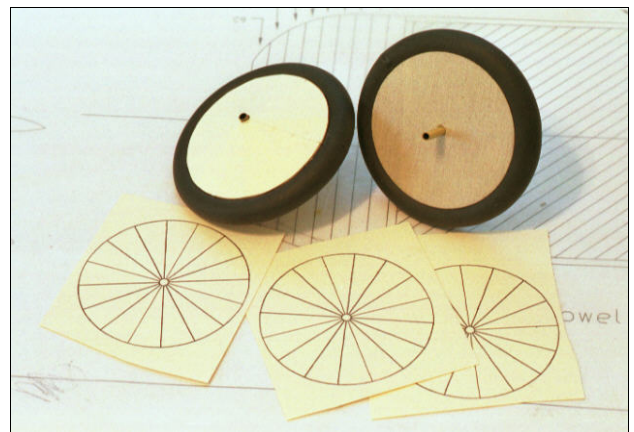
Gluing the ply sides on the 1/4" balsa core makes the basis for the wheels. Use the brass hub for alignment. Epoxy the hubs in place and add a sufficient amount of epoxy around the base of the hub to form fillets to the ply. Alternatively, gluing an additional 1/2" square piece of scrap 1/8" balsa with a hole drilled in the centre can be substituted.

Tires

Next, CA glue the neoprene cording together to form 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.

Attach Tires

Then attach the tires to the wheels and CA in place. A thin bead of CA around the rim makes for a secure tire.



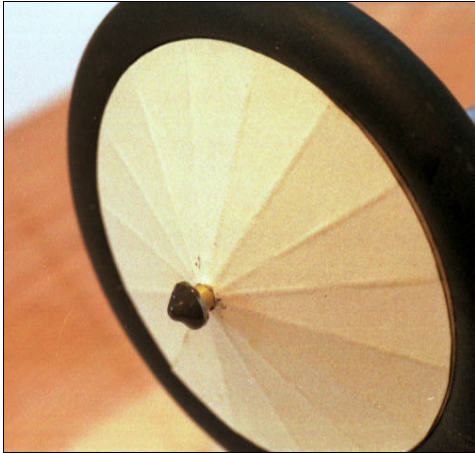
Wheels

Make paper card cones

Paper cones supplied are cut out and a wedge is cut out by making cuts to the centre along one wedge of the spokes. Use a ballpoint 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. Close the paper cut-outs to form cones and tape the joint inside the cone.

Fit Cones to wheels

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.

