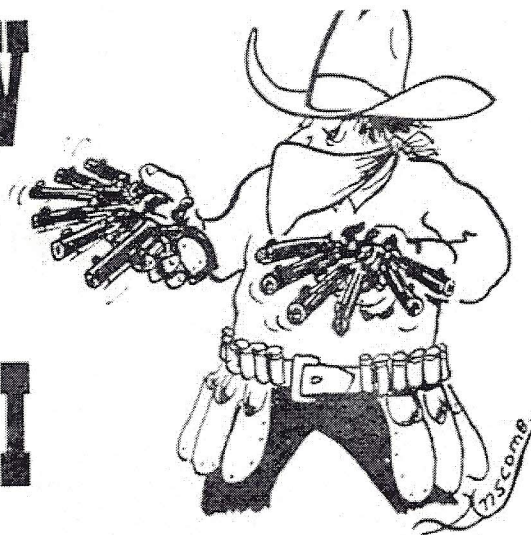




# OUTLAW goes MULTI



**DAVE HUGHES** describes how he adapted this single-channel Keil Kraft kit model for three-function proportional gear . . .

**N**OT HAVING flown a power model for some two years (gliding gets to be an obsession!) I had decided that I must either get *some* use from our Club strip this year, or stop paying my subs. How to get back gently into power? My old, bent and oil-soaked *Tauran* was still in the loft, but I hate repairing old prangs. And, anyway, it seemed to me that a small, docile model would be the answer and I hit upon the idea of fitting the Keil Kraft *Outlaw* with multi. After all, it had carried 11oz. of single channel gear (motorised actuators on rudder and throttle) and had not been in the least overloaded, so another couple of ounces shouldn't make too much difference.

### The conversion

It certainly makes a difference in the controllability of the model, however, to have three proportional functions!

I fitted my Skyleader SL and three of the Logictrol servos—rudder, elevator and throttle. The picture shows the disposition, and no re-trimming was necessary as, with this set-up, the model balanced in exactly the same place. How big an elevator? I thought that 1½ in. chord looked about right, so that was what I made it—simply by slicing through the tailplane with a modelling knife, at 1½ in. from the trailing edge. I then eased the knife blade through the join of tailplane and fuselage, thus separating what now became the elevator. After sealing the bare edges

with strips of MonoKote to match the existing finish, I hinged the elevator in place, and relieved the rear of the fuselage to allow for upward movement of the elevator.

The hinges are of mylar strip, pinned with toothpicks. The movement?—I had to start somewhere, so shaved my angled fuselage cut-out to give ¼ in. up. With ½ in. down, this makes a total throw of ¾ in. The control horn is tucked away *inside* the fuselage—nice and neat but a little awkward to get at for adjustments as it means you have to twist the pushrod from the servo-end, leaving the clevis still on the horn.

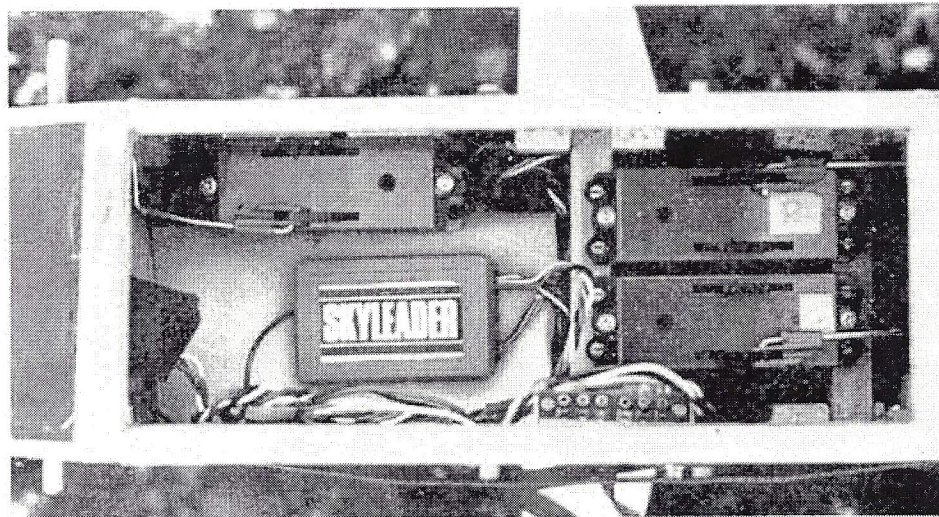
I replaced the sponge rubber main wheels (already becoming a bit soggy with glowfuel) with a

pair of M.G. ones, and securely fixed the remaining nosewheel tyre to the nylon hub with Evo-stik, and hoped that this arrangement would give a satisfactory run for take-off.

