



"363" a multi DELTA

by PETE RUSSELL

49 in. span for .40 cu. in. engines

WITH so many exciting, elegant and efficient full-size aeroplanes using the delta configuration, it is surprising that so few modellers have tried this layout, and that even fewer have had any success — the first critical flight often being the last. Yet it can be done. Deltas have often won 2½ cc and open pylon races, and, during F.A.I. record attempts, one went to over 12,000 feet. I have built three deltas, over the last five years, all three are still flying, and the latest, presented here, has even mixed it with the Hammants, Van den Berghs and Sprengs, without disgracing itself. This is not to claim that it is the ideal aerobatic contest aeroplane, but it will do all the manoeuvres, does 75 mph with a fully silenced O.S. 40, has a rate of climb comparable to the *Spitfire II*, and attracts attention wherever it is flown. So, if you think all current multis look alike, and would like to try a three-cornered flying machine, if only to be different, 363

is the model for you.

363 is an attempt to produce an out-of-the-rut, fly-for-fun aeroplane with all mod cons, that can also be used for the occasional open pylon race or aerobatic competition. Construction is orthodox, about the only unusual feature being the finite thickness trailing edges (you know; cut off square). In the case of the rudder, this is to counter an occasional "snaking", a sort of twitching in the yaw plane, to which deltas seem to be prone. It still shows up a bit in very slow tight turns, but is a useful reminder that you are on the ragged edge.

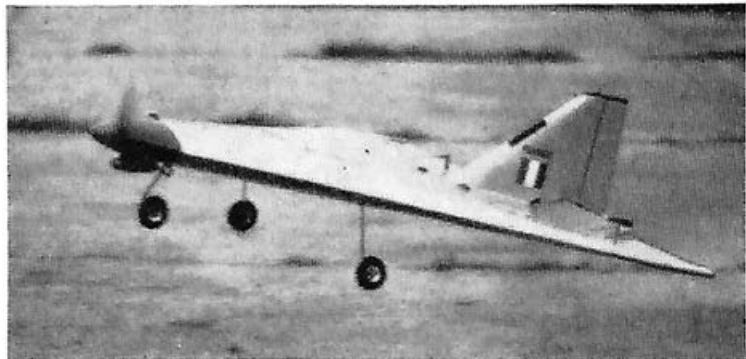
363 is not for the beginner, so installations of engine, control runs, radio equipment, etc., are left sketchy — most people have their own ideas on these subjects, anyway. The double 90 deg. bell-crank rudder linkage is based on the never-use-one-bit-when-thirteen-will-do philosophy. It could be avoided with a bit of shuffling around, no doubt.

The original 303 is covered with heavyweight modelspan, which has proved entirely adequate (on the first 250 flights, anyway) and weighs an ounce or two under five pounds, even with the electric brakes and the attendant extra 3 x 225 DEAC. A 9 x 6 prop seems to suit the O.S. 40, giving some 14,000 rpm static.

Trimming and flying

Nothing is specially critical but, for the first flight, you might find it less exciting if you locate the c.g. as shown on the plan. I was a bit apprehensive before the first flight (who isn't?) of the 363, and put 4 ounces of lead in the tank compartment, but this proved an unnecessary bit of insurance, as the flight was uneventful.

When your big moment comes,



make sure you are getting full power when you move the noise lever right forward, and be careful not to over-control on the rudder/nosewheel, which is a bit fierce at moderate ground speeds. With no wind, heave-ho speed will come up after about 175 feet, and you can climb away at more or less any angle you like, but go easy on the ailerons — they are powerful, to give positive roll control at all speeds.

It will pay you to keep your new toy aeroplane fairly close, and to avoid "unusual positions" to start with. A lot of people have crashed their first deltas on their first flights due to dis-orientation (not only deltas!) It seems easier to get a confused idea of the attitude than with the normal layout and, being fast, deltas dwindle to a silhouette rapidly. After a few laps round the field, try a fast roll (because it's easier) and then a loop. The latter will be fairly wide, because the elevators have been made deliberately "heavy" to give smooth response in the looping plane, with minimum loss of speed.

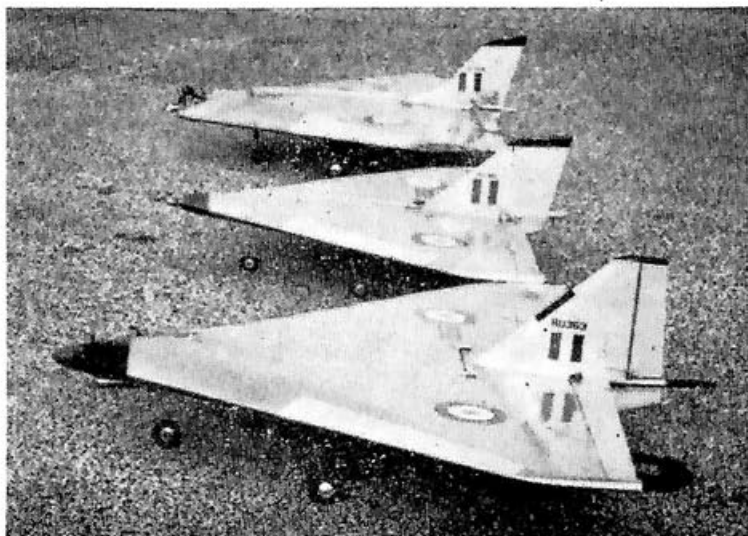
Deltas and indeed, all low aspect-ratio aerodynes, get big increases of drag in high 'g' situations. *The Mirage III* is a distinguished precedent for this "light aileron, heavy elevator" arrangement. For the same reason, get your 363 quite high before you try your first outside loop. The acceleration can be a bit breathtaking, especially if you are not sure you are going to make it. Later you can try moving the c.g. back and forth to get as much, or as little, pitch response as you like. The "max. rearward" c.g., shown on the plan, was estimated empirically and has not been flight tested. If you try it back there, do write and tell the editors how you got on!

