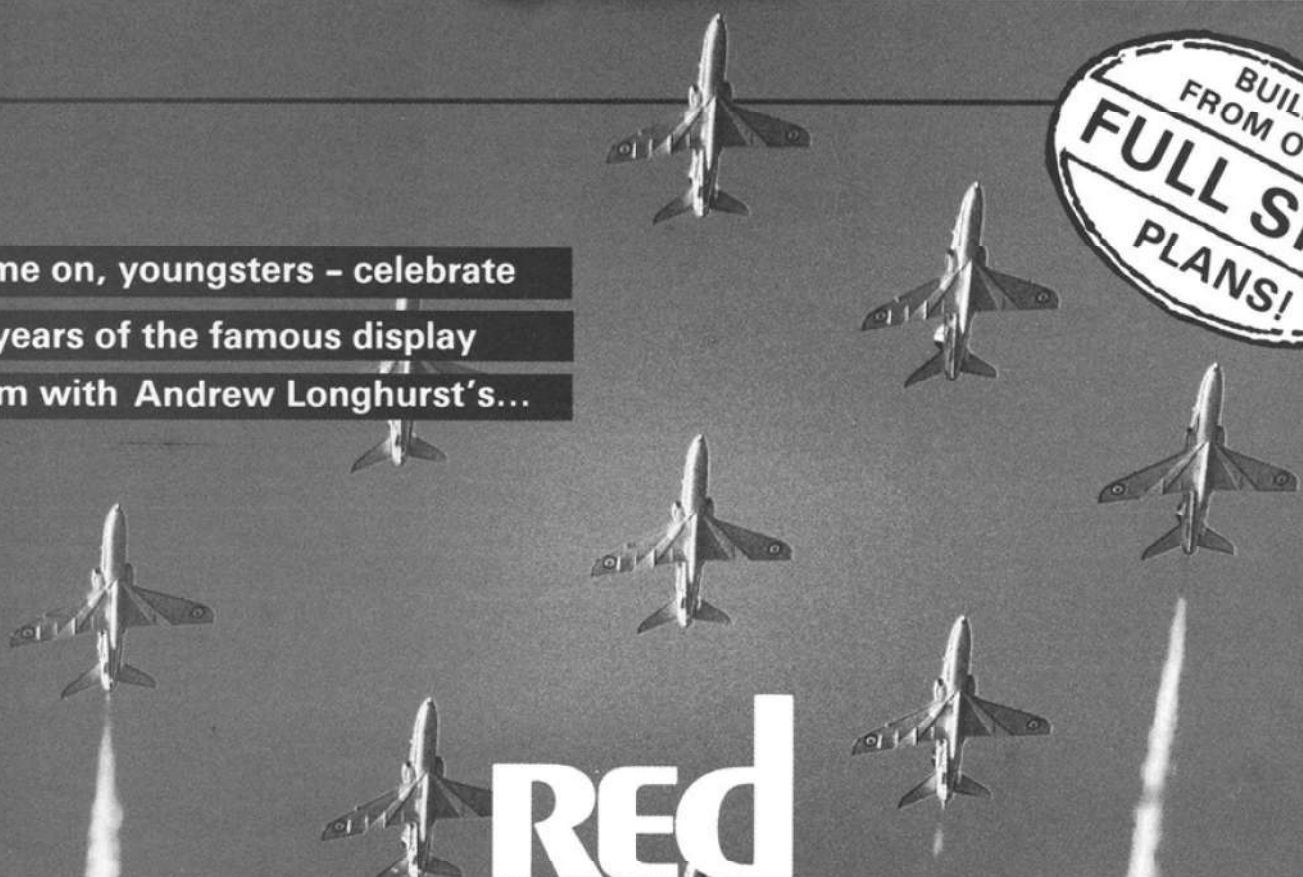


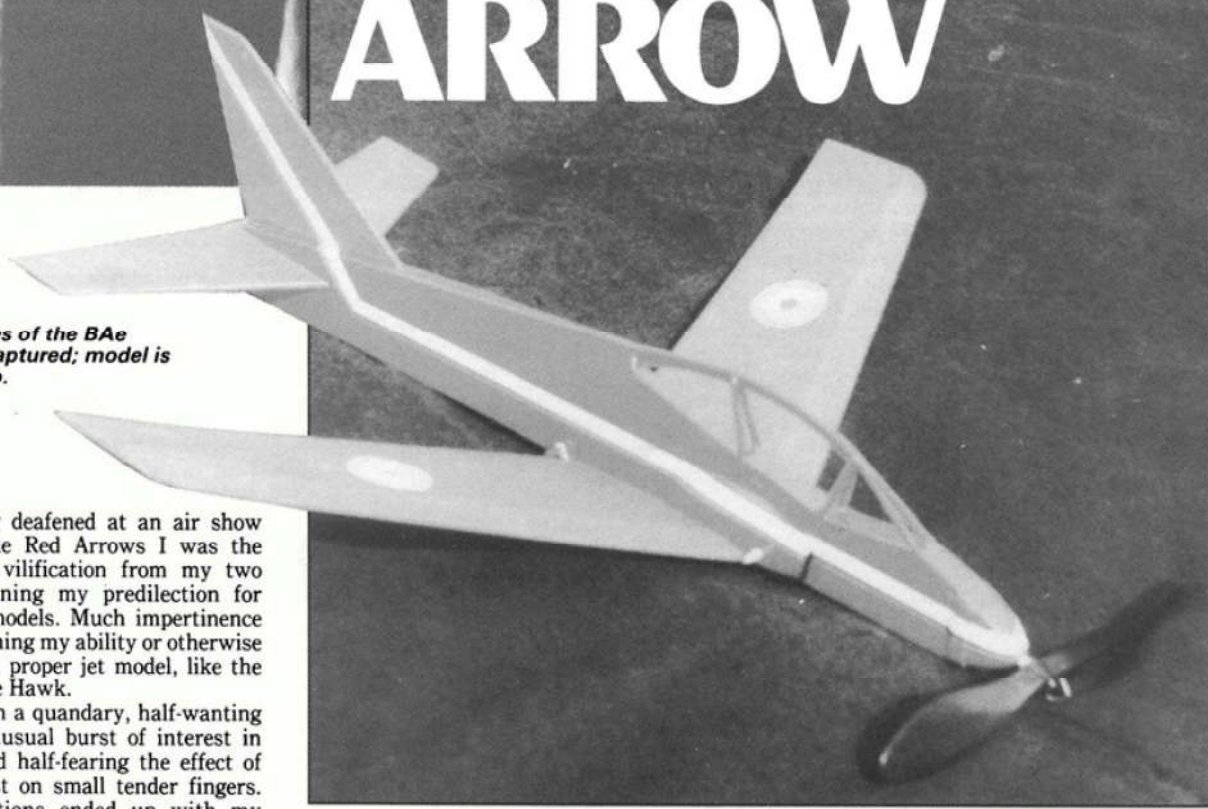
BUILD FROM OUR
FULL SIZE
PLANS!

Come on, youngsters - celebrate
25 years of the famous display
team with Andrew Longhurst's...



RED ARROW

Essential features of the BAe Hawk are well captured; model is a stable flier, too.



AFTER being deafened at an air show featuring the Red Arrows I was the target of much vilification from my two offspring concerning my predilection for ancient rubber models. Much impertinence was aired concerning my ability or otherwise to design them a proper jet model, like the British Aerospace Hawk.

I was caught in a quandary, half-wanting to foster this unusual burst of interest in model planes and half-fearing the effect of hot Jetex exhaust on small tender fingers. Further negotiations ended up with my offering to build a proper jet but with Rubber Band power. 'Absolutely no problem,' I assured them, airily closing my mind to my last, disastrous attempts at flying low-wing rubber models.

When they had gone to bed I quickly enlarged the Hawk three-view drawings helpfully provided in the display programme and made a small profile glider to test the aerodynamics. I quickly discovered, to my chagrin, that the wretched thing had a fatal desire to fly sideways. I chopped the fuselage about to no avail and finally sought assistance from my hero Bill Dean's F86 Sabre plan

(part of the plan Octet U657 from ASP). By grafting on the highly-swept Sabre wings the missing stability appeared as if by magic.

The next thing was to evolve a really simple wing structure, suitable for youngsters to build, which would avoid the stall sensitivity of the flat plate section. I remembered Martyn Pressnell's article on wings in the September '87 *Aeromodeller*, and its exhortation to try leading edge droop. Guess what - it really works! In fact, we ended up with a quite sophisticated little wing which is very stable and yet simple enough for my ten-year-old to build with only a modicum of supervision.

Get building!

Build the flat part of the wing, the tailplane and fin over the plan as usual. Add the leading edge 'droop keepers' to the wing so that the high point exactly coincides with the 2mm sq leading spar. Remove the flying surfaces from the plan and glue the leading edge drooper onto the wing, allowing a little overlap at the ends. When dry, carefully sandpaper the two wing roots so that they will joint perfectly at the required dihedral angle.

