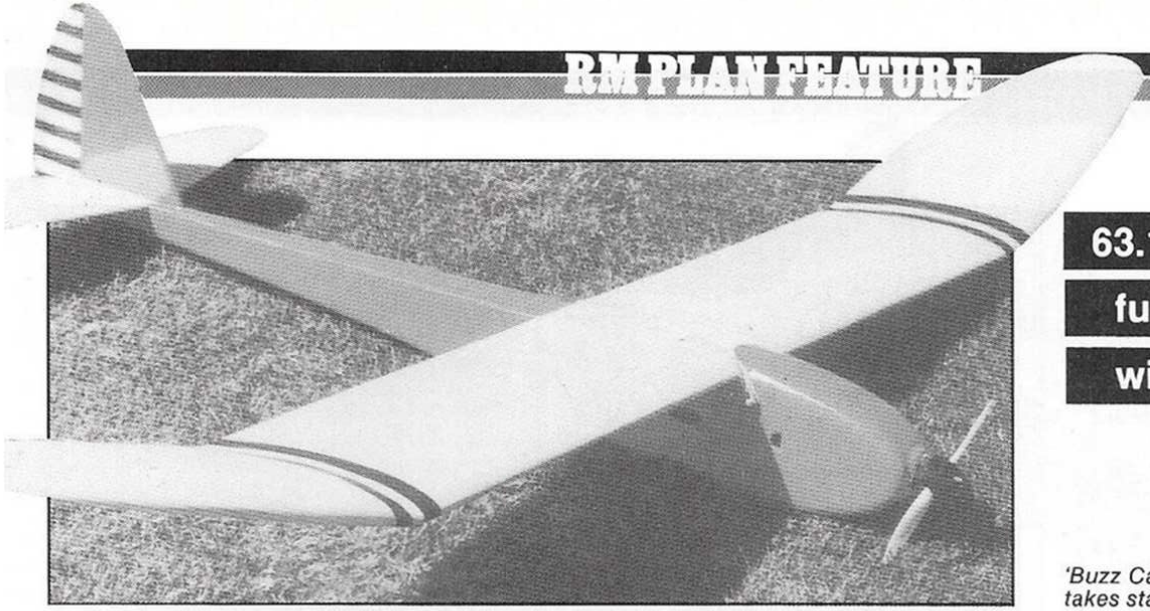
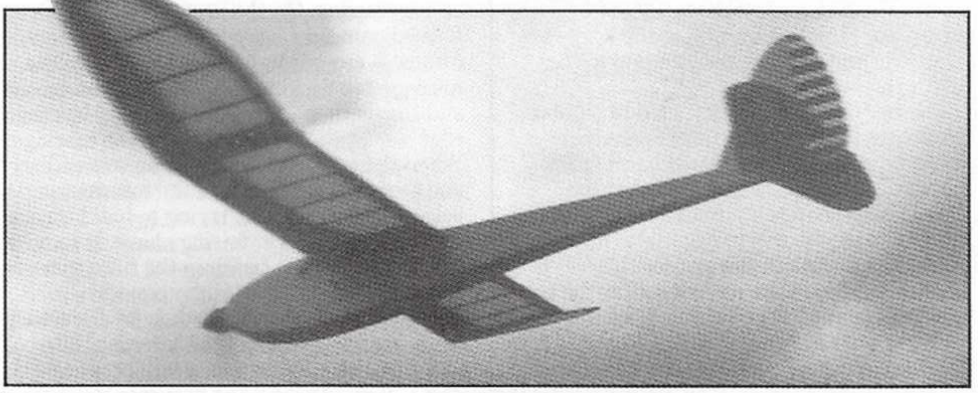


63.1/2 inches of three-function electric fun

with Andrew L. Reid

'Buzz Cat' has pleasant vintage lines; takes standard buggy 540/550 motors.

BUZZ-CAT



The original idea for 'Buzz-Cat' developed from previous experience with diesel powered models which used the concept of combining relatively modest power with a good gliding performance to obtain a relaxing, easy to operate machine for Sunday flying. Well, almost ideal that is, since diesels, or glow motors for that matter, produce a great deal of oily mess which quickly spreads itself over both model and operator with complete impartiality!

The next step towards the truly ideal sports model was logically to replace the two-stroke motor with a clean, convenient and quite electric power unit. After a little head-scratching it seemed possible that a model could be produced at about 5ft wing span, having a target wing loading of 14oz/sq ft which would retain sufficient gliding performance to make use of available upcurrents, without being too flimsy for knock-about sports flying. The end result was a design somewhat reminiscent of certain continental power duration types of the late 1940s and early 1950s, and although never particularly intended to be vintage, it is a style which should have a fairly wide appeal. The name 'Buzz-Cat' was selected as having a suitably 'jive' period flavour...

