

A simple Club 20

T-BIRD was first drawn up in its Mark One form, four weeks before the first Club 20 meeting. Construction therefore had to be simple. The model was completed one week before this first meeting, test flown but found to be full of minor faults, not to mention a very 'green' pilot, with equally as many faults. 'T-Bird' was not therefore flown at this meeting, held at the Nene Valley site, but I attended anyway and got rather wet. Nevertheless, I had a very enjoyable day and learnt a lot from watching and chatting to other pilots, some equally as 'green' as myself.

During the next few months, 'T-Bird' made many flights, both test and racing. In this period it became evident that the model could be fast and had winner potential *if* consistency could be maintained, but very much depended on pilot, prop, plug and model match. (The typical pylon racing situation in fact). Various combinations were tried on the Fox-19 motor and we eventually arrived at Taylor plugs and a cut down Tornado 8x6 prop. (The right prop took a long time to find, so be patient.)

All along, the engine had been mounted in the inverted position, which looks nice, but as most races this year did not require an

undercarriage, the engine took rather a hammering on landing. (Created starting problems too). One day the inevitable happened - the engine complete with wood bearers parted company with the rest of the model. This gave me the opportunity to carry out modifications which I had been considering - hence 'T-Bird Two' which is presented here. After a few more test flights our green pilot (not now quite so green) managed an encouraging third at Avon Cosmetics (amazing how a place in the frame gets your tail up), second at Cranfield, and first at North Berks. and finally a fourth place at Sutton Coldfield due to dirt in the fuel line (there's a moral there somewhere).

You may be wondering what all the foregoing waffle is for. Well, I thought for the new Club 20 pilot, as I was, it would be an encouragement and for anyone contemplating building 'T-Bird' it would give them a little confidence that the model had some development and effort behind it.

Now for the technical details? Since I'm a simple soul, technical may not be the right word, but here's a brief description of why 'T-Bird' looks like it does.

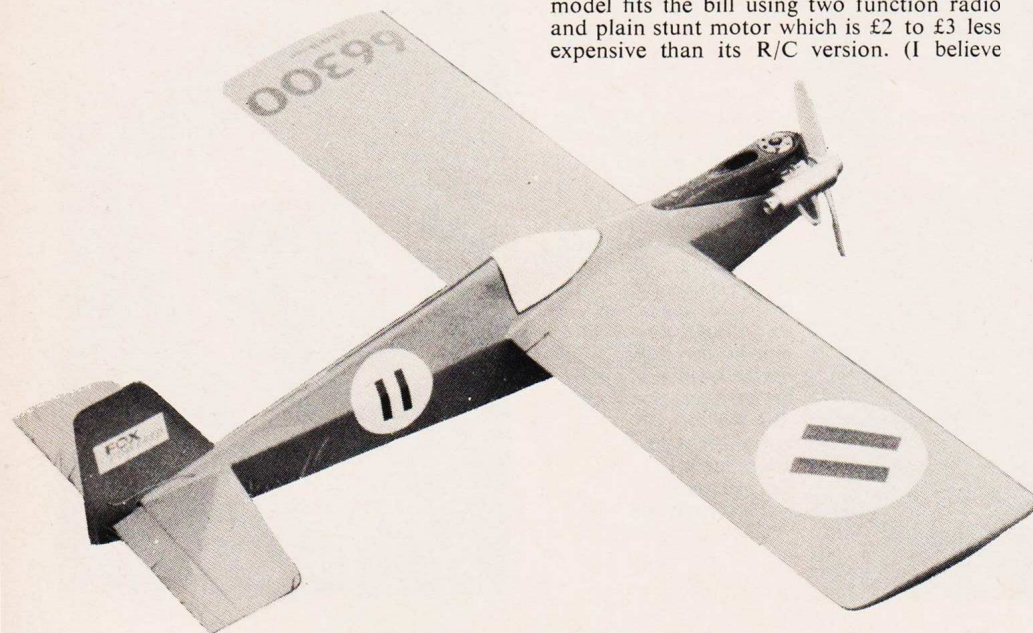
In the original proposal for this class, economy was of major importance. This model fits the bill using two function radio and plain stunt motor which is £2 to £3 less expensive than its R/C version. (I believe



I'm right in saying that the Fox 19 is the cheapest motor in its class). The amount of wood in the construction is also relatively small, particularly if a foam wing is used as on the original. The shape originated around the full size Cassutt racer. This aircraft being rather chunky, I slimmed it down a little don't you think? The wing section at the root has its origin in the 'Eppler 374' and at the tip, the top part of this section was thinned. These sections were chosen, as I have used this type of section to good effect on slope soarers, where low drag and high speed were required. The fin has been kept large for accurate and straight flying. Tail surface, well . . . it does its job after all! An engine cowl is used with cooling and drag in mind, although if you prefer, with minor modifications when constructing the fuselage, the cylinder may be dangled in the air stream. Regarding the cowl, no overheating problems have been experienced to date, although with the weather we have had this summer, liquid cooling for yours truly has been welcome.

