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Radio MODELLER

IT'S AN ILLUSION!
Plans for Andy Nicholls' top
aerobatic design

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RM proudly presents one of the top

Aerobatic contenders in the UK –

Andy Nicholls' 'Illusion'

Radio Modeller

Illusion



R/C gear in 'Illusion' is Futaba 1024A PCM and motor O.S. 'Hanno Special', turning APC prop. Features to note in the pictures above are the closed-loop rudder controls, semi-enclosed tuned pipe, compact servo cluster which includes in-flight mixture control, and glassfibre under cowl, available with the plan from RM. Wings are by Dalesman, selected by Andy for their quality and accuracy. With Nicholls at the sticks, 'Illusion' is currently one of the most consistently successful F3A models in the country.

Illusion was designed and built after I returned from the 1988 European F3A Aerobatic Championships in Sweden. This was my first international event and I was not only impressed by the flying skills of many of the top pilots but also by some of the models and the smooth style of flying which predominated. So, with the desire to build a model that would enable me to be more competitive internationally,

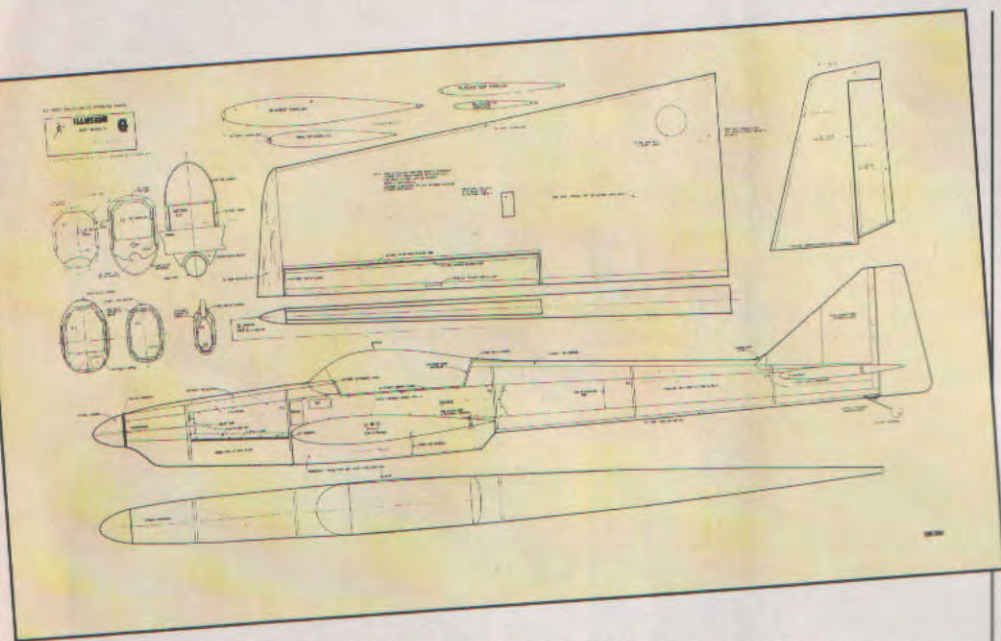
out came the drawing board and a busy winter followed...

The model's pleasing, well-proportioned lines are enhanced with the enclosed inverted motor and semi-enclosed tuned pipe. An out-of sight vertical climb is possible on a good .60 enabling a near constant speed to be achieved throughout manoeuvres. The slim, rounded fuselage is adequate for unlimited knife edge flight, but helps reduce

drift when flying in crosswinds.

Construction is fairly straight forward with balsa fuselage, glass fibre cowl and foam wing and tailplane. Although the original models were fitted with Merati pneumatic retracts and powered by a rear exhaust pumped .60 with tuned pipe, fixed undercarriage and a standard motor could be used, but of course performance will suffer.

Originally pumped Enya .60s were used,



Full-size copies of the 'Illusion' plan are available as RM 384, price £6.60 including postage and packing, from Radio Modeller Plans Service, Argus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST. A g.f. under-cowl (COWRM 384, price £9.75) and a moulded canopy (CANRM 384, price £6.50), are also available from our Argus House offices. Both of these prices include postage and packing.

but recently I've begun using the new OS 'Hanno Special' because of the improved performance at low r.p.m.s enabling large propellers – typically 12 x 12 – to be turned at approx 10000rpm which give much power but reduces noise.

