

**UNUSUAL, FAST
AND AEROBATIC**
46in. SLOPE SOARER
FOR 2 FUNCTION
R/C DESIGNED BY
COLIN MOSS

COMET II

UNUSUAL AIRCRAFT have always interested me, which probably explains what has become to be an obsession with the *Me 163* 'Komet'. This interesting rocket powered flying wing fighter was developed during World War II for service with the German Luftwaffe and it did indeed see limited action towards the end of hostilities. My first 'Komet' model was flown as a slope soarer initially, although intended for powered flight, this method seemed an ideal way of sorting out any problems of trim, balance and control response, before powered flight was attempted.

Since the successful completion of the .60 powered stand-off scale *Me 163* project, I had often thought that a smaller, purpose-designed slope soaring version would make an attractive model. It would need to be smaller and slimmer than my scale version if it was to match my other design criteria of transportability, manoeuvrability and robustness, and thoughts gradually crystallised into the design of *Comet II*.

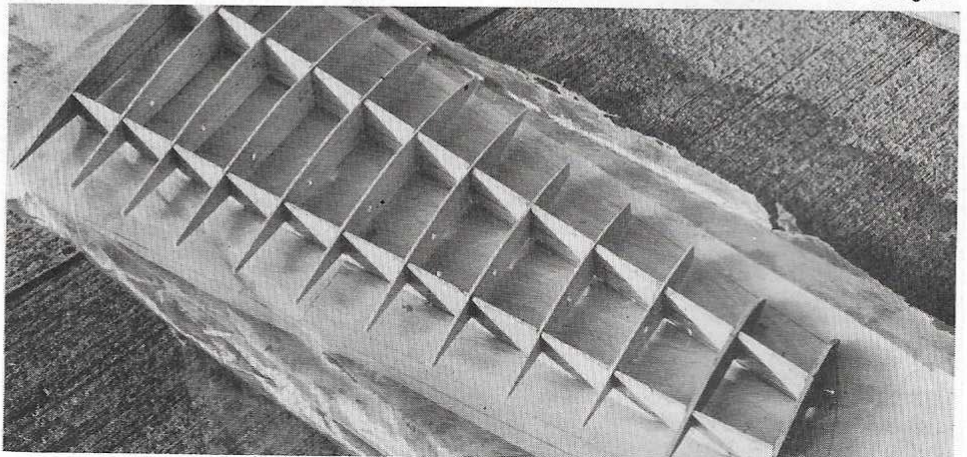
Although the model is in no way scale, nor intended to be, the wing planform is very much based on the successful *Me 163* model. The resulting slope soarer is quite fast and aerobatic, but does need a reasonable breeze to keep it aloft, and above all it's appearance in the air certainly fulfills my wish for something unusual.

washout in each panel, and this must be incorporated at the core-cutting stage. Quite simply, mark a horizontal datum on the root end of the blank, and then make sure that the tip datum slopes up towards the trailing edge by ½ in. (12mm). It is then important not to distort the cores whilst veneering. Use the

blocks from which the cores have been removed as a support cradle whilst applying the veneer.

Foam cored wings dictate the use of torque rod ailerons connections, the ailerons are the same size and position as for the built-up version, but do use substantial pianowire for the torque rods, 12swg is fine.

My method of building conventional structure tapered wings bears description, part sandwich method, and part 'jig-sanded'. Cut out tip and root rib templates from aluminium or *Formica* and produce a roughly finished sandwich of ribs. Mark centre lines on all ribs before dismantling this sandwich. Assemble the spars onto the ribs and then contact glue



