

STOL

REVISITED

Peter Russell presents the MkII wing version of his famous 'Short take off and landing' aircraft.

WHEN THE ORIGINAL StOl was designed in 1972 — it wasn't even called a 'StOl' then, just '242S' — it was really little more than an aeronautical doodle. There was just the vague idea that it might be possible, with a really light, relatively high powered model, to operate in and out of a normal sized back lawn with trees down either side.

The model that subsequently emerged had a faintly 'vintage' look about it, particularly the structure, compared by the standards of the day. It flew very well, towed gliders, carried cameras and was mildly aerobatic, all on an OS 19, but it's STOL (short take off and landing) qualities while very good by normal standards, were not considered *quite* good enough to operate out of the aforementioned lawn in complete comfort. So, after several months, split flaps were fitted. These brought about a big improvement in the slow flying capability, so much so that dynamic stability, especially lateral stability, became a problem at the ridiculously low speeds that were now possible. So the final modification was to fit slats to the outer half of the leading edges of the wings, and this did the trick. 'Garden flying' now became common, first only in near calm because the configuration of the 'runway' meant that all take-offs had to be to the west and all landings to the east, regardless of wind direction. With a bit of practice, however, first moderate cross wind components became acceptable and finally even down-wind components of a few knots were not too much of a problem. The model went on to do several hundred flights, entirely without mishap, from this somewhat unorthodox flying site.

There were snags, of course. First, the wing, in a determined attempt to get minimum possible weight and maximum possible lift, was of apparently flimsy construction and with a concave undersurface to boot. The original never actually broke, but there was always that uneasy feeling that

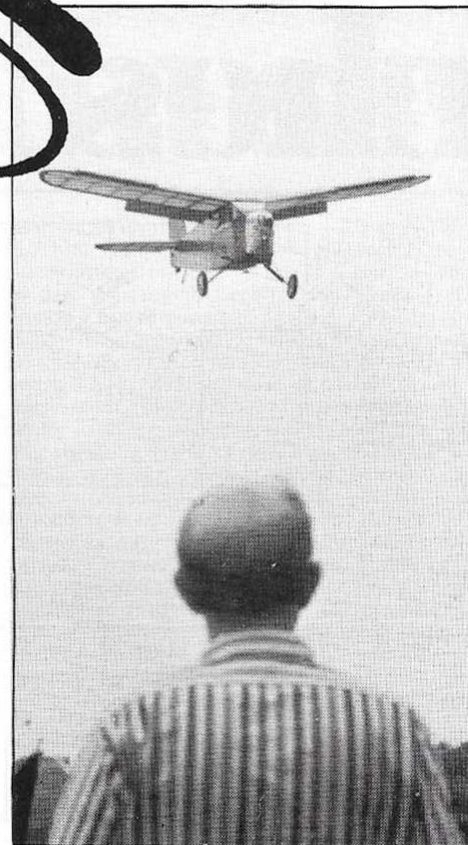
For the Mark II only the wing is changed. It has a totally different structure and section but the same planform. New wings give even better control, less trim change with flap deployment and peace of mind during aerobatic sessions.

one day a bit of unthinking abandoned aerobating *might* break it. Second, the flaps and slats, being afterthoughts, left something to be desired from the engineering point of view. Finally, the under-cambered wing section helped to create a massive nose up trim change when the flaps were fully lowered. This latter feature was just about livable with, provided that you always got the speed well down before lowering the flaps and also arranged the trim so that it was full 'nose up' in normal level flight. This way the full trim range was available to counter the nose up pitch caused by the flaps.

So it came about that, after more than ten years of reliable service, it was decided to make an attempt to rectify the niggling snags by designing a completely new wing. All the rest of the model had given no trouble at all, so that remained the same. The undercarriage had been particularly reliable and capable of taking all those nasty plaster-it-on type landings that are occasionally necessary in STOL flying.

The basic thoughts behind the new wing were as follows. The ultra light weight of the old wing had proved to be unnecessary and a much more robust wing could be used with little detriment to the slow flight capability. A wing section a bit thicker with a blunter leading edge and less overall camber would give less sensitivity to small changes of angle of attack, have less centre of pressure travel and produce less pitching moment when the flaps were lowered. This latter was the only arguable part of the concept, but, in the final result, the new wing was much stronger, was nicer to fly and the nose up pitch on flap deployment was only about half that of the original.

Slats again were not part of the original concept — it had been hoped that the new wing section wouldn't need them. As with the Mark I, however, the ultra-low airspeeds that were possible with the new plain flaps



Full-size copies of the plan shown here at 1/6th scale can be obtained as Plan No. R/C1190 from RCM&E Plans Service, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead HP2 4SS. Price £4.85 plus 50p postage. (Overseas accelerated surface post £1.05).