Futaba 1024A PCM radio is used operating seven servos; ailerons (2), elevator, rudder, throttle, in flight mixture control and retracts. So many useful features are available with this radio enabling a model of sound design to be accurately set up for precise aerobatics.

Anyone attempting to build this model will need to have some modelling experience and, for this reason, I have not provided step-by-step instructions, but will mention points of particular interest. Needless to say, it is not a beginners model to fly; however, anyone able to competently fly a low wing sport model should have no problems. Aerobatic models designed to fly the full FAI turn-around schedule need to be as viceless as possible enabling the pilot accurately to fly the many components that make up each manoeuvre.

Fuselage

Assembly of the fuselage is best done in a jig, or with the former centre lines over a line on the building board. With triangular strip and doublers added, join fuselage sides with formers 2 and 3. When dry, pull in rear fuselage adding remaining formers. Pre drill F1 for engine mount and install with correct side and down thrust. Nose top sheeting and rear decking should be added whilst still in the jig. When dry, remove fuselage and add lower rear decking. The motor should be fitted to attach nose ring and adjust spinner clearance. Remove motor and roughly carve the cowl to shape. Extra balsa should be added inside the engine bay prior to shaping as most of the existing fuselage sides at this point will need to be carved away.

Wing

Obechi covered foam cores in high density (HD) foam from Geoff Mosley of Dalesman Wings were used on the originals. Not only are these beautifully made, but they are very accurate and I strongly recommend their use.

Holes are cut and bearers for retracts epoxied in place. Wheel wells and servo cut-outs are lined with 1/16in balsa after boring holes through the foam for aileron servo leads and retract tubing. Ailerons are cut from each panel and exposed foam surfaces faced with balsa.

Join the wings with epoxy on a flat board at the correct dihedral angle (roots may need sanding slightly to ensure a good butt joint). Ensure that both wing tips are parallel so that any slight warp in either of the panels will be 'lost' at the centre, reducing the effect that it may have during flight. Add the plate for the wing mounting bolts, tuned pipe clip and reinforce joint with glass cloth and resin.

Tailplane and fin

The tailplane is also obechi covered foam, joined with epoxy. Elevators are cut from the panel and faced with balsa. Fin and rudder are from sheet balsa and carved to aerofoil section.

Assembly

Ensure that the wing is accurately fitted to fuselage with the correct incidence (0.5°). Under-wing fairing is constructed from balsa block or laminated sheet. Tack glue it in place on the fuselage and carve to rough shape before attaching to wing. Sand to final shape to match glass fibre cowl and fuselage rear. Then hollow out to suit tuned pipe.

Glue the tailplane to the fuselage at 0° incidence relative to datum line; accurately measure from wing tips to tailplane tips to

be sure of correct alignment. Glue fin in place, fairing tailplane and fin into fuselage with scrap balsa. Finally, sand entire model and attach canopy.

Finishing

Solarfilm covered wings and tail were used on the originals, and, although the fuselage could be film finished, for durability mine were finished with tissue and dope and painted. All-up weight, less fuel, should be 8-8.3/4lbs, depending on radio, retracts, finish, etc. Check the c.g. and lateral balance of model, adding weight to adjust if necessary.

Flying

No problems should be encountered by anyone with some experience of low wing models. As with all tail draggers, hold in a little up elevator for the first few feet of the take-off run to hold the tail down. Because control sensitivity is, I believe, a very personal thing – some pilots like twitchy models, others prefer reduced throws giving a much softer feel – the control throws given are only a guide. Please experiment and aim to achieve a response to aileron, elevator and rudder which suits your own style of flying.

Control throws – basic guide

Aileron: 17mm up, 14mm down
Elevator: 17mm up, 20mm down
Rudder: 60mm each way.

I hope you enjoy building and flying 'Illusion' as much as I have. My two 'Illusions' have been used for two seasons and achieved some very pleasing competition results including:

Season Champion: 1989
21st place World Championships 1989
2nd place British Nationals 1990
13th place European Championships 1990

Post script

Finally, I would like to take this opportunity to thank the many people who have helped and supported me so much since my first Aerobatic competition in 1986. A big 'thank you' also to the GBR/CAA and Derek Hardman of Solarfilm for supporting the UK Aerobatic Team during 1988/89/90.



Winning at F3A is no illusion! The man, the model and a small selection of the spoils.