

# The Lady Eowyn

**A 55 inch span aerobatic sports model for engines up to .25 two strokes (a .21 four stroke has also been used), this four function beauty was designed by PETER MILLER.**

Lady Eowyn, lovers of 'Lord of the Rings' will no doubt recognise the name. For those who do not, Lady Eowyn was a very beautiful lady and a pretty good swordswoman. The name was chosen for this model because she is designed to look really pretty and to be aerobatic.

The design was intended to test one or two ideas before designing a particular scale model, it was also intended to have sleek semi-scale appearance based on some of the classic American aircraft of the late thirties to early forties before the era of 'spam cans'. To make the model interesting to fly, aerobatics were a must. Originally flown with an HP VT 21 the model was very pleasant to fly and mild aerobatics were possible, re-engined with a Super Tigre X25 she really came to life. It must be said here that this model may look like a trainer ... it isn't and less experienced modellers could find themselves in trouble very easily. If the CG is  $\frac{1}{4}$  of an inch too far back the model will start to roll normally and then after getting inverted it will do about two and a half flicks before it can be stopped, in this condition spins will start extremely easily at low speed and will need full down elevator to stop them.

## Fuselage

Construction of the fuselage is quite simple, it is merely two built up sides held together with formers and cross braces and then sub formers, stringers and outer sheeting is added. The landing gear mounting is slightly unusual but works well, do not omit the cross member on F-2 as this prevents the wires from tearing through the former. The side window frames are very effective and result in some of the neatest windows I have seen.

There is adequate space for any radio equipment and access to the tank and radio is good.

Any engine from a good 19 up to .29 can be used, the VT 21 will fly the model but the performance will lack the sparkle of more powerful engines, if the VT 21 is used the duct for the exhaust need not be fitted.

The Super Tigre silencer fitted the cowl with addition of a small blister but a Mick Reeves Universal manifold and remote silencer would be better and avoid the need for the bulge.

## Wings

Wing construction is slightly unusual, the trailing edge is the complicated part.

Cut out all the sheet parts for the trailing edge and tips. Lay the bottom T.E. sheet parts down, then lay down the bottom main spar, packing it up with scrap  $\frac{1}{16}$ in. sheet. This is followed by the ribs, top spar, aileron spar and top T.E. parts, the tips are built up at the same time.



The centre section is built over the plan and then the wing panels are joined to it after which all the sheeting and cap stripping can be done.

The ailerons can be built at the same time or later, this is not important. When the ailerons have been built they have to be chamfered for the hinges, the hinge line is found by drawing a line from the top of the aileron at the inboard end to the highest point at the outboard end, if the aileron leading edges are chamfered to this line the visible gap on the top will be minimal and some of the effects of top hinge drag will be obtained.

The bellcrank for the aileron control is set up with the aileron operating and parallel with the aileron, this will give some aileron differential.

**Tail Surfaces**

The tail surfaces are very simple and strong, however assembly is slightly unconventional, this is to allow the very sleek and scale like fairing of the fin into the fuselage.

The fin is glued to the fuselage and once all this has been covered the two 1/4in. dowels are glued into the holes in the fuselage, the roots of the tail plane are covered and the tailplane is then glued to the dowels making sure that everything is true, after this the tail plane is covered. The very small gap between the tailplane and fuselage can be left or faired over, it is not very noticeable and would be quite scale like if left.

**Covering**

Cover the model with Solartex ... What? You mean there are other covering materials? Oh well, it is your model so if you want to use something else, go ahead.

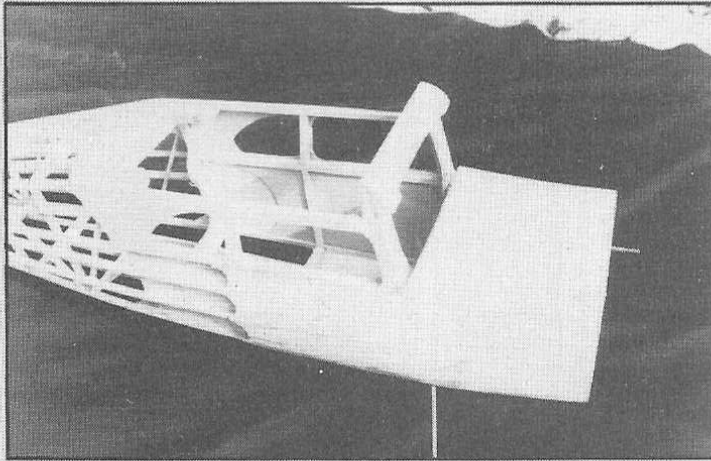
Cover the bottom of the fuselage first, then cover each side but use the same piece of Solartex to cover the fin and top of the fuselage, by careful working it is possible to make the fuselage top covering flow into the fin in one smooth sweep. Join the two pieces along the centre stringer and up the fin leading edge, the fin portion of the covering is stuck down just at the top of the sheet base of the fin and at the top longeron. This looks so much better than any attempt to carve blocks to shape or get