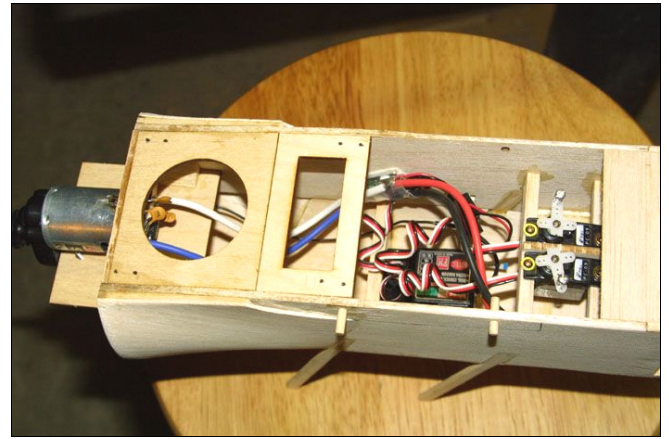


Wheel Cone

INSTALLING THE RADIO CONTROL GEAR

Mounting Motor, Radio Location And Electronic Speed Control

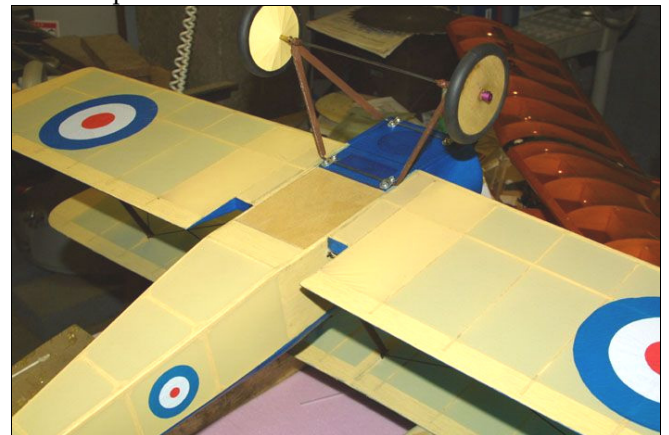
The motor unit is simply screwed in place on the ply plate, the receiver and ESC are attached to the fuselage sides with servo tape and the servos are screwed to 1/4"x1/8" spruce rails which are then glued in place across the fuselage. The exact position of the gear isn't that important, just so long as it is easy to get at. Make up the pushrods and fit them to the servos, but do not bend the control horn linkages at this stage, just leave them protruding from the back of the fuselage. Once the model is assembled and the control horn positions known, the remaining z-bends may be added to the pushrod wires.



Motor & Electronics in Place

Battery Tray

Only after everything else is finished should the battery pack be fitted so that you can use its' weight to balance the model at the point shown. The pack is retained with Velcro strip.



Battery Hatch

ASSEMBLY

Assemble Top Wing

The first task is to epoxy the top wing accurately onto the c/s struts. Use 30-minute epoxy for this job so that you have plenty of time to make totally sure that it is aligned accurately with the fuselage. While this is drying, add the locating dowels to the bottom wing panels and make up the interplane struts. These are cut from streamline section 1/4"x1/8" bass or spruce, using the gap shown in the side view to gauge the correct length. Since the wings have the same dihedral, the gap shown is the length of the struts. Don't forget the locating lugs on each end. The interplane struts follow the same line as the c/s struts.

With the model upside down, use the locating dowels and interplane struts to assist with aligning the bottom wing panels to the previous assembly and allow to dry.

Fitting Tail Surfaces

It is now a relatively simple task to use this assembly as a guide for fitting the tail surfaces, although great care will be required to get the rudder hinged at exactly the right angle. Make a point to glue AND pin the rudder hinges. The last thing you need is for the rudder to come loose mid flight.

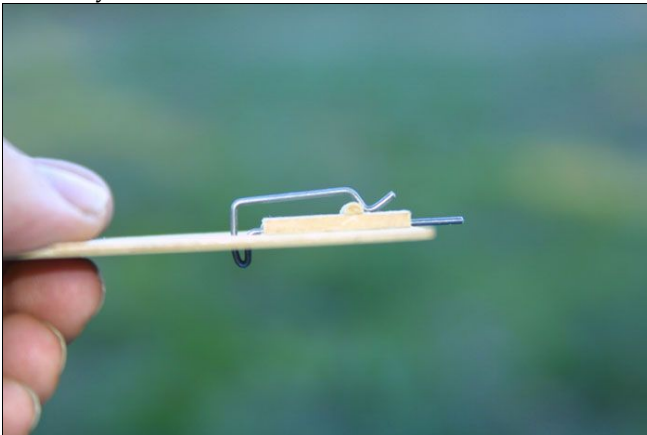
Control Horns on the Pushrod Ends

Slip the control horns onto the wire pushrod ends and, with both the servos and the control surfaces centred, glue the horns into their slots.

Glue Cowl in Place

Lightly glue the cowl in place and trim underside of cowl. Fit the Access Hatch

Make up, cover and fit the access hatch, add the battery pack and your model is finished.



Access Hatch Cover

Balancing the Model

Balance the model at the point shown.

FLYING

Wait for a nice calm day for the initial flights with your Bristol Scout, making sure that you have balanced her correctly and that all your pre-flight checks are carried out. For these first flights, set up your control throws to about $\frac{3}{4}$ " l/r rudder and $\frac{3}{8}$ " each way on elevator. These settings can always be changed, as you become more familiar with the model, but should prove safe for test flights.

The model may either be taken off from the ground, or hand launched. The only points to remember being that you should let her pick up plenty of speed on the ground before attempting to get airborne, and hand launches should be firm, but not javelin like, and level.

Once you have become accustomed to her you will find that loops, stall turns and touch and goes are all well within her scope. Good luck with your little Bristol Scout, and remember – BEWARE THE HUN IN THE SUN!

CONTACT INFORMATION

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