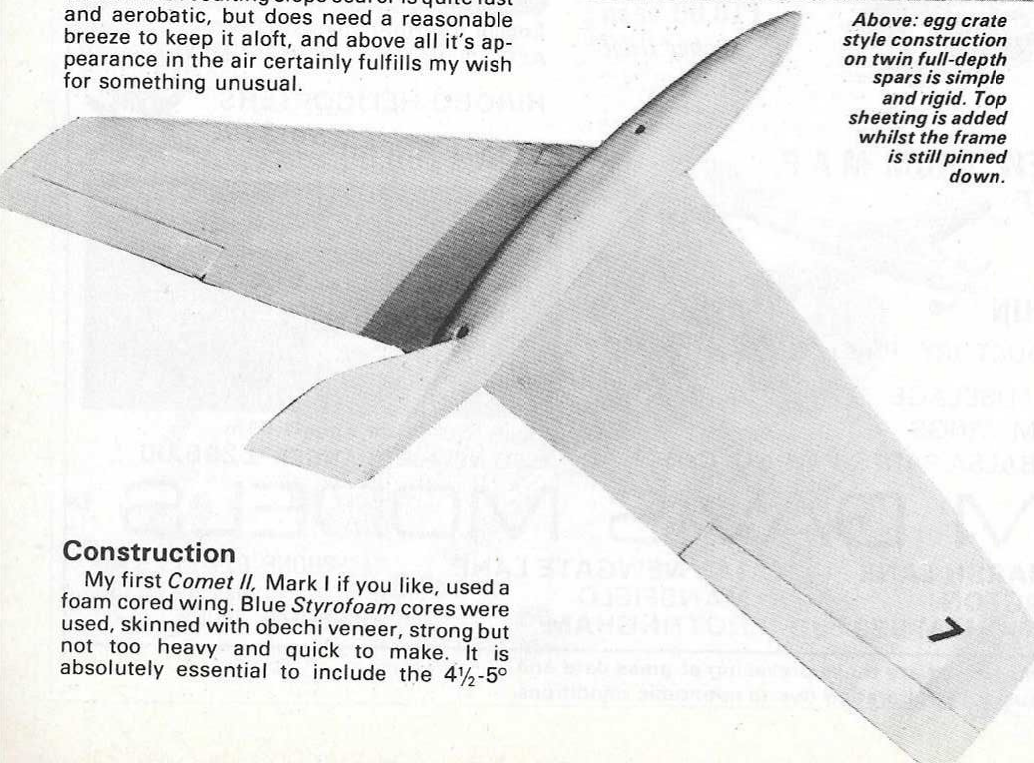
Above: egg crate style construction on twin full-depth spars is simple and rigid. Top sheeting is added whilst the frame is still pinned down.

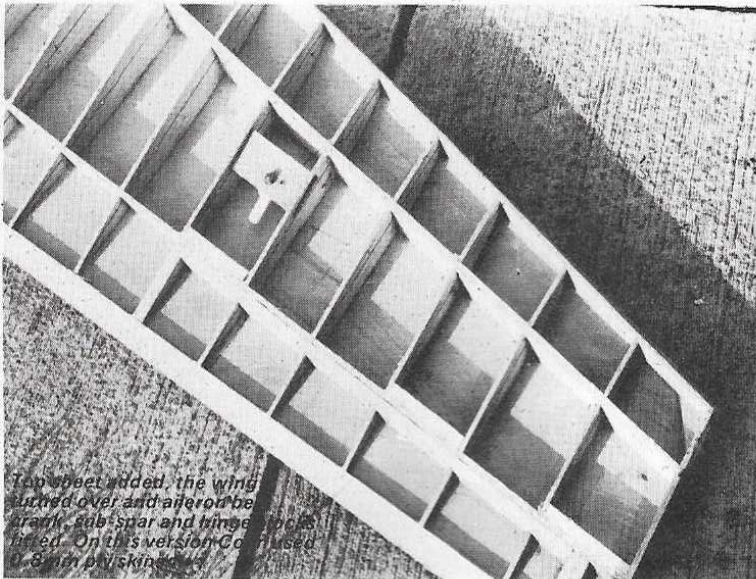
the templates onto the outside of root and tip ribs. Using a long sanding block, finish sand the intermediate ribs, running the block over the hard facings glued to the root and tip ribs. This method ensures that the gluing surfaces of the ribs match up exactly to the sheeting. Add the false leading and trailing edges and sand again. Now the top sheeting can be fitted, either with contact glue or PVA. Remove the wing thus far completed from the board, turn over and sand the underside of the ribs with the long sanding block. Add the elevon leading edge, trim off the excess spar material and sand again. Finally, before adding the top sheet, instal the elevon bellcrank and linkages.

When both wings are complete and sanded, remove the hard facing ribs from root and tip and thoroughly epoxy glue the two wing halves together upside down on the building board. Necessary cut-outs can now be made for servo installation, the holes lined with scrap balsa sheet and mounting rails installed if you do not like the idea of fixing the servos with servo tape. Reinforce the centre section joint with woven glass tape and epoxy or polyester resin, masking off the wing sheeting to prevent unwanted spread of resin. Cut out the elevons, add end facings and control horns and hinge to the wing with Mylar strip hinges.