The rudder is not very effective and, to do a sharp turn, you need a blast of power as you put the rudder on, then a bit of opposite aileron to counter the yaw/roll couple.

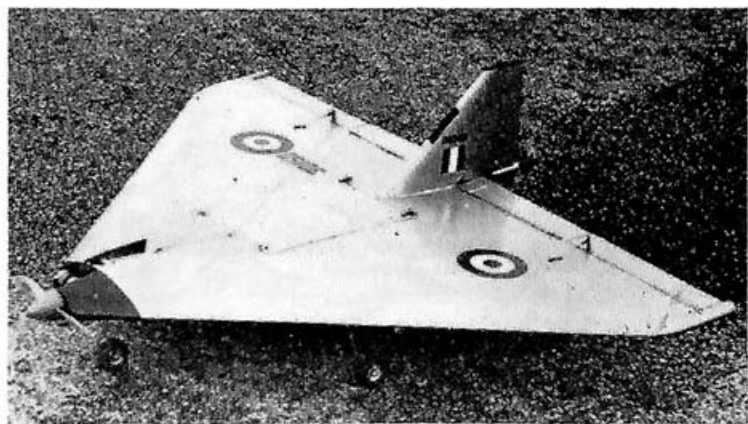
Landing Technique

Before your first landing, try some slow flying at altitude. It will maintain height on about $\frac{1}{2}$ power, with the nose well up. This aeroplane has no nasty habits and, if you overdo it, it will just start to sink. There is no clearly defined stall, in the conventional sense.

When you feel ready for your first landing, bring it round the

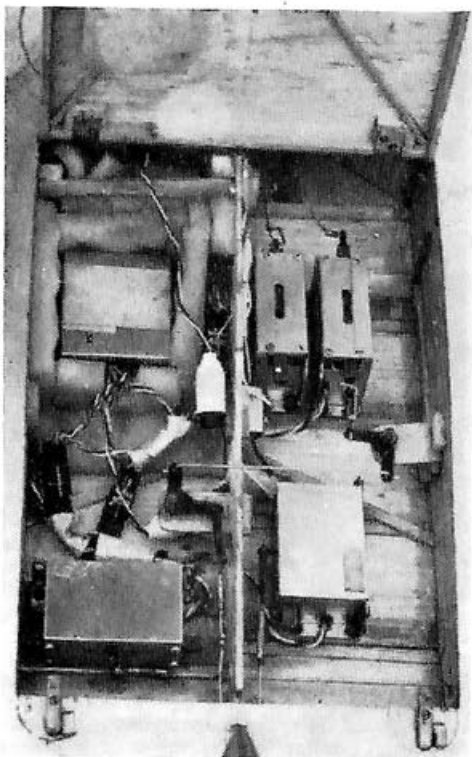


Above—designer's three deltas—still going strong. Below—"363" again.



ASSEMBLY SEQUENCE

1. Block the $\frac{1}{8}$ in. sheet central leading edge member, and the bottom $\frac{1}{8}$ in. trailing edge member $1\frac{1}{2}$ in. above the building board. If necessary, make a splice on the trailing edges (ratio 3 to 1).
2. Assemble ribs to the above (PVA glue used for all glued joints on original). With a straight-edge, mark and cut the spar slots, and leading edge stringer slots.
3. Assemble engine bearers (with nosewheel leg bearings), engine and tank bay bulkheads, then fit all stringers and spars.
4. Complete top surface with leading edge sheeting, cap strips, etc., and leave 12 hours to dry out.
5. Turn over, and fasten to blocks again.
6. Assemble and fit main undercarriage, aileron bellcranks, push/pull rods, etc.
7. Complete undersurface with stringers, spars, sheeting, cap strips, then add $\frac{1}{8}$ in. sheet webs to the main spars.
8. Fin is built up as wing, except that rectangular ribs are sanded to shape after assembly.



This view, "with the lid off," shows the installation of the Kraft equipment - ample room! A lot of the bell-crankery could, of course, be obviated by the use of cable-and-tube type linkages.

circuit at about 50 ft., slowing down on the downwind leg. Don't make the mistake of doing high, meandering circuits. Provided that you can rely on the engine to keep going, it is easier to keep them close, low and slow. With no wind, the base leg should be about 300 ft. away, with quite a bit of power on for the final turn but, as you line up, you will probably have to close the throttle fully to get the right rate of sink. Start getting the nose up quite early, slowly coming back on the stick so that it lands in the old-fashioned three-point attitude. As long as you get the tail well down, landing the 363 is very easy, and surprisingly slow. The wide track undercarriage takes all the sweat out of cross-wind landings and take-offs and, as you get used to it, you will find that wind doesn't bother 363 much at all. Those crisp ailerons are a great help, when it's gusty, during the last few critical feet before touch-down. All this presumes that you will be using proportional control, but the two earlier designs flew well on reeds, and no doubt this one would too.

Whatever the "modelling-isn't-the-fun-it-used-to-be" brigade say, this kind of flying beats birch-and-silk-A-frame-pushers every time!