Cement together with a 13cm block under

one wingtip. Cover the top surface of the wing and tailplane and both sides of the fin in Red tissue using thinned down PVA as an adhesive. Choose the kind of tissue that has a glazed surface; it is not too porous. When dry, lightly spray with water to tension the tissue. Check for warps, recover if necessary. RAF roundels can be added by colouring discs cut from self-adhesive labels.

Next - the fuselage

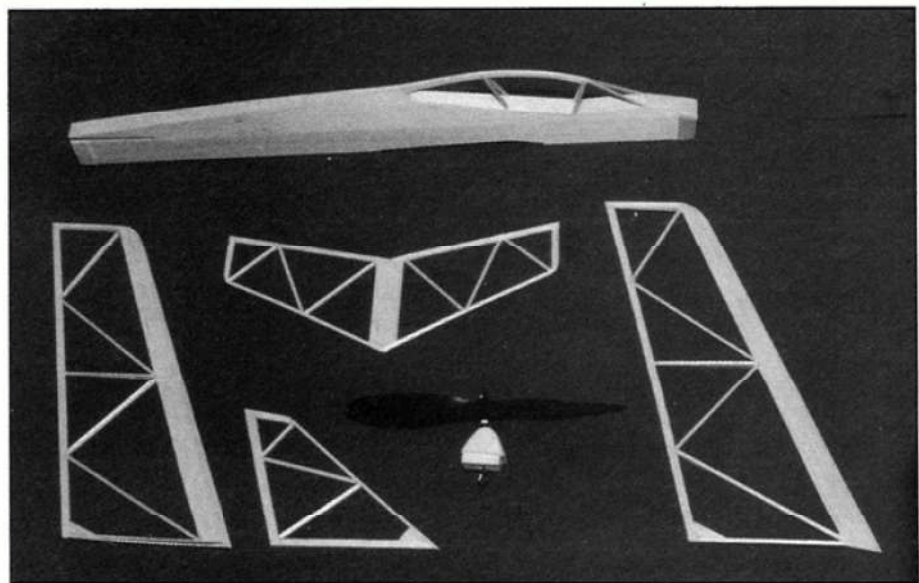
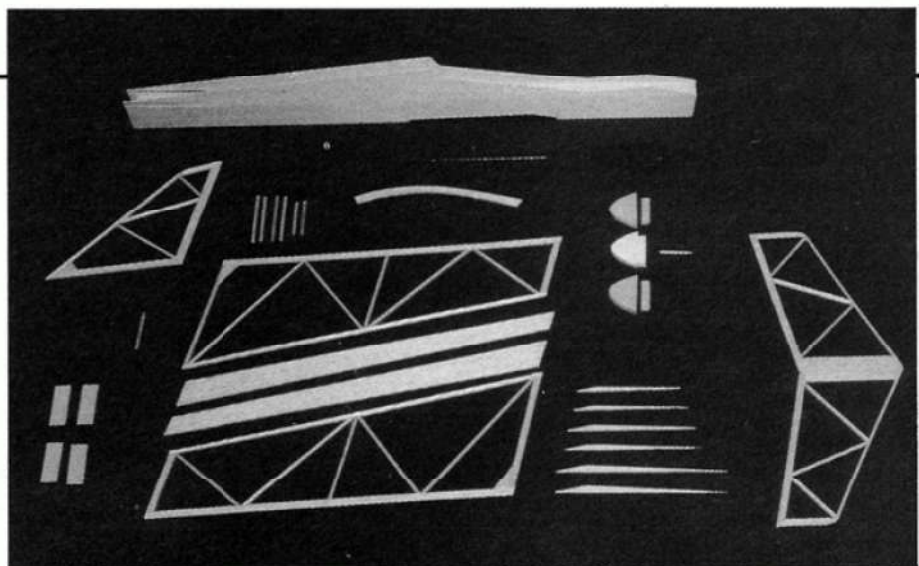
Use light 1.5mm sheet for the fuselage sides, which should be cut round the under sides, which should be cut round the edge of the cockpit. Take one of them and surfaces and the central spacer, making sure they are vertical. Glue on the other side of the fuselage to form the motor tube. When completely dry close the top of the fuselage together at the rear of the cockpit, inserting the top spine F5 as you do so. Next fill in rest of the fuselage top and cockpit floor with F1 to F4 and cut the cockpit top F6. This is supported in place by V-shaped struts to form the divisions of the cockpit. Glue on the tail, fin, the front and rear fuselage doublers and the air intakes. These should be sanded to shape beforehand except at the bottom where they meet the wing. This is carved later to fit the wing and provide a firm mounting. If the tailplane is a firm push fit in the fuselage slot it can be left removable, but if loose it will need to be glued in. If the model is to have a hard life, bind the front of the fuselage with some cotton thread smeared with balsa cement to prevent splitting on impact.