Construction

I do not intend to give copious construction notes, as this model is no trainer, though I hasten to add, not difficult to fly, but more of that anon. Design is very basic, so the wing is of conventional construction. The one point I would emphasise is that no dihedral is used, but when the wing is joined, do it

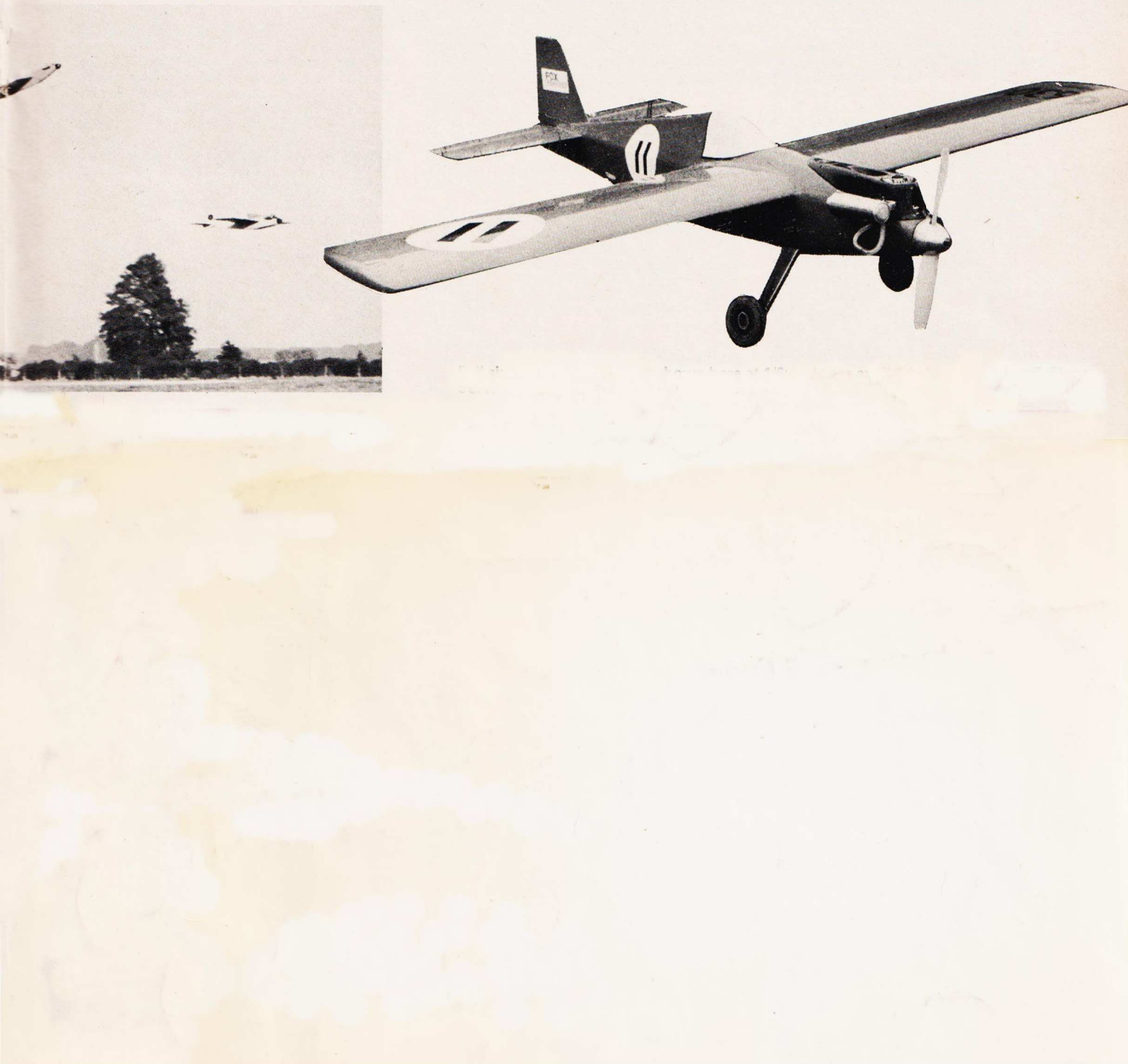


APRIL 1976

BIRD

By
CLIFF STONE

racer with a proven performance — for the new racing season



upside down on a flat surface. I would be interested to see 'T-Bird' with the built up wing, as the plan shows. The original used a foam wing—a personal preference in that I find it quicker and foam wings do not suffer from covering sag. In this light, it may be worth considering a fully sheeted built-up wing.

Make up the basic fuselage and glue the wing and tail to this. Add 3/16 inch spine and bevel to correct angle, after which the top decking can be cut and tried for fit, gluing into place when correct. Add canopy or block for canopy and roughly shape. The fuselage front end should now be added with engine in situ and tank installed. (Do not forget to block up carb and exhaust with tissue paper). Add sheeting to tank bay and 3/16 inch. around engine. Very rough shaping only can now be carried out, but take care not to remove too much wood at this stage.

