





BEFORE DIVING into the construction side of this article, I would like to give the philosophy behind the design.

With the FAI noise limit at 105dB at one metre, I was having problems getting my *Titan* design model down to this low figure, therefore I had to think of the requirements of a new design. These were: (1) an enclosed engine (2) enclosed exhaust system, doing away with the tuned pipe as this increased the revs., and therefore the noise (3) slightly smaller lighter model to keep the power to weight ratio the same (4) keep the exhaust heat away from the receiver and servos etc.

Mercura fulfilled all these requirements. The inverted rear exhaust motor is cowled with the air running along the duct under the wing to cool the exhaust system, the wing insulates the radio gear from the heat of the exhaust and no over-heating of the engine, exhaust or the radio has been experienced.

The construction is very straight forward, but it should be remembered that this is not a beginner's model and as such I will not give a cut and glue building construction.

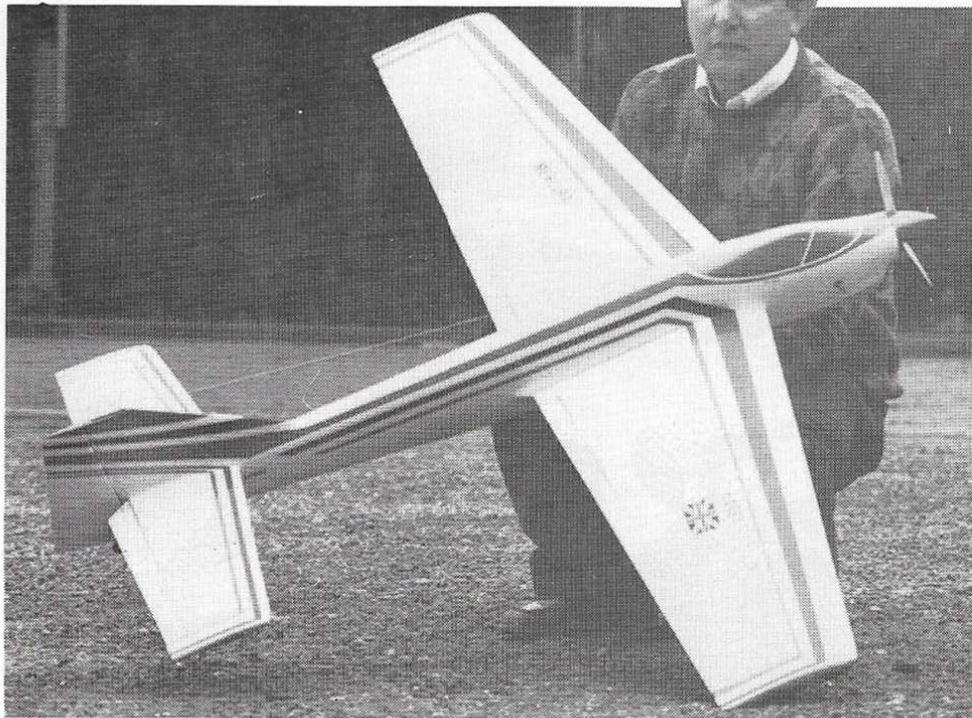
Fuselage

The fuselage sides and formers are assembled and if possible put in a simple jig for the top and bottom planking to be done. The remainder of the construction is with block, especially round the engine, where as much solid balsa as possible is used to dampen out

No external protuberances in the engine department — the all enclosed engine/silencer system reduces the noise level effectively and gives clean line to the model.