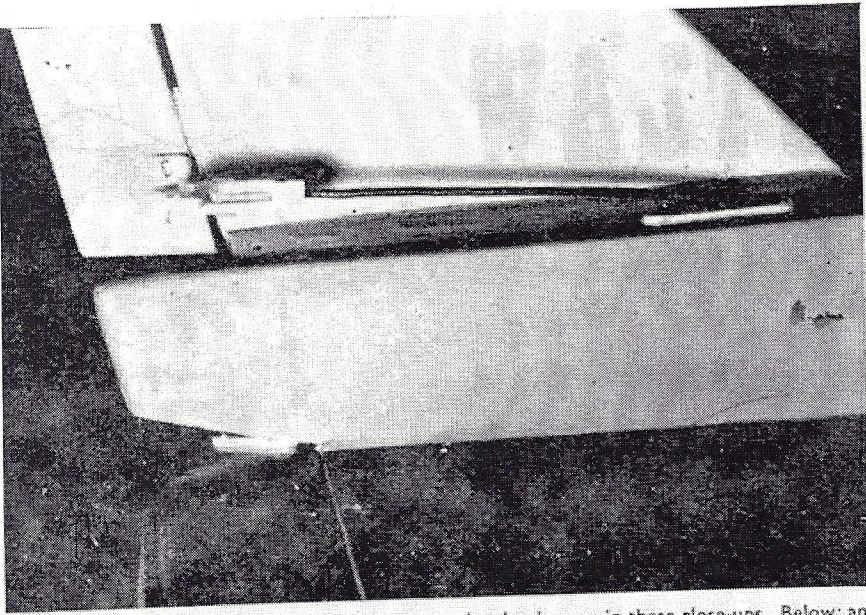
### Up and away!

Our club strip is paved, but is only 10ft. wide and I wondered if I could keep the *Outlaw* straight without a steerable nosewheel. There was an almost flat calm on the day I selected for the first flights (I'm not impatient!) so I let her gather speed before pulling off gently at the last couple of feet before the end of the 30yd. strip. I'd had to hold in a fair amount of rudder but she'd stayed on the cement, though I had to be quick

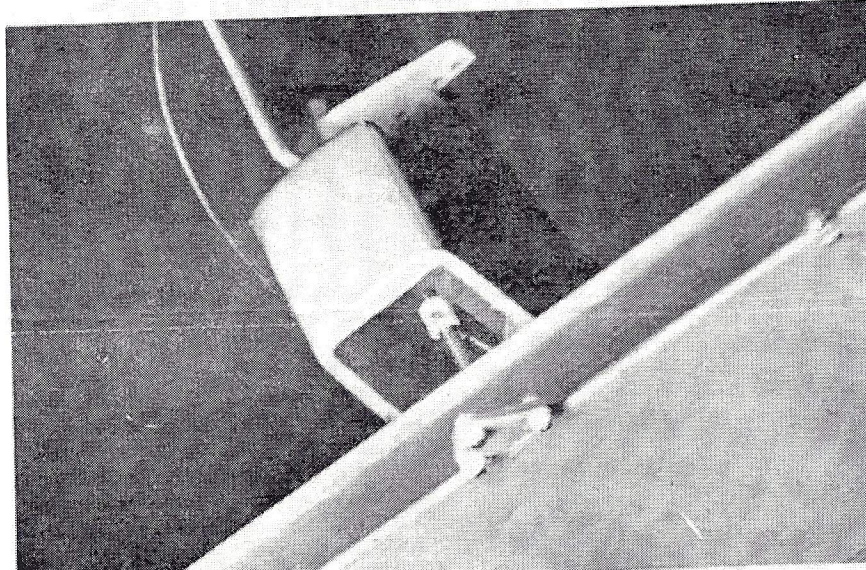
Heading photo shows D.H. with multi-Outlaw—and plaque he won at South Coast R/C Rally—for third place in limbo event! Below: plenty of room for the tiny Skyleader SL receiver and three Logictrol servos, in the space previously occupied by Tom Thumb's single-channel gear—and only 2oz. heavier! Next move will be a new wing with ailerons, to complete the "Full-house."