The engine cowl may be something new to you, it certainly was to me. It took a long time to build as I had no guideline to work to apart from F.A.I. racer plans and only an old article or two on the subject. It is made up from sheet laminations as indicated on the plan with the engine still *in-situ*. Cut a hole in each of the top laminations for the cylinder head, to give 1/16 inch. clearance all round. The two lower side sections on one side will have to be cut to drop over the exhaust stack, and the hole left under the exhaust can be filled with scrap, glued to the lower fuselage cowl. Top cowl will then lift off without removal of the silencer. When satisfied with fit, glue laminations together, and tack glue the whole to the fuselage, sand to rough shape and cut out the air intake, not forgetting the carb. needs direct air access. Remove and file air outlet which should be 1 1/2 times the size of the intake. The insides of the cowl should be smooth to aid air flow. 'Polyfilla' or equivalent will fill the grain nicely. Intake size on the original is about 1 inch x 1/4 inch. overall. Add fixing screws and dowel locators and sand to final shape, taking care to ensure that the inside of the cowl is smooth.

There are other factors to winning races than just a fast model, which I would like briefly to detail. Take great care when running-in your motor. If done properly it can be a long job but will pay dividends in the end. My own motor seems to be just reaching its peak after a whole season's racing

Right: internal shape of engine cowl is important. Should fit tightly around cylinder head so that air is forced through fins. Air outlet much larger than intake to permit free air passage. Far right and bottom right: motor installation showing Fox 19 motor. Below: two function radio installation for elevator and ailerons. Underside radio hatch as airframe is one piece.

Try to get 'caller pitman' who can go with you to most meetings so that you can build up an understanding with each. Barry Marshall, my 'caller' has pulled me round a number of bad races (we all have our off periods). He also helps me to keep my 'cool' which is very important.

A point I would like to make here concerns the 3/8 in. elevator movement. For normal racing, that's when you are well in the lead, at least half a fuselage length, about half movement is adequate, but when one is behind, pressure can be put on the leaders. This is where a good 'caller' can be invaluable in that he can watch the opposition and pull you that bit tighter. But be careful as it is so easy to cut a pylon in this situation and is not the idea. Whilst on the subject of flying, of course if it is your first attempt, concentrate on getting round the course in one piece, flying fairly high and wide. After a few races, gradually mix it and pull tighter. As you gain confidence and get the feel of racing, then you may become more aggressive.

Always thoroughly check your model the day before a race meeting. 'Dicky' servos, loose engine, screws, etc. etc. can all be cured then, but it is not so easy five minutes before a race. Ask for advice if you are not sure what to do if an unfamiliar situation occurs. I'm glad I took the advice regarding my ailerons.

This whole article is based on my own and my caller's techniques and observations, and as we have only been racing for one season, there must be room for a lot of improvement in both model and flying technique, so please try your own ideas.

The tank is made of an oval Mustard tin with fixed feed pipe and single vent/filler. The tank is filled by standing the model on its nose, fuel will vent from the needle valve when full. The fill tube can be connected

to exhaust pressure if so desired. To stop the engine at the end of a race simply fly the model inverted for a few seconds to starve the engine. If a Mustard tin is not available, an alternative is suggested on the plan using the same venting arrangement.

Radio installation is up to you, but watch out for nose heavy tendencies, a common problem with these small racers. Plastic covering is to be recommended as there is no threat of divorce because of smell, and it is light too. Minimum weight allowed in this class is 2 lb. 2 oz. so try to aim for this weight, although mine weighs in at 2 1/2 lbs. 3 lbs. 2 ozs. is the maximum weight allowed.

Now on to the flying. 'T-Bird' will make a smashing (ha! ha!) small Sunday model with a few minor modifications, i.e. full strip ailerons, with a little more movement, a more conventionally shaped front end and the fitting of a 'clunk' type fuel tank. It would be wise to fit an K/C motor of .15-.20 size although .09's have been used in these small models. Low speed characteristics are good, although in windless conditions take care not to be caught out by the stall which, whilst gentle, is sudden. The model literally stops and pancakes vertically. At normal speeds, control response is instant. I have put 'T-Bird' through a number of manoeuvres within the confines of not having a throttle or rudder, achieving loops, rolls, inverted flight, cuban eight, square loops and figure of eight, all of which she handled happily.

But this machine was designed primarily as a Club 20 racer and in its racing state is still very forgiving. Do not, however, exceed aileron movements of 1/8 in. up and down or elevator movement of 3/8 in. up and down. I originally had more movement on the ailerons and this made a consistently straight course almost impossible to fly over ten laps. It was a bit like flying a 'big dipper' but thanks to Mr. D. B. himself, the movement was cut down (a bit of advice which I think he regrets giving me?) My flying and nerves settled down immediately, thanks once again Dave.