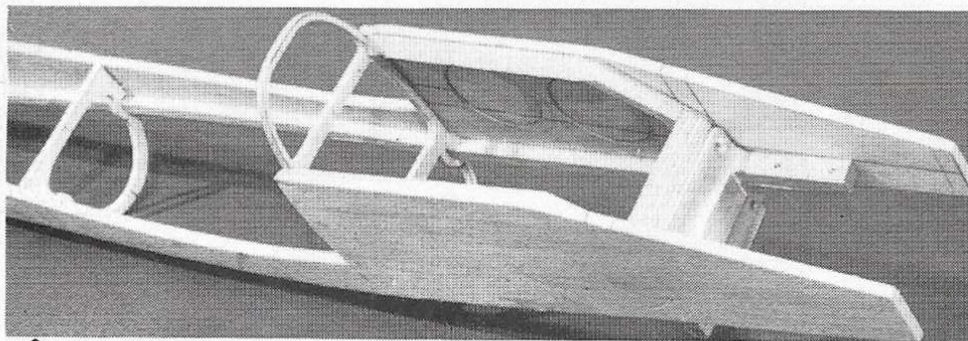
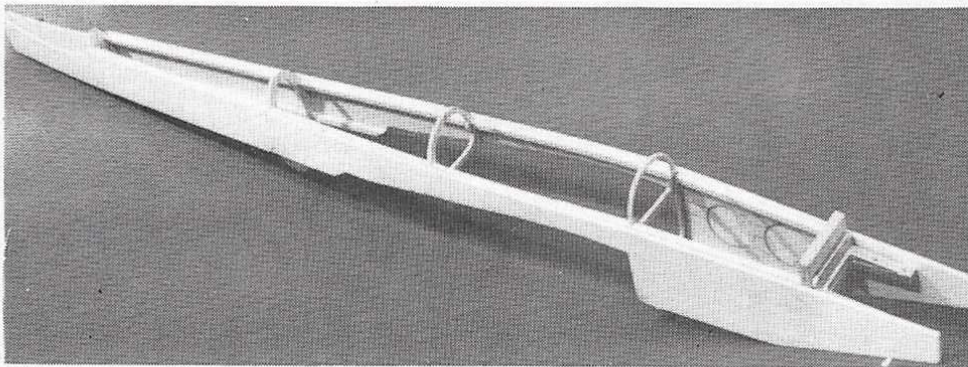
Full-size copies of this plan shown here at 1/6th scale are available as plan RM255 price £3.50 + 40p post from RM Plans Service, PO Box 35, Bridge Street, Hemel Hempstead, Herts.





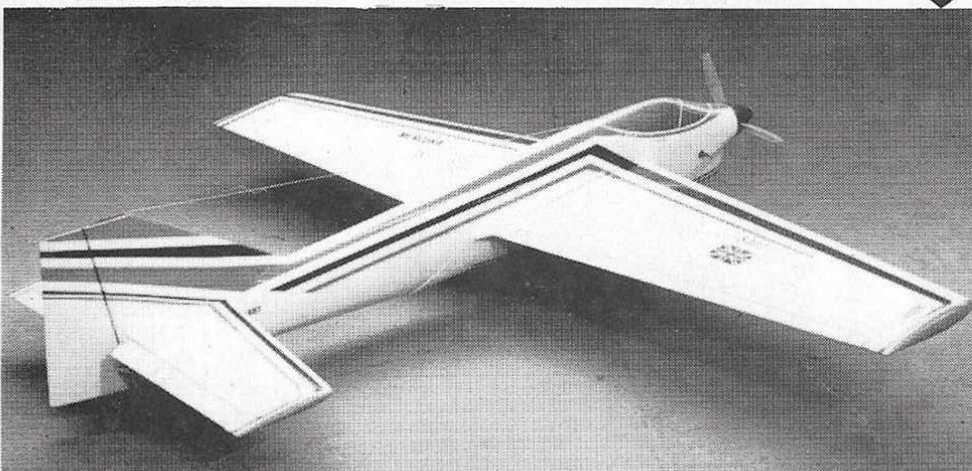
Clive displays *Mercura* to show its relatively small size — no tuned pipe is required on its OS.61VF for this reason.

Another reason is its light weight, as this construction photo (below) shows.



There's plenty of space for the fuel tank, thanks to the lack of nosewheel and novel wing fixing.

Rear view shows the junction of the large exhaust duct with the fuselage — and the neat colour scheme.



vibration and therefore noise. The tank floor may need changing slightly to accommodate other rear exhaust motors and their manifold pipes.

One of the major differences with this design is the position of the wing dowels which are on the side of the fuselage, the advantage of this is the readily accessible tank bay. These dowels are fitted very securely with their top edge on the centre line of the wing. The leading edge root fairing is fitted on completion of the wing fitting.

The engine cowling is constructed using sheet and block and on the original models the method of fixing was pegs and a glider type canopy catch. Particular interest should be paid to the internal shape of the cowling so as to obtain maximum cooling.

Tail, fin and rudder

The tail plane and fin are of conventional construction using the sandwich method to make the ribs. Once assembled they are sheeted and the elevators and rudder tack glued on for sanding. Foam tail surfaces may be used if required.

Wing

A conventional construction is used on the wing and the basic structure should be checked for straightness prior to fitting the inter-spar webbing and skinning. Under-carriage can either be fixed or retractable. (The flight performance of the model is not affected wheels up or down). The ply plate method of installing retracts has worked well for me in built-up or foam wings, but the builder may prefer his own method.

