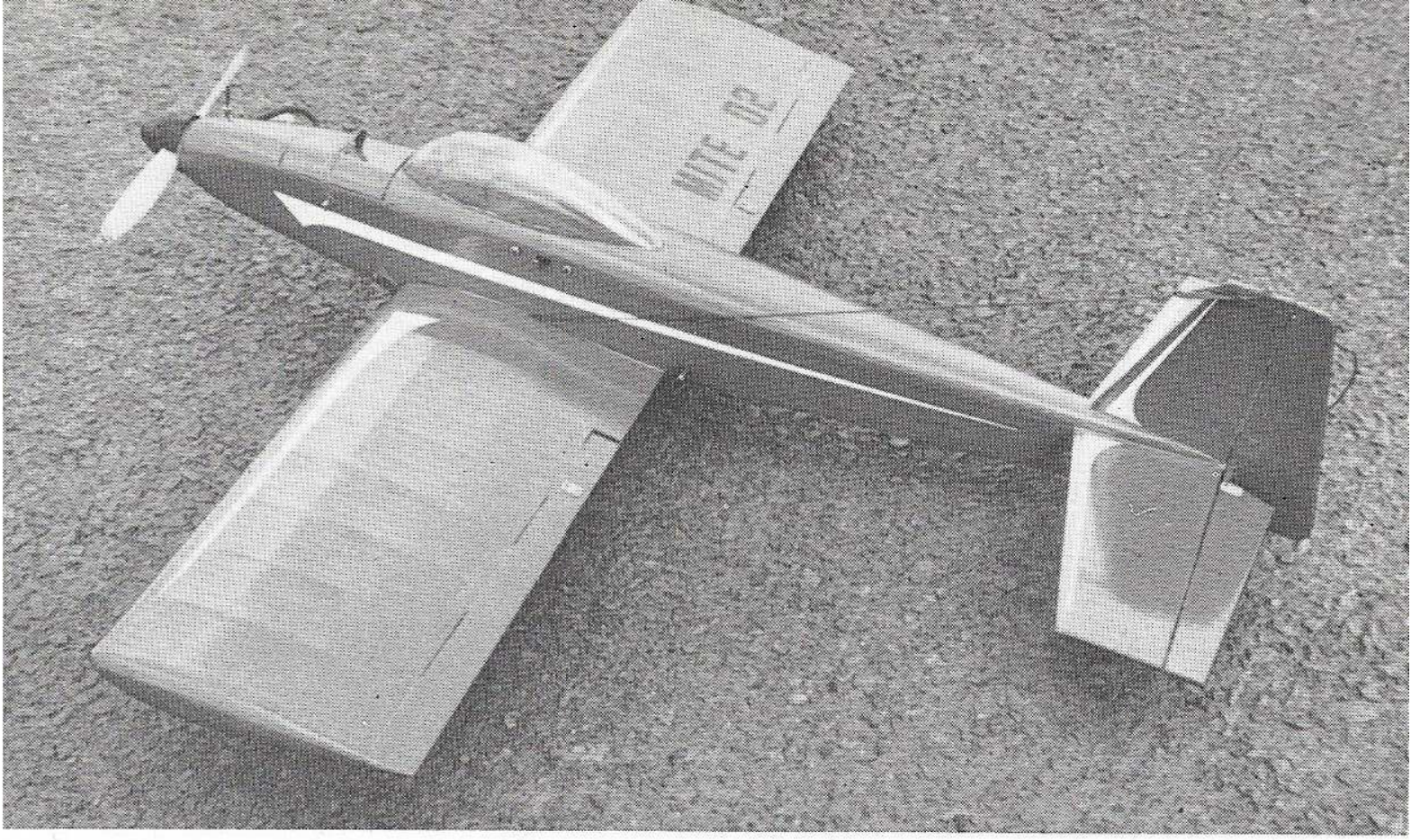


The "MITE"

by D. L. LYALL

build this small, compact mini-multi for some real fun-flying! 37" span for .15–.19 motors