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The wedge-shaped cut-away above the elevator can be clearly seen in these close-ups. Below: an M.K. "screw-thread" type horn is used, hidden inside the fuselage. Ordinary horn and quick-link on rudder.



to release rudder when the wheels unstuck to avoid too much of a swing.

The climb away was smooth and steady, the little O.S. 10 singing merrily on its 8 X 4 nylon prop. I contented myself, therefore, on the first flight, with just flying around and adjusting the trim, occasionally throttling back to check on any differences between power-on and power-off trim. There were, in fact, some differences but I eventually reached what seemed to be a satisfactory compromise, with the *Outlaw* flying nice smooth circuits.

After landing slope soarers in all sorts of winds and coping with odd wind-gradient effects, how easy it seemed to do power-on landings! If you undershoot a landing approach with a glider, you land short and that's it. But with my little *Outlaw* it was quite fascinating to undershoot deliberately and

then stretch out the approach with a few short bursts of throttle. And how sweetly that O.S. 10 answers, too.

**Mild aerobatics**

Next flight, I was a little more adventurous, and tried some mild aerobatics. Loops are quite nice, though one is obliged to dive the model a little first, as with a glider, to build up the necessary excess airspeed. Probably, with a .15 size motor fitted, there would be no need for this, and I will be trying my O.S. 15 in the model shortly. Stall turns were very pretty, and quite positive despite the rather tiny rudder, so I thought I would see if it would roll. Well, I know this was asking a bit much, but, after taking the model up to the proverbial "great height" I dived it slightly, let it come level and then threw on full right rudder. It seemed an age before the *Outlaw*

was round as far as the inverted position, and when it had got that far, and I pushed in some "down" to keep the nose up, it really didn't seem as though it was going to go any further! However, I hung on and eventually the roll was completed, though the heading was some 45° from initiation.

I tried several more rolls and, with practice, was able to produce quite respectable ones. The secret is to dive the model quite well before entering, and go very easy with the "down" so as not to slow things up too much.

Having established the fact that the model would remain inverted for a short while (even though it seemed a long one!), how about trying inverted proper? Repeat the roll process, but neutralise rudder once it's on its back. Okay! That she goes! Your actual inverted *Outlaw*. And it steers around like this, with about 4/5ths full down elevator, reserving the last bit for tightening the turns. Yes, steers around, and the rudder works the same way, relative to the stick, as it did upright—just like with ailerons.

**Delights of propo throttle . . .**

So much for aerobatics. Though all this is fun, I really found the nicest part of flying my multi-*Outlaw* was doing innumerable touch-and-go's, and using that proportional throttle every bit of the way—not just slamming it from "low" to "full" and back again. And in windier weather, too, the usefulness of this function is a real delight. Wind, however, gives trouble with take-offs, as the model can be blown over quite easily by a cross-wind gust before it really gets moving. So phase two (if you'll excuse the expression) will be interesting. This is to fit the O.S. 15 which should liven things up more than somewhat. Phase three will be to build another wing, with only a trace of dihedral, and fit ailerons. More of this anon!

Meanwhile, for those who may think of thus extending the uses of this charming and versatile kit model, a note of the rigging. Just a fraction more downthrust is needed than that shown on the plan (a washer-thickness sliver of wood or paxolin under the two rear bolts should do it). And the model flies with a certain amount of down trim—though the wing is still at the single-channel rigging position. For use with .15 it will probably be necessary to reduce the wing incidence a little.