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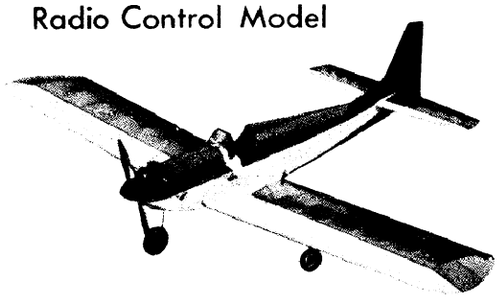
FLEETWING

54 in. Wingspan
Radio Control Model



BUILDING AND FLYING
INSTRUCTIONS

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INTRODUCTION

The FLEETWING has been designed for those modellers who have progressed beyond single channel radio-control and have now become interested in the greater degree of control obtainable from multi-channel equipment. The FLEETWING is an intermediate step between the simplest forms of R/C and the complex, large and expensive full competition multi-channel models.

Using six channels, the performance of this model falls very little short of ten channel operation and, in fact, all but three of the manoeuvres possible with the large model can be performed by the FLEETWING. These three manoeuvres are:—**(1)** the spin; **(2)** stall turn; which need rudder control and **(3)** inverted flight — which needs elevator trim.

The three controls chosen for the FLEETWING are:— **(1)** Aileron — which is essential for the low wing type; **(2)** Elevator — similarly essential and **(3)** Motor speed control. In no circumstances should the builder substitute a different control, e.g. rudder, for any of these three. However, rudder and/or elevator trim control may be added to the system if the builder possesses more channels of operation.

The most modern form of radio control — proportional, is very suitable for the FLEETWING and will greatly enhance the performance.

BUILDING SEQUENCE.

1. Start by joining the main spars and leading edges of the wing together in the middle using the braces **D1** and **D2.** Ensure all angles are equal by pinning the parts next to each other while they set.

2. Pin the tailplane leading and trailing edges over the plan, with $\frac{1}{8}$" packings under each to hold the parts above the plan. Thread all the tail ribs on to the $\frac{1}{4}$" sq. tail spar but DO NOT CEMENT. Glue **T9** in place on the tailplane leading edge.

3. Cement all tail ribs to the leading and trailing edges and pin whilst setting. The joints between the ribs and the spar may now be cemented.

4. Select one of the wing mainspars, previously joined and after cementing two **W1** ribs together to form one $\frac{1}{4}$" thick rib, glue this rib to the mainspar in the centre, carefully holding the rib to bisect the dehedral angle of the spar.

5. When firm, pin the mainspar down over the plan in the correct position on the PORT plan. Now add the rest of the ribs in the port wing, packing up the trailing edges of all the ribs the same amount to align them properly.

6. Glue on to this assembly the $\frac{1}{4}$" × $\frac{1}{8}$" T.E. strip, followed by the upper spar and the leading edge. Leave to set firmly.

7. Meanwhile, return to the tailplane. Remove from the plan and cement parts **T6, T7** and **T8** in place. Carve elevators to triangular section and join with the elevator horn. Remove all pins from the tailplane and sand the L.E. and the T.E. to the correct sections. Finish by rubbing down the entire tailplane lightly with a very fine grade of sandpaper.

8. After carving angles into the elevator front to allow movement, hinge the elevator assembly to the tailplane. Ensure free movement.

9. Remove wing assembly from plan and pin down starboard lower mainspar to the STARBOARD wing plan. Slide all ribs into place between the two projecting spars and cement in place. Cement all Rib/leading edge joints.

10. Glue Starboard $\frac{1}{2}$" × $\frac{1}{8}$" T.E. in place, again being careful to gain accurate alignment of all ribs. Leave to set.

11. Join the two halves of each fuselage side holding a ruler along the upper edge to ensure alignment. Add the ply forward and the balsa rearward doublers.

12. Remove wing from plan. Remove scored section of rib **W1** and cement servo tray in position, followed by parts **UC1** and the 1" × $\frac{1}{16}$" T.E. sheets.

13. Mount servo and aileron bellcranks. Join with wire push rods, add aileron quick-links and check operation of servo. When satisfied, glue $\frac{1}{2}$" × $\frac{1}{2}$" hardwood U/C key blocks in place using white glue and leave to dry.