Prospective buiders will find that a standard electric car motor with prop-adaptor and a 6 cell 7.2 volt battery pack will provide entirely adequate power for 'Buzz-Cat', but it is recommended that compact radio-equipment (not necessarily fully miniature) with a 270mA. nicad is used. Performance depends upon keeping wing loading below about 150z/sq ft and every bit of sensible weight saving helps in this respect. The prototype built as described in this article turned the scales at 2lb 8oz giving a wing loading of 13oz/sq ft but it is just as robust as any two-stroke powered sports model.

It is essential that some form of transmitter operated motor control is employed, and in the interests of complete flying safety this should be done using a third channel on the transmitter, separate from the main flying control functions of rudder and elevator. A proportional motor-speed controller is suggested as these can now be obtained for only a little more outlay than a compact servo plus micro switch, and will be a worthwhile investment if the electric flying bug bites.

Building 'Buzz-Cat' is perfectly orthodox and should be well within the capabilities of the average modeller. The most important thing to remember is to maintain rigorous weight control at all stages of construction. Electric motors of the type under consideration here are not super high-power units and performance will be sluggish if you build heavy. The secret is 'strength with lightness'.

Fuselage

Construction of the fuselage could hardly be easier, but as the cross-section dimensions are determined by the method of motor mounting it is necessary to make a decision on this item first. The simplest motor mount is a 1/32in plywood tube rolled around the motor so that a tight push fit is obtained when the motor is inserted from the rear; the completed tube is epoxied to suitable doublers on the fuselage sides. The internal width must in any case be sufficient for the battery pack to be inserted with reasonable ease.

Alternatively, the motor mount may be made removable by epoxying dural lugs onto the sides of the ply tube and reinforcing with glass cloth; this mount is then screwed to short hardwood bearers, epoxied to the fuselage sies. (A suitable commercial motor mount may be used if preferred). The fuselage sides are parallel back to former F2 and thus the width of this former will be decided by your choice of motor mounting and size of battery pack. The prototype used the simplest ply-tube method, which eliminates the need for an access hatch, but which has the disadvantage that alignment of the thrustline must be absolutely spot-on during construction.

Having made or obtained the motor mount and cut out formers F1, F2, and made up floor-pan F3 to suit, the basic fuselage sides are cut out and assembled. Bending the 3/16in square longerons around the tight curves at the nose can be achieved

by making a series of saw cuts in the strip and carefully cracking it to follow the curve. Start final assembly by epoxying F1, F2, floor-pan F3 and the motor mount (or bearer) to one of the fuselage sides, remembering that all-important check on the alignment of the motor mount.

Allow the epoxy to completely set before glueing the second side to the formers and drawing together at the rear; note that the longerons are tapered slightly at the tail end. Complete fuselage assembly by adding top and bottom sheeting (with grain lengthwise) and planking around the nose curves with 1/2in wide strips of 1/4in thick balsa (with grain crosswise). Some trimming will be required to clear the motor mount.

When all adhesives have set, final shaping is carried out using razor-plane, sandpaper, and rasp or file around the nose. Aim for a pleasantly rounded shape, but do not remove too much material from the longerons. Any gaps in the nose planking may be filled with car body filler or plastic-wood. The front end of the prototype was further strenghened by applying a layer of 1oz/sq ft glass cloth using thick clear dope as adhesive. The opening for the battery pack may most conveniently be cut out after the fuselage has been completely covered and finished. If preferred, a hatch may be employed rather than simply leaving the battery exposed, but some holes for ventilation should be provided in either hatch or fuselage sides.

Wings

The aerofoil section used on 'Buzz-Cat' is flat-bottomed so construction is quite speedy. Start with the centre-section by pinning down the trailing edge, lower cap-strips, centre bays sheeting and leading edge sheeting. This is followed by the bottom spar, ribs and the 1/8in ply dihedral – braces. Tilt the end ribs to the required angle using the template shown on the plan.

Away she goes! Average flight times are in the 20 minutes range on six cell 7.2v power.