Prop assembly

The fuselage is rather narrow so it is essential that the noseblock seats perfectly and does not wobble from side to side. It is formed from a central core of 6mm balsa with two layers of 3mm either side. Carving from block would do just as well. All you need for the propshaft bush is a small length of brass tubing which is a clearance fit on the 18swg shaft. Drill a hole in the noseblock, roughen up the tubing a little and glue it in with Araldite or cyano. When complete and sanded to shape bend the diamond-shaped hook and check it will clear the fuselage sides. Add bead and prop and bend the end to form a winding hook which will engage in the clutch of the prop. Check very carefully that the downthrust is as shown on the plan and that you have no sidethrust. Remember that although the noseblock should be a firm fit, it still must knock out on landing otherwise you will be in trouble with bent prop shafts.

Finishing

The best advice is to keep it light. Therefore just colour the fuselage red with a felt marker pen and add go-faster stripes from self-



adhesive labels. I would not varnish, dope or paint any part of the Red Arrow, but consequently would not recommend flying in a rainstorm. You could cover the cockpit with transparent plastic, but it looks and flies just as well without. Lastly, attach a small rudder trim tab to the fin. Clear plastic is best but use an impact adhesive for this material such as 'Bostic Clear'.

Full thrust!

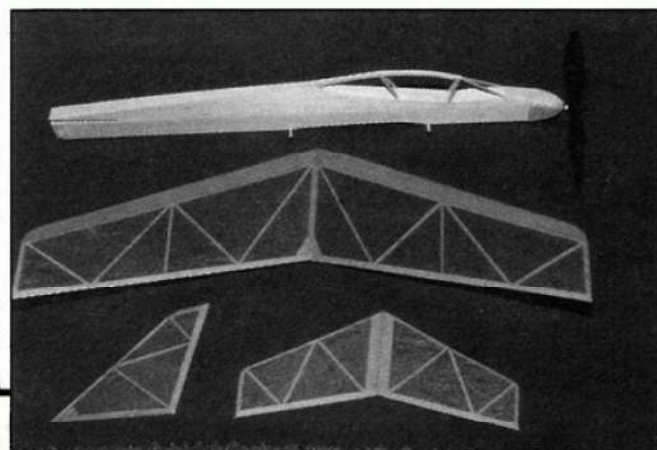
Choose a day when the wind is light. The 40cm loop of rubber specified on the plan is rather shorter than the distance between the hooks in order to keep the noseblock in place. You may therefore need a length of wire with a hook bent in the end to get the motor in. This system is nice and simple but prevents the freewheel clutch moulded into the prop from operating correctly. This is not impor-

tant, but for best appearance in the air, use a 45cm loop of rubber and hold the noseblock in with an external rubber band of similar device.

Try a few test glides. You may need to add a little plasticine to the nose or, more likely, the tail to get this right. Make sure the glide is flat but with a barely perceptible turn to the right. Use the trim tab on the rudder to achieve this if required. Crank on 200 turns and launch gently into wind. If the Red Arrow flies in a wide right hand circle with a steady climb, increase turns in stages to a maximum of 400 on 'finger' turns or 500 stretch wound.

If you encounter problems make only temporary adjustments to the thrust line until you have convinced yourself that the glide is perfect. If the model stalls on power try packing the noseblock 1mm at a time to increase the downthrust. If it dives in fairly straight, try some packing underneath the noseblock to reduce the downthrust. When perfect, sand your adjustments into the nose of the model with a sanding block to make them permanent. If the model starts to climb but then drops its right wing and spirals in, check that (a) you have no wing warps; (b) you have no right thrust built in and (c) that you have not put on too much right rudder. If all appears in order, but the model still piles in to the right, ease on a bit of left rudder tab and try for a right turn under power but left on glide.

Avoid tight turns and you will find the Red Arrow a very forgiving and excellent flyer.



Construction shots on this page show components, part-assembled and part-covered framework. Model must be coloured red!