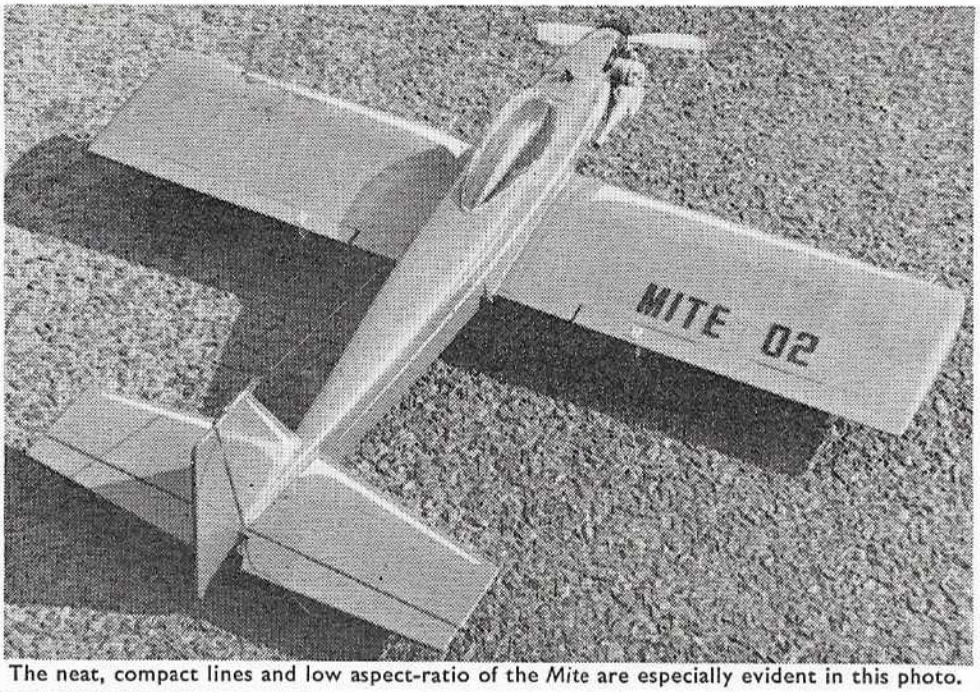
BEFORE designing the *Mite*, I had been flying a small well-known aerobatic design of 38in. span, and using an O.S. 19 motor. This machine had a few drawbacks, mainly caused by the type of field I fly at and the weight (16oz.) and size of my home-built digital gear. In order to obtain the correct C.G. position in the model, I had found it necessary to fit the DEAC in the main radio compartment with the receiver and servos. This, combined with the width of the fuselage, prevented the fitting of more than two servos, so rudder control was omitted.

As regards flying, the machine proved excellent, the only problems being getting the machine off the ground and back down again. The tricycle undercarriage gave too much drag on the grass strip to allow the aircraft to get up enough speed for a take-off. In fact, all the take-offs were made by hand launching (*quite so—Eds*), which is an amusing exercise when flying without a helper. Landings were made dicey by the combination of small wing area and high weight. Any attempt to slow down the high gliding speed of the model only resulted in one wing stalling and dropping, followed by the inevitable crunch.

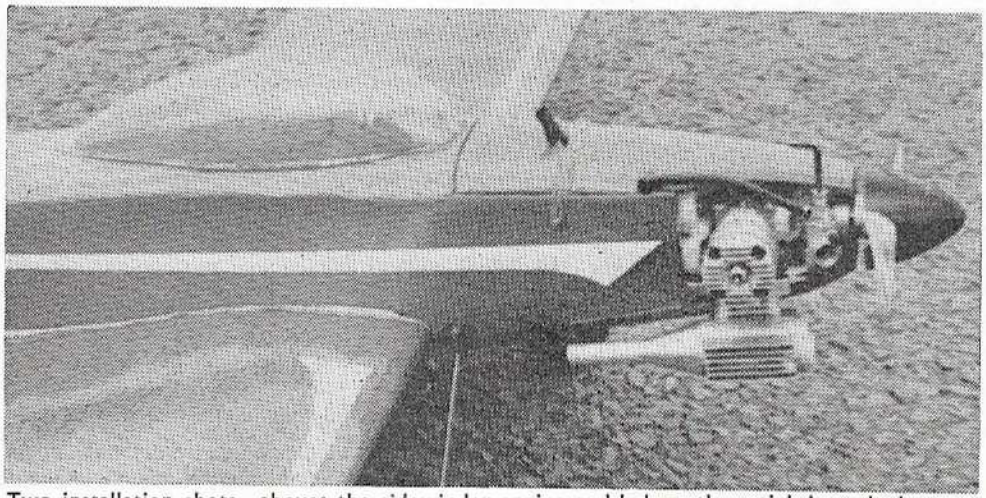
To try and overcome these disadvantages the *Mite* was drawn up, with the following points in mind:

1. The weight was to be kept to a minimum, 2¾lb. being the acceptable maximum, without compromising the performance. I felt that this was about the maximum weight a .19 size motor could pull through manoeuvres such as vertical rolls and the top hat, which depend to a large extent on the power/weight ratio of the model.
2. Wing area to be at least 2 sq. ft. in order to achieve a reasonably low wing loading.
3. A two wheel undercarriage, attached to the fuselage for strength. Securing the under-

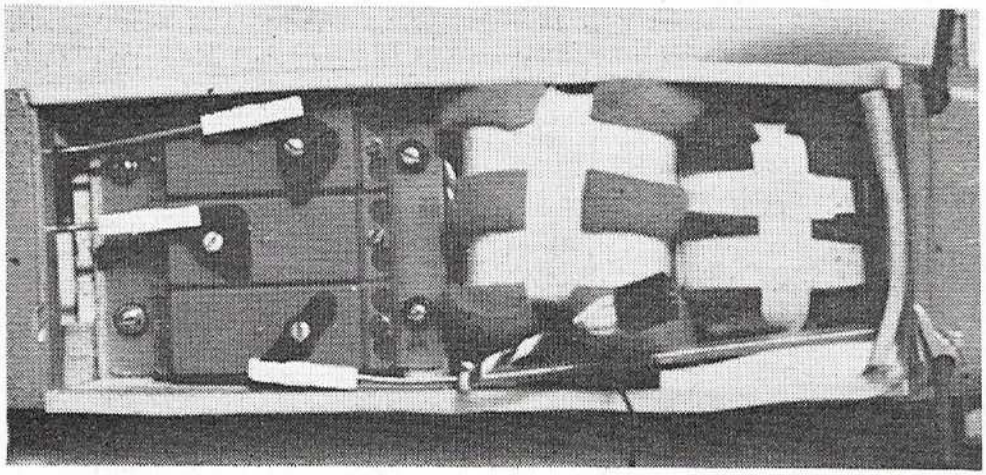
This "on the airfield" snapshot of designer David Lyall with his Mite prototype shows the really diminutive proportions of this grand little model off to good effect.