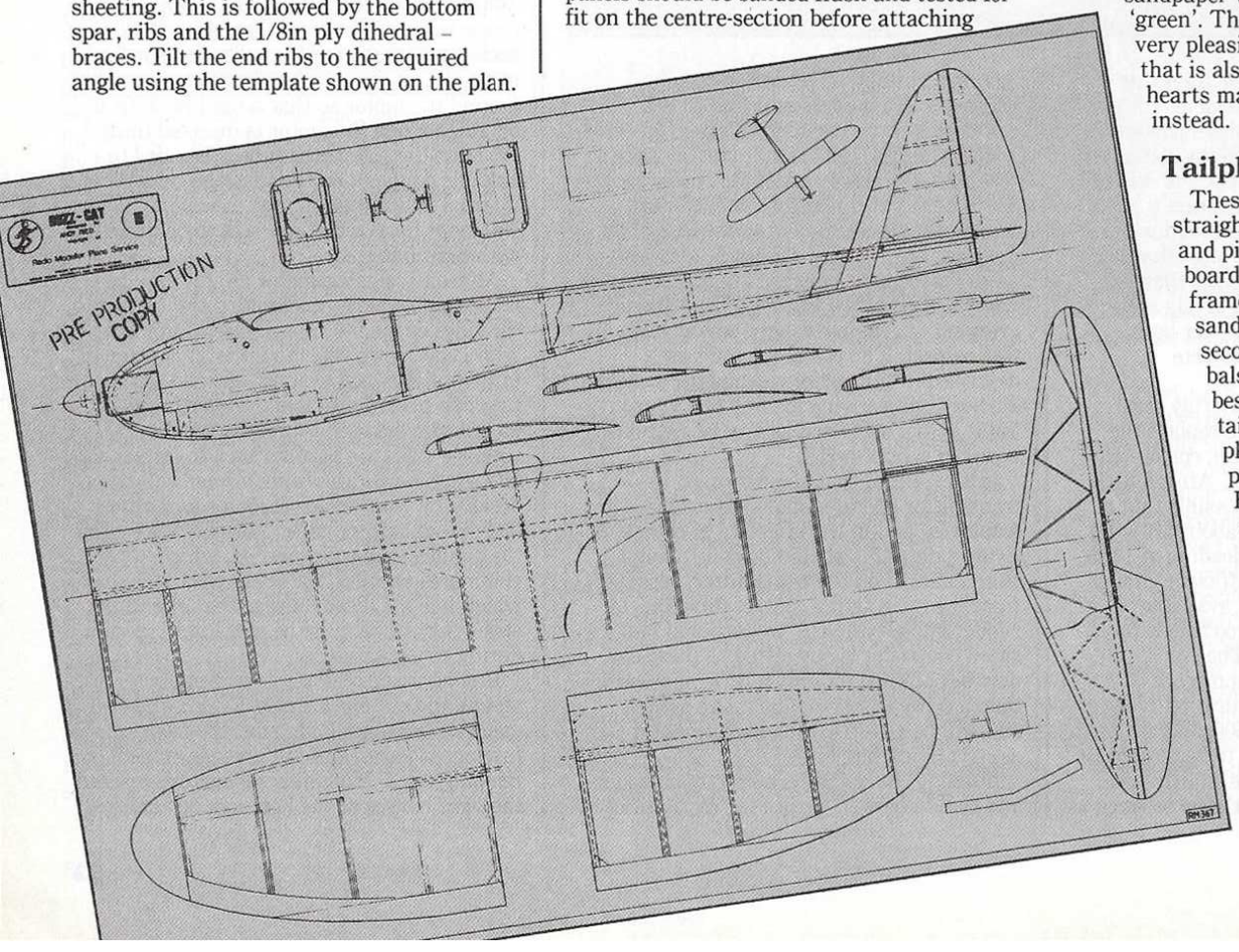
Complete the basic framework by adding the top spar and the false leading edge. The panel may now be removed from the building board and the tops of the ribs, etc., sanded flush to receive the top sheeting and cap-strips. Finish of by adding the leading edge strip and carving and sanding to the final wing profile.

The tip panels are constructed in similar manner to the centre-section, the only differences being that tapered balsa spars are used instead of spruce, and that the leading edge strip is laminated from four lengths of 1/8in balsa to negotiate the curve. It is easier to cut out the slot for the dihedral braces in the root ribs after the tip panels are complete and the ends of the panels should be sanded flush and tested for fit on the centre-section before attaching permanently in place.

Having completed the whole wing framework, test for seating and alignment on the fuselage before adding the centre-section fairing. On the prototype this was formed using car body-filler. A 1/16in ply former is cut out to match the curve of the fuselage top decking in front of the wing, and this is then epoxied to the wing leading edge whilst the wing is fixed to the fuselage. When the epoxy has set, mix up some filler, and carefully work it onto the top sheeting behind the ply former, trying to build up a smooth and uniform fairing shape. It may prove necessary to build up the filler in a couple of layers, depending upon its viscosity. Final shaping is done by file and sandpaper whilst the filler is still 'green'. This method will produce a very pleasing and accurate fairing that is also very durable, but fainter hearts may of course use balsa instead.

Tailplane and fin

These items are quite straightforward. Cut out one side and pin down to the building board. Assemble the interior framework on this side and sand level prior to adding the second balsa skin. The solid balsa rudder and elevator are best tack-glued to the fin and tailplane so that both can be planed and sanded to final profiles in one-piece. Hinging of the control surfaces may be by means of mylar strips, or by using the covering film itself as preferred.