a neat sharp corner between fin and fuselage, it reduces drag as well. If you are using anything apart from Solartex for this job ... my heart bleeds for you.

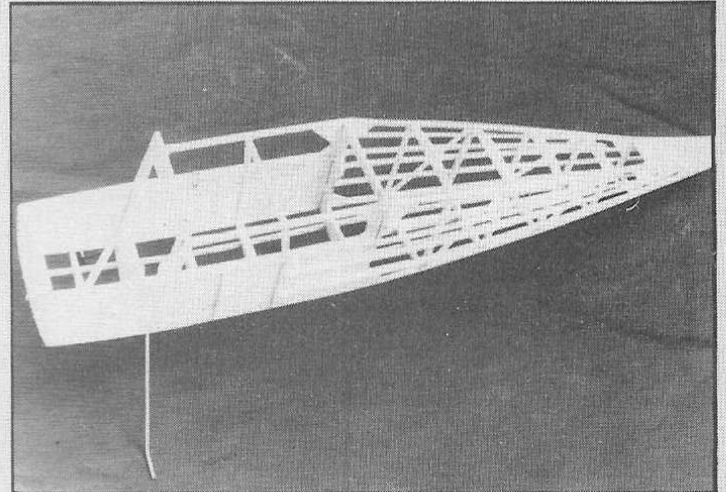
The wings and cowling are also covered with the same material as are the rest of the tail components.

The covering material round the window openings is cut and folded in. The wind screen can now be stuck down with Evo-stik and then a thin strip of material is used to seal all the windscreen edges. Side windows are added after painting.

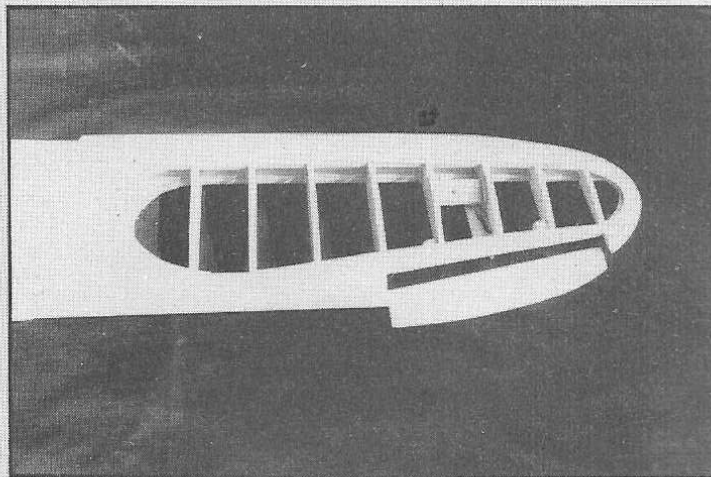
Lady Eowyn lends herself to a nice flowing colour scheme and, if you feel up to it, some fancy art work. If you spray the model with cellulose, (car touch up spray



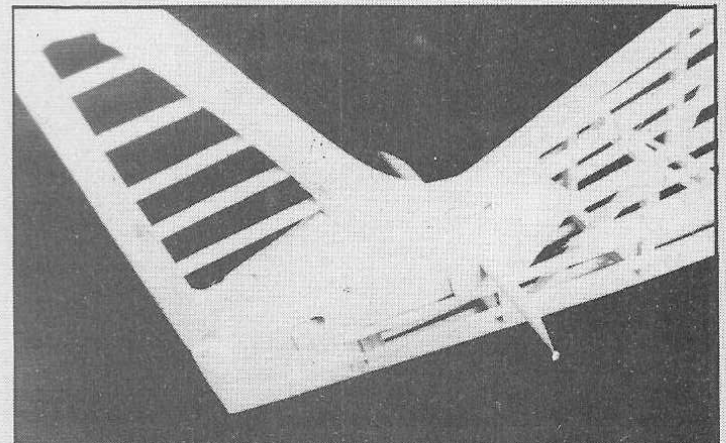
*The scalloped edging to the sheeting gives a far tidier appearance to the completed model. Note the top of the central cabin former has been cut away to give easy access.*



