

## Building and flying

As a basic design and construction exercise *Little Sparky* is probably the smallest size electric R/C model capable of flying in all but the roughest (above 25mph winds) conditions, and even in those in the hands of a skilful pilot. It is cheap and quick to build and incorporates such features as a complete 'motor and undercarriage tray' and 'radio mounting frame' in to which the most complex parts of the model are assembled with complete accessibility and ability to be tested before installation in the model. The motor and battery used are the Astro 02

(radio control version). The radio comprises two of the sub-miniature servos each weighing no more than 21g ( $\frac{3}{4}$ oz) now being introduced by several manufacturers, a two channel radio receiver, stripped of its protective case then mounted on foam rubber, and four 100ma/hr cylinder nicads. The complete radio is mounted in a frame as shown in the full-size parts layout, the final shape and size of this frame being determined by the equipment used. The all-up weight of the 'radio mounting frame' complete should be about 100g, say 4oz. The radio battery (if using cylinder cells) may be rapid charged if required, but is capable of more than one hour's operation, which should be sufficient for most purposes. The flight duration is approximately five minutes with a full charge.

**Construction:** Start by making and assembling the motor and undercarriage tray. If the pilot is left-handed it would be as well to reverse the location of the motor ON/OFF switch and the airscoop. The lever of the switch (Astro or Tandy (Radio Shack) 274-324 or 326) should be arranged to push *forward* for 'ON'. A semi rigid plastic tube

(an empty ink tube from a ball-point pen is ideal) long enough to extend about 12mm ( $\frac{1}{2}$ in) beneath the undercarriage is slipped on to the lever; when it strikes the ground it will move the switch to the 'OFF' position. Obtain or make a thin cardboard tube capable of accepting the motor and holding it firmly, cutting away at the back for cooling air exit, then assemble to F1, using an oversize piece of balsa for this purpose. When dry cut to final size and chamfer edges as on G/A (general arrangement) drawing. Assemble all parts to the tray and wire up. Fix the airscrew and give a short charge (no more than one minute). Check that the charging is correct. Switch 'ON' (avoiding the airscrew)

whilst holding firmly then simulate the method of launch, ensure that the motor rotation is correct and that the motor switch is conveniently positioned. If you are not absolutely satisfied now is the time for changes, not when the tray is assembled to the model. When finally satisfied discharge the battery, remove the airscrew and motor operating tube, then tape over the motor cooling holes to prevent the introduction of foreign matter during remainder of construction.

Cut out the fuselage sides and assemble to radio mounting rails and stiffener. Assemble F2. When all dry, assemble fuselage sides to F2 and motor/undercarriage tray, then add the top *front* skin from nose to wing position only. When all dry, pull the rear fuselage together with a gap of 6mm ( $\frac{1}{4}$ in) to allow for elevator pushrod and cooling air exit. Then add tailplane, together with remainder of top and bottom sheeting. When all dry, sand to finish, adding fin and dorsal fin.

Cut all wing parts and assemble – note the location of dihedral brace 'X'. When all dry, sand to finish.

Cover model with lightweight tissue and dope using the minimum required to seal the tissue. While drying the wing should be held or pinned down to incorporate 6mm ( $\frac{1}{4}$ in) washout (negative incidence) at both wing tips. Ensure no warps are present in structure – steam out if required.

Sew on rudder and elevator with strong thread using 'figure eight' stitches and making sure they move freely. Make and fit control horns and wing mounting dowels.

Temporarily slide in radio mounting frame, with radio installed. Strap on wing, using rubber bands. Check the centre of gravity, moving the radio frame to obtain correct

balance, and when finalized drill and attach with woodscrews. Make up rudder and elevator pushrods and assemble in the correct sense, adjusting the location to provide no more than 3mm ( $\frac{1}{8}$ in) left and right movement, together with 6mm ( $\frac{1}{4}$ in) up and down on the elevator. Remove tape from the motor, fit the airscrew and motor operating tube, charge the radio battery and finally check again for balance and warps.

'Little Sparky' is a tiny model, but if you can cope with the radio-mounting frame, the rest is straightforward. The design is based on a full-size home-built, 'Big Willie', built in Holland. Top picture shows the ink-tube 'off' lever clearly.

## Flying

Choose a very calm day. Charge the battery for no more than 20 seconds, switch on radio (check the operation) and launch smoothly into wind, switching on motor. Watch for a smooth straight descent, adjust controls if required, and repeat the procedure, increasing the charge time when satisfied to one, two, and four minutes before using a full charge. Small models are sensitive to any control changes. Whenever any work is carried out on the model or the radio is removed, always go through this trimming procedure. It is quick and easy and reduces the chances of damage enormously.

One final point, small models are difficult to judge at any distance – try to fly close to yourself when near to the ground but don't try any violent turns to do so. Select a good colour-contrasting tissue for covering and keep the weight as low as possible.

