



The designer demonstrates the battery hatches, note also the actuator hatch in the open position on the fuselage topside.

"SPARKY"

A 48 INCH SPAN RADIO CONTROL STUNT MODEL FOR 1.5 c.c. MOTORS DESIGNED BY HARRY HUNDLEBY

Simplicity of construction, accessibility of motor and radio equipment and above all the ability to "take it" were the design features that led to "SPARKY", who although oil-soaked and battle-scarred, still lives after 12 months of continuous flying to take second place at the West Essex Gala and perform demonstrations at the King's Cup.

The most important feature of "Sparky" is his ability to penetrate even 40 m.p.h. winds without climbing to more than 150 feet; this at Cranfield during the 1951 Ripmax, where he flew up-wind a distance of 200 yards to the first pylon. Penetration being an essential qualification of any radio job and other radio "bugs" will probably be interested in how it was achieved.

Original rigging set-up was wing at $1\frac{1}{2}^\circ$, generous downthrust and a flat plate tail-plane at 0° . This provided a very "stuntable" aircraft but no penetration. Increasing the downthrust beyond a certain point made the model so dangerous on the turn that a fresh approach to the rigging problem was very necessary.

Overtime on the old brain cogs produced the thought "Why not a lifting tail?" which was duly made and fitted. Re-trimming for this was an education as to the effectiveness of a lifting tail. The model was glide tested and naturally more negative incidence, 2° to be exact, was necessary on the tail. An attempt was then made to launch under power and the model dived in at the launcher's feet! No alteration had as yet been made to the amount of downthrust which was 8° under the original flat plate set-up. This was then reduced by half and still the model flew straight into the ground. It was not until the thrust line was at 0° that the model performed satisfactorily. The key to the whole problem, is of course, that the slipstream effect on the

THE designer's early experiences with Radio Control Flying were via the prototype "Rudder Bug", that splendid design of Walt Good's, which served as an AEROMODELLER test bed for the commercial R/C outfits available at the time. Many and varied were the adventures and misfortunes of that old faithful, and it says a lot for its construction that the original wings still decorate the author's office. Some of these misfortunes were due to vagaries of equipment, and a great deal more to the writer's ignorance of radio, and more still to what the types describe as "pilot trouble".

A few months of sundry prangs proved, as far as the writer is concerned, that large models have inherent disadvantages for R/C flying, particularly stunt work. Not the least of these being an inability to hit the ground hard without sustaining damage, due to their large mass and weight. As one's experience of R/C work increases, admittedly the prangs become fewer and wider spaced, but it is a daring man who will look you in the eye and refuse to admit the possibility of future misfortune.

All this being borne in mind, the writer decided that a compact yet practical model capable not only of "bouncing" but also of harbouring in comfort the necessary radio equipment, could be built around the 4-ft. span mark.

Other factors led to the size and type of model. Firstly there was that magnificent little Albon Javelin nestling in the editorial desk following its "Engine Analysis" test, which simply asked for incorporation in an R/C stunt job. Secondly, there was a visit from Geoff Fairbrass and Pete Wallace of E.C.C.'s with the new E.C.C. equipment for test and subsequent review. A sight of this miniature X.F.G.I. receiver with its low all-up weight and the cobwebs were dusted off the old workshop drawing board.

Sparky is definitely an all-weather machine, as this photograph taken last winter amply demonstrates. It performed most successfully on skis but naturally had a reduced rate of climb.





This shot taken at the West Essex Gala shows the model fitted with a polyhedral wing as a temporary measure.

lifting tail is very considerable, so considerable in fact that it forces the nose down in no uncertain fashion during the powered part of the flight, but loses 75% of its effectiveness on the glide. Added to which the absence of downthrust makes for more efficient operation as the thrust line is almost parallel to the line of flight. In other words the resultant of our main forces Thrust and Lift is more in a forward direction than an upward direction, giving less drag, increased speed, and the desired penetration. When the model dives (following continued application of rudder) the speed obviously increases considerably. Here our old friend the lifting tail does its stuff again by further increasing the angle of dive and in turn the speed. So that the following zoom carries the model comfortably over the top in a loop. It is possible with "Sparky" to obtain a near vertical dive on the glide and such is the speed obtained that a definite whistle can be heard!

One feature not yet commented on is the moment-arm, or to be exact, the lack of it! As the writer's friend and critic Eric Smith puts it, "It looks as though it ought not to fly. But it does, so you can't argue!" It was certainly not without some trepidation that this was kept down to 10 inches, but stability is good and the reason for it, manoeuvrability 100%.

At the risk of boring readers with a further design consideration, there is the question of weight, and in turn wing loading. "Sparky" when first built weighed 32 ounces, which gave a loading of 12.6, the maximum for this size of model as given in our "It's Designed for You" series. It was originally thought that this would be too much, bearing in mind the flying speed it would produce; the speed it would hit the ground, on occasions; and the fact that on normal flights the whole lot had to be brought back to the ground in one piece! However, these fears have proved groundless (no pun intended). The construction being sufficiently rugged to withstand vertical dives on to grass under power. For

those who may still have doubts the designer would mention that the original "Sparky" now weighs 40 ounces, giving a wing loading of almost one pound per sq. foot, 15.8 to be exact! Here we must pay tribute to the type of undercarriage used, which beyond doubt is ideal for heavily loaded models. The idea was gained from one of the late Eddie Riding's scale models, the principle being modified and improved to take heavier loads. One excellent feature of this undercarriage design being, that the tension may be varied to suit the terrain one is flying over.

Simplicity of construction nullifies the necessity for building instructions, although a point to remember for those who are making this their first radio model, is to complete all wiring, installation of switches, etc., before sheet covering the fuselage.

Check that the C.G. position is correct, this is most important, and then test glide with the batteries in position but **without** the receiver. With a satisfactory glide achieved conduct the usual short power hops to obtain correct power trim. Make sure that the model flies dead straight, both under power and on the glide. It should fly straight on the glide without adjustment unless you have warps or a fin out of line. No sidethrust was necessary on the prototype, which if left to its own devices would bore steadily up wind.

Having achieved all the above then instal your receiver, which besides being suspended by rubber bands should also, as an additional precaution, be encased in sorbo rubber. This is well worth doing in view of the small fuselage cross section as with a very heavy landing the receiver does tend to hit either the front bulkhead or sides of the fuselage.

Instal the small crank and you are ready for your first radio flight. The large crank is definitely for the more experienced radio flier and even he should apply rudder in small doses as the model has a surprisingly quick turn.

Remember the motto of all successful and consistent radio fliers in "CHECK" and "CHECK AGAIN" between each flight and under no circumstances fly if you have the slightest doubts as to the condition of your equipment.

One final note regarding suitable airscrews. For steady pleasure flying use a 9x5 or 9x6 and for stunt work either an 8x5 or 8x6. The former will give you a much longer run but is not suitable for stunt flying. The designer's favourite prop for the Javelin is the E.D. plastic 7½x6 and definitely produces greater thrust than any other airscrew tried to date.



On the larvae at Cranfield during the 1951 Ripmax. A picture that emphasises the short moment arm.