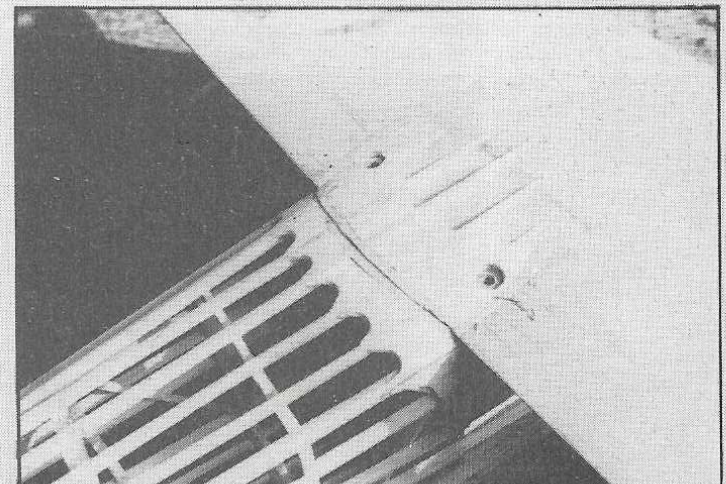
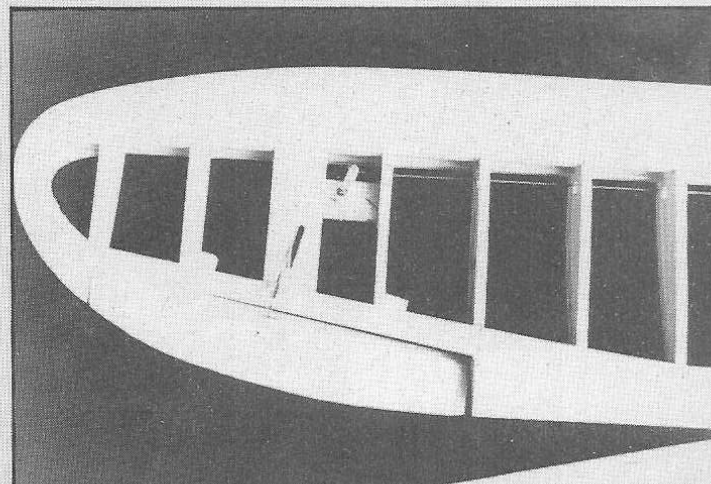
*During construction. Small side formers — to shape the sheeting — can be seen, and the centre former spacer is still in place.*



*Inset ailerons, though small, give plenty of control power, but they must be close fitting. Below, the underside view of the wing shows the aileron pushrod emerging from an extra wide cap strip.*

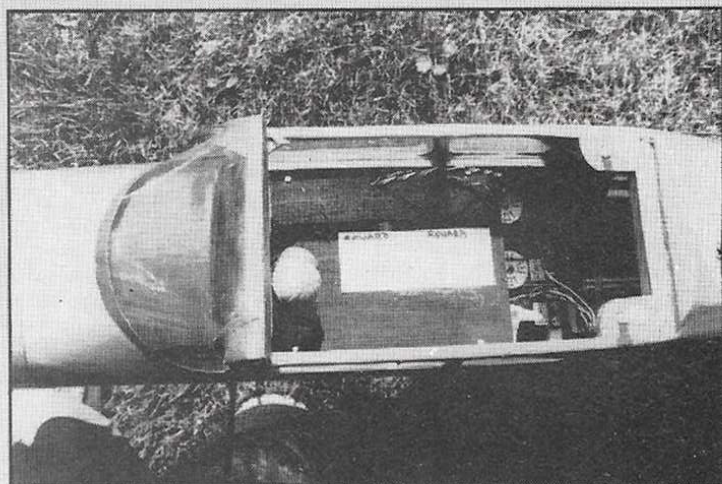


*Above, tail fixings. The tailplane can be built up over the plan to ensure it's flat, then the joining dowels are fitted into the fuselage and the halves attached to them. Below, wing fixing. The simple skeleton fairing looks neat when covered.*





The Lady Eowyn was designed around the HP VT-21 and the width of the cowling suits this engine exactly.