14. On to Former 1 ($\frac{1}{4}$" Ply) mount preformed nose U/C leg, using clips provided.

15. Glue engine bearer to RIGHT fuselage side followed by **F1, F4, F3, F2, F5, F6** and **F7** in that order. Use a try-square to ensure that all formers are perpendicular to the fuselage side. Add second engine bearer and $\frac{3}{16}$" × $\frac{3}{16}$" tailpost. Add LEFT fuselage side.

16. Drill $\frac{1}{2}$" × $\frac{1}{2}$" U/C key blocks for main U/C legs. Mount legs to parts U/C1 in wing with clips provided. At this point, the four panels of leading edge sheeting are cementing to the wing followed by the centre sheeting (parts **CS1** and **CS2**) and all rib capping strips. Cut away the upper **CS1** and **CS2** parts where shown on plan for access to aileron servo.

17. Trim all spars, sheeting, etc., level at tip rib and cement wing tips in place. Glue all tip gussets at this time to hold tip centrally upon and perpendicular to the end rib.

18. Cut a six inch length from each preformed aileron and glue to wing trailing edge at centre. The moving ailerons may now be angled at their L.E. and hinged to the wing. As with elevator, check for free movement. Mount control horns on the ailerons, connect to quick links and again check operation by working the servo.

19. Join fuselage sides at rear end, insert **F8** and then the Tailplane/ elevator assembly is mounted in place using pins to hold whilst the cement sets. At this point it is a good scheme to offer up the wing to the fuselage and by sighting from the model the tail can be moved if necessary to align with the wing before the cement sets.

20. The elevator servo must now be mounted and the elevator pushrod made and installed. Check operation.

21. Sheet the bottom of the fuselage from **F7** to the tailpost with $\frac{1}{16}$" sheet, grain side-to-side. Add the $\frac{3}{16}$" × $\frac{3}{16}$" strip in the centre of the sheeting. Glue wing dowels in place.

22. Mount the receiver and servo battery pack (DEACs are recommended) in the space between **F2** and **F3**, passing leads through **F3** and running along to the receiver ON/OFF switch. This switch may be mounted anywhere convenient between **F3** and **F6.** Cement $\frac{1}{2}$" thick forward bottom block in place. Cut away block to allow the nose leg to bend back about 45°.

23. Mount engine in place and after soldering a wire across each pair of bolt heads to lock them, glue the lower noseblock in place. Lightly glue the tank hatch block in place temporarily between **F1** and **F3.**

24. Carve the tank hatch to outer shape, then glue 3" × 3" × 2" block to fuselage sides from **F3** to **F5.**

25. Shape the rear end of the top rear block to fit snugly over the tailplane, cement the block in place and fit the $\frac{1}{2}$" sheet pieces at the cockpit position.

26. Glue the fin and ruder parts together and leave to set, pinned to a flat surface.

27. Carve the entire upper fuselage top to its final shape, make the headrest fairing and cement this in position. Allow to set.

28. Sand the entire fuselage smooth with a fine grade of sandpaper and apply a couple of coats of sanding sealer, sanding smooth after each coat has dried.

29. Remove the tank hatch and hollow out to clear the tank. Mount the tank in place temporarily and check the fit of it and the hatch. Remove the tank and lightly tack-cement the hatch in place.

30. Sand the fin and rudder to section, rounding off the leading edge and tapering the trailing edge, then cement firmly in position, checking the alignment carefully.

31. Mount the engine servo in place and connect to the engine with **16G** wire. Instal charging sockets, etc., and check out the radio gear according to the manufacturer's instructions. See that there is a minimum of $\frac{1}{2}$" of foam rubber surrounding the receiver for vibration and crash protection. When satisfied that the R/C gear is operating smoothly and reliably, remove the receiver, servos and also the engine.
The model is now ready for covering and finishing

COVERING AND FINISHING

There are many methods of finishing a model like the FLEETWING but the one recommended is as follows:—

1. Give the model two heavy coats of clear dope, sanding lightly after each.

2. Cut panel of heavyweight Modelspan to size for a given part, such as one wing panel upper surface, etc. Hold under water tap, squeeze out excess water until just damp and lay over the surface to be covered. Heavyweight Modelspan must be used for this job.

3. Again using clear dope, paint through the damp Modelspan, around the outline, to the wood below.

4. When the clear dope and paper dry the result will be a taut covering job. The areas where clear dope contacted damp paper will have blushed, this need not cause alarm at this stage.