Mounting the wing on the fuselage is something that requires care. The sides of the cut-out in the leading edge of the wing are faced with thin ply, these faces should be an exact fit across the 2 dowels mounted at the front of the fuselage, all that remains are to slide in and carefully glue the 2 hardwood plates to the ply wing facings, which should rest on top of the dowels to hold the wing up in its seat. Once these plates are correctly fitted they should be doweled to the ply. Hardwood blocks or ply plates are fitted to the rear of the wing cut-out to accept the wing retaining bolts.

The wing should be a tight fit and is removed by lifting the back of the wing up (when the model is inverted) and sliding back. At this point in the wing construction the centre section of the wing, out to a distance of 2in. beyond the undercarriage mounts, should be covered with lightweight glass cloth or doped nylon. This is an important part of the construction and does not relate to whichever method of finish you use.

With the wing fitted to the fuselage the underwing duct is now planked with tubes being fitted for the wing retaining bolts, the size of the opening at the rear of the duct should be at least 4 times that of the intake area. Should the builder wish to fit a tuned pipe this duct needs to be extended into the rear lower fuselage as shown dotted on the plan.

Finishing

Each builder will have his own favourite method of finishing, mine is as follows.

The whole model is given a coat of sanding sealer and rubbed down, all knocks and dents are then filled with a mixture of dope and talcum powder in paste form. After sanding again the model is again sealed and rubbed down and parts of the model such as the engine cowling and air duct are covered with nylon. Once this is smoothly fitted the whole model is covered with heavyweight tissue and doped with thinned dope until a shine starts to appear. The model is then rubbed down once again then primed with the appropriate primer for the finish being used.

General comments and flying

The prototypes have all been fitted with OS61VF engines, but there seems to be no reason why this model should not perform well on one of the recently released very good .45's which are available, although in this case a tuned pipe is to be recommended. To enable easy cowling removal and a small intake area the remote needle valve has been mounted on one of the back plate screws, i.e. as control line speed. The carburettor used has been an E.D. because of its narrow front profile allows the carburettor to be totally enclosed within the cowl, this aids carb. silencing. The first prototype recorded 104db at one metre, the model I am now flying, using one of my own manufactured 3 bladed props., is recording 98db at one metre, the exhaust system is an expansion chamber followed by a Somoso No. 7 after silencer. The model's performance is very precise and movements should be kept to:

Elevator $\frac{3}{16}$ in. total

Rudder 2 in. total

Ailerons $\frac{7}{16}$ in. total

All up weight should be 7-8lbs.

Flying should present no problem to the experienced flyer, ground handling is excellent with the 2 wheel undercarriage and the model does not nose over. Landing speed can be deceptive as the model has a very clean shape.

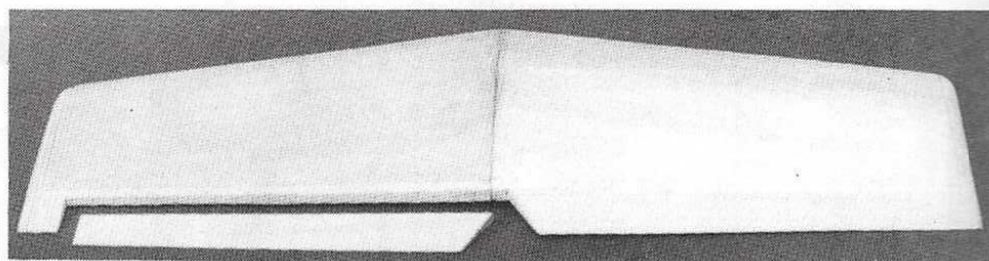
The model has been flown a season and a half by myself and Nigel Nixon and has achieved a number of high places.

Foam wings and tails, also glass fibre fuselages will be available from C. W. Developments, Building 106A, The Aerodrome, Headley Road East, Woodley, Reading, Berks. RG5 4SG.

Many thanks to Ian Stewart for the photographs. Good luck with the model.