To tidy up the visible interior, a plate covers the radio gear.

cans are great) then the art work can be done with Humbrol plastic enamel, this allows mistakes to be wiped off without damaging the rest of the paint job. Use matt enamels as they dry much quicker and so work progresses faster, they will be glossy after proofing.

Colours on the original model are metallic dark blue and light blue.

**Installation**

There is plenty of room for any radio equipment. The best way to go about the installation is to fit the engine and tank and then, with the model complete including paint, fit two long rails down each side of the cabin. Now mount the servos on two cross bearers or a plywood tray and then move

the battery and servos around until the correct CG is obtained. The battery will almost certainly be beside the tank and the servos will probably be well forward, the receiver can then be fitted behind the servos. The switch can be mounted on the ply behind the rear window, this puts it well out of the way and so avoids it being moved if the model is hand launched.

Controls are operated by hard 1/4 in. sq. balsa pushrods. Micro-Mold transfer linkages can be used or the conventional slots made.

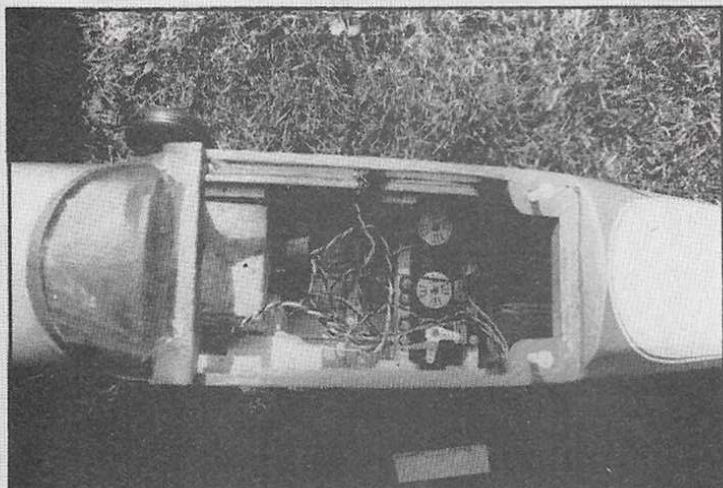
For initial flights the control surface travels should be about the following: Ailerons, 1/4 to 5/16ths in. each way at the in-board end. Elevator 1/2 in. each way and rudder 1/4 in. each way at the widest point.

These settings can be altered to suit your flying style as you get to know the model.