Finishing and assembly

The method of covering and finishing used on the model may be a matter of personal choice, bearing in mind the need to save weight wherever possible. The prototype used Solartex on the wings and tailplane, with old fashioned dope and tissue on the fuselage and fin, and Humbrol enamel for colour. Solarfilm could be used throughout, and will probably be the first choice for most modellers.

Once the airframe is covered, cut away the opening (or access-hatch) for the battery in the fuselage bottom. Some builders may also prefer to have an access hatch for the motor in the nose (essential if not using a built-in motor mount). Now is the time to make up the wiring harness for motor, speed-controller, and battery. (Much valuable information can be obtained on this subject from Ian Peacock's book on electric flight* which is well worth reading before starting out in this field).

The wiring harness is unfortunately quite a bulky item, the heavy duty wiring cannot be tucked away in the manner of servo leads, and in addition, a fuse (to protect the speed-controller), isolation switch (for operational safety), and plugs to motor and battery (for ease of removal) are desirable items. Space can be saved by making a built-in wiring harness specifically for the model, but swapping equipment to a second airframe becomes much more difficult.

It is best to install the motor and completed harness in the model before planning the radio control fitments. In this way the servos, nicad, etc., can be juggled around to obtain the most satisfactory arrangement for operation and correct balance of the model. (In the prototype, the 270ma. nicad ended up behind the former F2 to balance the finished model at the correct position). If all this sounds desperately fiddling, fear not, 'Buzz-Cat" was designed to ensure that all the equipment will go in with a minimum of fuss. The method of locating the battery shown on the plan using foam rubber pads at front and rear, has proved simple and efficient. The battery pack is pressed down onto the rear foam pad and locked in place by sliding a ply or plastic strip between battery and the tops of the fuselage longerons until the battery pack is firmly held. (This system may be used with either open fuselage bottom or hatch). Do not forget that the model must be balanced with the battery pack in place.

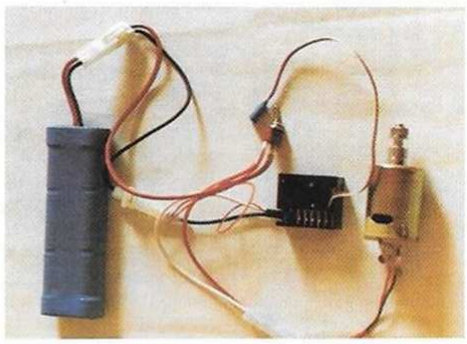
Flying

Provided that your 'Buzz-Cat' has been constructed accurately in accordance with the plan, and with the balance point in the correct position, first flights should be perfectly satisfactory, with trimming restricted to minor adjustments of elevator and rudder to achieve straight and level trim. The prototype was rigged with the balance point at the most rearward location (35% wing chord) using some down elevator trim so that the tailplane acts as a 'lifting' surface. This set-up is very responsive to up-currents, but heavy handed fliers may find it rather too sensitive for their taste.

As with all relatively low powered sports models maximum flying enjoyment is to be had when full use can be made of thermals and/or weak slope lift (shallow slopes can generate a surprising amount of lift once the model has climbed up into smooth air away from the influence of ground effect). The facility with electric models to switch the motor on and off at will in flight gives them a great advantage over their two-stroke brethren for this type of flying. Flight duration will depend upon length of motor run, lift availability, and your skill in taking maximum advantage of it. The prototype has averaged about 20 minutes per launch, the longest flight being a cross-country of 45 minutes duration using thermals and weak slope lift along the way. All flights have terminated with sufficient power left in the battery to switch-on and 'go round again' if the landing approach was not quite satisfactory.

The usual mild rudder/elevator aerobatics i.e. loop, stall-turn and spin with the occasional barrel-roll are quite possible, but should be commenced with a shallow dive to build up speed beforehand, as with gliders. It is recommended that you experiment with various propellers to find the most efficient diameter and pitch combination for your particular motor and battery installation (a 7″ x 4″ Topflite proved best on the prototype). Field equipment in the form of charging monitors, spare battery packs etc., is a matter of personal preference and funds.

In conclusion, 'Buzz-Cat' will be found to be a very satisfactory sports power model, robust and easy to operate, without the inconvenience of fuel and exhaust mess, and above all with an almost uncanny quietness that should not antagonise even the most sensitive of public ears. There is no doubt that electric powered flight is going to be very significant for aeromodelling in the future, so why not build a 'Buzz-Cat and get started right now?



Lightness is everything with electric models. More exotic motors and high power cells are optional extras but, if you build sensibly, you'll have plenty of fun with basic buggy equipment (like that illustrated at left) at a fraction of the cost!

* *'Introduction to Electric Flight' by Ian Peacock. Price £6.95, published by Argus Books*