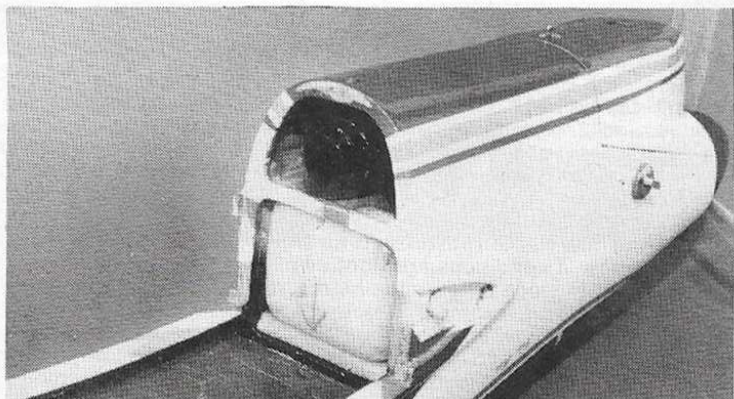
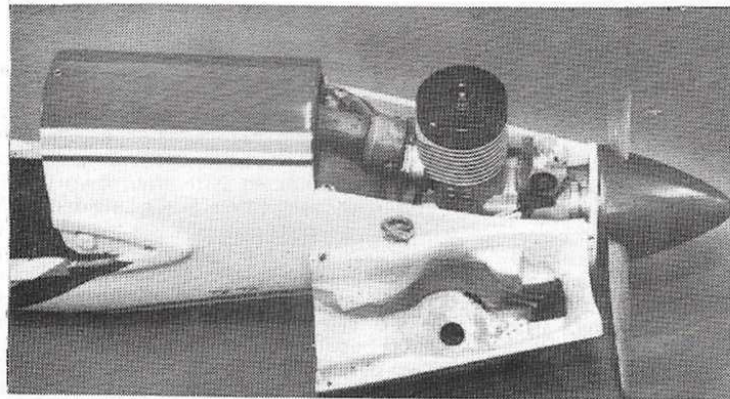
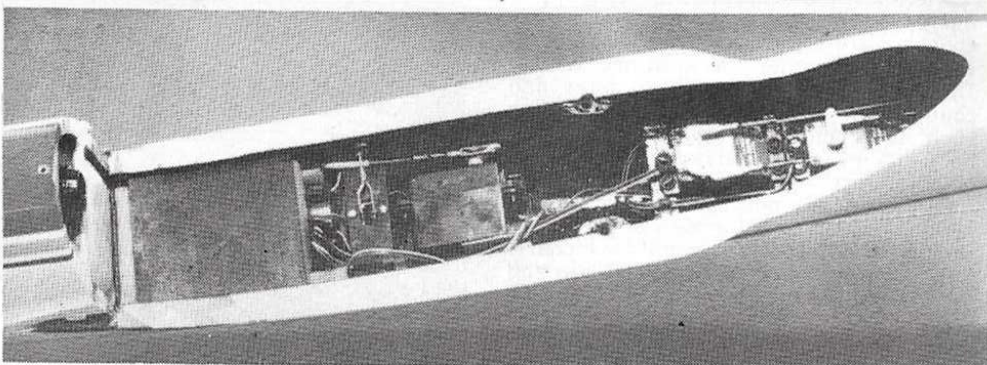
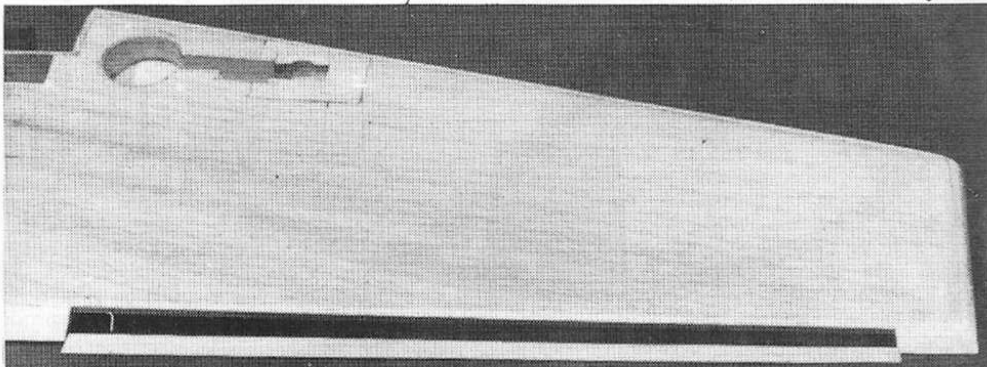
The radio installation is laid out all in line, thanks to the large access area provided by the ducting.

The wing locating dowel, tank and the exhaust duct are seen below. Note also the remote needle valve control knob.



The skinned tailplane halves, ready for the elevators, have yet to be set to their anhedral angle.

Underside of the finished wing shows the wheel well and the cover plate which goes over the retract mechanism — simple aileron system too.



The lower cowling removed to show its specially shaped inside, which aids cooling. See also the locating dowels and the exhaust manifold.

The tail end linkages, horns self-tap onto bolts, a tailwheel is used on prototype.

Primary silencer seen in front duct, note the wing locating dowel and remote needle valve knob. Below: air and exhaust exit of wing / duct shows the back end of Somoso No. 7 after silencer.