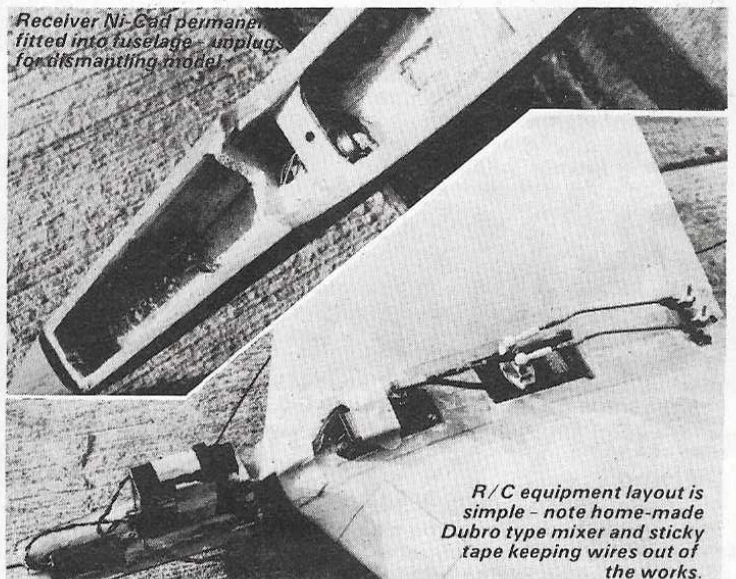
Construction

My first *Comet II*, Mark I if you like, used a foam cored wing. Blue *Styrofoam* cores were used, skinned with obechi veneer, strong but not too heavy and quick to make. It is absolutely essential to include the 4½-5°





Top sheet added, the wing turned over and aileron be-
trank, sub-spar and hinge slots
filled. On this version Co. fused
1/8 in. ply skin.



Receiver Ni-Cad permanent
fitted into fuselage - unplugs
for dismantling model

R/C equipment layout is
simple - note home-made
Dubro type mixer and sticky
tape keeping wires out of
the works.

Fuselage

This is really a misnomer, as the 'fuselage' of *Comet II* is little more than a fairing to cover the R/C equipment, and a mounting for the fin. Commence by cutting out the plywood underwing keel and the front and rear fairing pieces. Shape these carefully to match the underside of the wing. Glue on the keel and then the fairing pieces. Cut out fuselage sides and formers etc. and assemble the fuselage, making sure that the rear underside block and the nose block mate up accurately to the fairing pieces. Fit the front retaining dowel and the ply cross plate which takes the wing bolt, then fix the fuselage to the wing with rubber bands or adhesive tape. With a small drill, 1/8 in. (3.2mm), drill right through keel, wing, wing plate and fuselage

top. Then dismantle and open out the small holes to the correct size for the blind mounting nut, bolt and screwdriver blade respectively. The fuselage is now ready for carving and sanding to a smoothly curved shape.

Equipment Installation

By this time you should have a wing in front of you with two wire pushrods projecting through the upper surface and two servos fitted. The receiver can either be fitted to the front platform with servo tape, or hooks and rubber bands. Choose a convenient location for the on/off Switch and screw into place. My prototype used a 225 mAh battery pack, located in the removeable part of the fuselage; it is obviously necessary to re-

member to unplug this when dismantling the model! Do make sure that the battery pack will not foul any of the linkages if you decide to alter its position from that shown on the plan. You can, of course, move both battery and receiver around to achieve the indicated balance point.

Eleven controls require a mixer system of some description, I used a *Dubro* type mechanical mixer of my own manufacture, choice of a different type may dictate a change in servo layout. An electronic mixer could, of course, be fitted, one such as the *World Engines* 'Christy mixer' would be ideal, and of course some of the modern 'all singing and dancing' R/C sets have in-built mixer facilities. Complete the fitting of the linkages and check direction of movement. Do not

allow yourself to become confused with the mixer system, check that for aileron control *only*, everything works as it should, then check that for elevator control *only*, all is correct. When both controls are operated simultaneously they should mix as required. Set the elevons with about $\frac{1}{16}$ in. (1.5mm) 'up' on each with the *elevator* servo in the neutral position.

Finishing

Choose whatever system suits you, I used tissue and clear dope, but if an extra tough finish is required, lightweight glass cloth and epoxy resin is very good. Heat shrink film covering is quite acceptable providing your slope site is not too abrasive, the film can get very 'tatty' very quickly if it is.

Flying

Check carefully that the model balances exactly as is shown on the plan when fully assembled with all equipment installed. Charge up your R/C equipment batteries and wait for a good breezy day with the wind directly on to the face of your favourite slope.

Control movements should be Aileron $\pm\frac{1}{4}$ in. (6.5mm), Elevator $\pm\frac{1}{2}$ in. (12.5mm). My prototype weighed in at 2lb. 2oz. (1kg) in it's foam wing version. Do not fly the *Comet II* too slowly, especially in turns as drag increases very rapidly with high angles of attack. Aerobatic repertoire of *Comet II* is sufficient to provide most intermediate to good slope flyers plenty of enjoyment. Loops, rolls and bunts (provided enough control surface throw is available) are possible and *Comet II* will fly inverted. Once she is trimmed out and flying backwards and forwards across the slope you will be forced to agree that *Comet II* is an unusual and attractive sight — I hope you have as much pleasure with your model as I have from mine.



Left: Aileron servo projects into the plywood keel. Above: designer Colin Moss with *Comet II* prototype. model makes an exciting change from usual 'kippers'



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