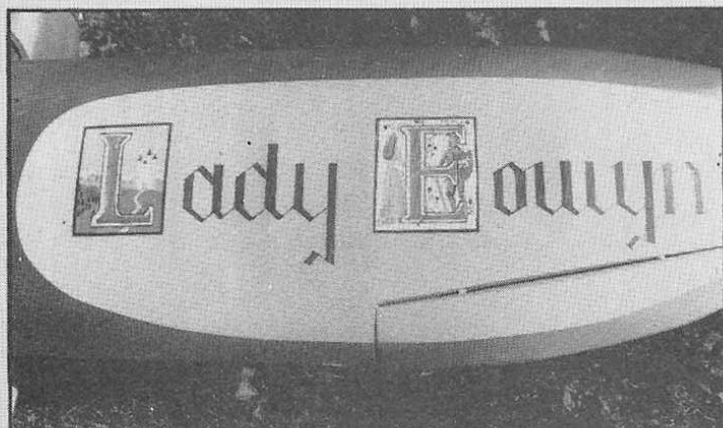
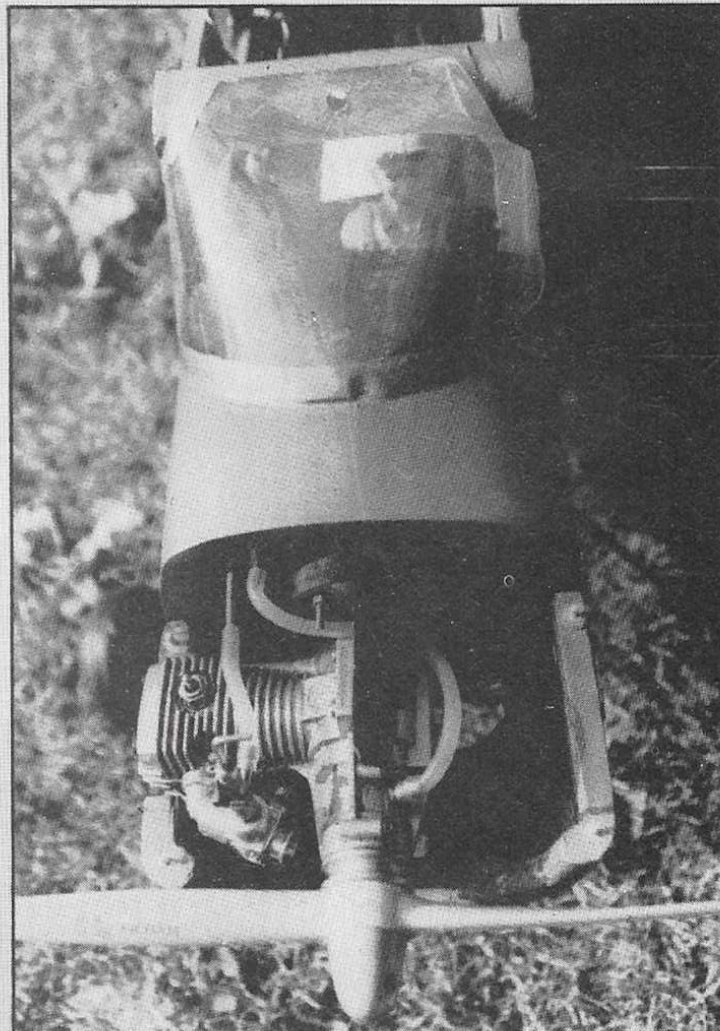
The CG shown is near the rearmost limit and first flights can be made with it slightly further forward. A ballast box is provided in the rear fuselage, this can be filled or emptied by undoing one screw and swinging the tailskid to one side. The finished model should weigh about 4lbs.

**Flight Tests**

Lady Eowyn was first flown with the HP VT 21, power was marginal until the nitro content was increased to 15% and an 8 x 6 Master aircrew was fitted. At this time it was not realised that the CG was a little too far back and some nice flights made, aerobatics were limited and rolls tended to turn



Cover plate removed, the radio and servos can be seen in the comfortably spacious fuselage. Right, the cowling top removed to show the engine installation. Below, fancy illuminated name, inspired by the 'Lord of the Rings'.



into flick rolls halfway through, also spins needed a dab of full down elevator to stop the spin. The model was not twitchy longitudinally as happens in most cases of tail heaviness but it did seem to wallow a little and this was put down to the low power output of the engine.

Lady Eowyn was next fitted with a Super Tigre X25 and the CG was moved forwards to the location shown on the plan. In this configuration the model became a much nicer and groovier model with plenty of power for aerobatics.

The ailerons are very effective and so are the elevators, in view of the very small amount of dihedral the rudder was also very powerful. The model had about  $\frac{3}{16}$ ths washout on the wings but it is felt that this was not really essential and may have contributed to the tendency to develop the flick

roll once the model reached the inverted stage of the roll.

The model can be hand launched easily so the choice of takeoff method is open. The suggested test flight sequence is first, gain some height without trying to make the model hang on the prop. Once several hundred feet of safety has been obtained slow the model down and check the stall characteristics to make sure that any wing dropping is mild, always correct a dropped wing with rudder after neutralising the elevator. Next try a roll, if the roll is satisfactory carry on to the next test, if it degenerates into a flick roll land and move the CG forward. The final test is the spin test, again, plenty of height and then enter the spin, after a couple of turns centralise the controls. If the spin does not stop apply full down elevator for a moment and the spin

will stop, again, move the CG forward.

If all the tests are satisfactory and the CG has not had to be moved forward one can try moving the CG back a fraction at a time to increase manoeuvrability if required, otherwise just carry on and have some fun. The Lomcevac is always spectacular, plenty of speed, pull up to just over the vertical and then apply full left aileron, full right rudder, full down elevator and full power and the model should do an end over end tumble, if not, try at higher and lower speeds until it does, recovery is from an inverted spin.

I am always interested to hear from builders of my designs and would be especially interested to hear of your experiences with Lady Eowyn.