5. Proceed in like manner for the rest of the entire model.

6. When the whole model is dry, apply two further coats of clear dope. It will be noticed at this time that the previous blushing will have disappeared.

7. The rest of the finishing process from this point is a matter of choice. If the builder requires a high degree of finish, more coats of clear dope should be added to the open tissue-covered areas, while over the sheet and block areas three or four coats of sanding sealer should be applied, with a light sanding between each.

8. The model's surface should now be smooth, flat and reasonably polished.

9. Colour paint may now be applied in a scheme to suit the taste and desires of the builder. Two main types of paint may be used: (*a*) ordinary model-type cellulose dope, followed by a coat of fuel-proofer (Marjonos is the best for this), or (*b*) a colour polyurethane paint may be used, in which case no additional proofing is necessary.

10. Any transfers to be used may now be applied and finally the acetate windscreen may be cemented on to the model.

11. Whichever painting scheme has been chosen, it is best to leave the model a week or so before flying in order to allow the fuelproofer or polyurethane to become completely "cured". Meanwhile the pre-flight check can be carried out.

PRE-FLIGHT CHECK

As is well known, the first one or two flights of any model are far and away the most critical. If these can be made with success the whole future of the model is assured. The success or otherwise of these first flights is largely dependent upon accurate alignment, correct c.g. position and proper tracking of the wheels.

Firstly, assemble the model and place upright on a perfectly level table. Block up the nosewheel until the tailplane is exactly level with the table. Take a measurement from the centre of the leading edge of the tailplane to the table, similarly from the trailing edge to table. Both measurements must be equal. Now measure the wings which also should be level with the table. If they are not, i.e., if there is a small amount of positive or negative incidence on the wings, this must be removed by carving away the fuselage sides until the wing is at zero incidence. This alignment is **critically important.**

Next, the c.g. position must be determined and brought to within $\frac{1}{4}$" of the position shown on the plan. If incorrect the R/C equipment may be moved fore or aft, or weight added to nose or tail.

The tracking of the model also is important since we have no rudder control by which to steer the model on take-off. Take the model out into the road and push along to establish the tracking. A turn to right or left must be corrected with the heading of the nosewheel.

Now sight the model carefully by eye to see if any warps are present in the wings or tail. If any are found these must be removed by steaming. Check also the motor thrust-line and generally inspect all screws, etc., for tightness.

Finally, a complete and thorough check of radio equipment operation must be made. Give each control a hundred or so commands— and if any fail ONCE, find out why. Never fly a radio model with suspect reliability of equipment. This would be dangerous and, anyway, you never win!

FLYING.

If at all possible it is wisest to gain the help of an experienced radio pilot (contact your local club and ask for the best "radio" man) to perform the duty of the first flight, as he may well be of great help.

If, however, you are forced to proceed alone, here is the way to go about it but use extreme caution at all times. After starting the engine set the "idling" speed as low as possible. Head the model into wind, advance the engine speed to FULL and allow the model to gain some 30 m.p.h. before giving a very short pulse of "Up Elevator" to lift the model off. Be ready to correct any dip of either wing with a pulse of "Aileron" control. All signals in reed multi-channel flying are of very short duration — about $\frac{1}{8}$ sec. or $\frac{1}{4}$ sec. unless performing a manoeuvre.

Allow the model to gain a fair amount of height as altitude is a good safety factor. Remember when the model comes toward you that aileron control is reversed. Practice this point on the ground until familiar with it. Always remember if trouble looms **(1)** Immediately reduce engine speed to lower the airspeed of the model and **(2)** "Up" elevator is of no use in preventing a dive unless the wings are level with the ground. "Up" elevator applied to a model which is in a banked turn will only increase the turn.

Probably the wisest course is to gain plenty of height and then throttle the engine back to low speed, because control will be much gentler on a slow model and more time is available to think. For the first few landings, concentrate on getting a GOOD landing and do not worry too much if the model is a fair distance from you. Precision of landing point can come later, as will manoeuvers.

Good multi-channel flying is all a matter of reflex action, commands are seldom thought about but seem to happen by reaction to a given situation. When this becomes familiar to you the model may be manoeuvred like any full-size competition ten-channel model. But always remember a couple of flights with help from an experienced pilot will teach you far more than any amount of written instruction.

Happy Landings!