The neat, compact lines and low aspect-ratio of the *Mite* are especially evident in this photo.



Two installation shots—above: the sidewinder-engine and below: three tightly packed servos, with the receiver and Deacs taped in a foam wrapping.



carriage in this manner considerably simplifies the wing construction, due to the omission of all undercarriage fixings. Two wheels were also felt to be an advantage for flying from rough grass.

No dihedral. The amount of dihedral used on an aerobatic design of this type did not offer sufficient advantages in the way of stability, to justify the additional work involved in construction. The wing is basically 36in. span with block tips, thus allowing the use of standard sheet and strip balsa sizes.

5. The fuselage dimensions were mainly dictated by the sizes of the items to be carried internally, i.e. the tank length determined the nose length of the model. The wing chord was arranged to allow the radio compartment to carry all the radio gear, including the Deac. The fuselage had to be wide enough to enable three servos to be fitted abreast. The servos, in fact, were mounted on a detachable tray, the tray being secured by four screws to two bearers running across the fuselage.

CONSTRUCTION NOTES

As can be seen from the plan, construction is very simple. It is doubtful if construction could be further simplified without the use of foam core wings and/or other moulded components.

Wing

Construction differs slightly from that normally used, in that there is no sheeting on the wing at all. This does not mean that the wing will be any weaker, as can be seen from an examination of the wing cross section on the plan, the solid leading and trailing edges, combined with hard balsa spars, being the main strong points of the structure. This type of construction does not have any real advantages over the sheeted wing, other than simplicity of construction and ease of repair in the event of damage.

Note the shape of the ailerons. It's not an error in the drawing, in fact there is a good reason for this, sorry, two good reasons. First, to get as much of the aileron area out toward the wing tips where it is most effective, secondly to avoid excessively weakening the trailing edge at the inner edge of the aileron cut-out. Shaping the leading and trailing edges should be no problem, if you have been wise enough to invest in a mini or razor plane. If you have not invested in one of these handy little gadgets, now's the time. For shaping block a tool of this nature is invaluable.

Construction commences by cutting the leading and trailing edges from a sheet of ½in. medium/hard balsa. Ribs are formed using the sandwich method, the blanks being cut from soft 3/32in. sheet. Pin down the underside front mainspar and assemble the ribs to it, use a piece of scrap ½in. sheet to pack up the rear of the ribs. Add the top spars, leading and trailing edges (note the trailing edge should be shaped before assembly), followed by the centre section sheeting, and scrap sheet fillets. Turn the wing over, add the second spar, centre section sheeting and tip blocks. For strength, white glue fillets

The *Mite* has no dihedral, which makes for simple construction, but looks a little "droopy" in this low-angle shot!

should be smeared on all joints. The wing can now be sanded and all control linkages fitted, after cutting out the ailerons.

Fuselage

No problems here, the only point worth commenting on being the undercarriage installation. Be sure and use plenty of Araldite or epoxy around the fixings and bulkhead. If your landings are anything like mine, a strong undercarriage assembly will soon prove its worth.

Commence fuselage construction by cutting out the sides and formers. Attach ply doublers to the fuselage sides, using a contact adhesive. Bend the undercarriage wire and secure to F.2, using brass or thick tinplate clips. Assemble formers F.1, F.2 and F.3 to the fuselage sides, pull the sides together at rear and glue.

Temporarily attach the wing to the fuselage, using rubber bands, and then fit the tailplane, to check for alignment with the wing. Remove the wing and add the fuselage top blocks. Roughly carve the top decking to shape and cut the slot for the fin, again checking for accurate alignment. At this stage it is advisable to smear former F.2 and the undercarriage fixings with epoxy adhesive for added strength.

Construction is completed by adding the underside sheeting and then forming the engine cowling from soft sheet as per plan.

Finishing

Finish should be Monokote or Solarfilm, with trim as preferred. The use of any other type of finish is not advised as it would probably be heavier and, in any case, involve considerably more work. If done carefully, it is quite possible completely to cover the machine using only one large sheet of Solarfilm.

Flying and trimming

For initial test flights check the c.g. position and control surface deflections. Ensure that the deflections do not exceed those stated on the plan. In particular, the ailerons are the most sensitive control surfaces on a small model of this nature. With everything set as per plan, the elevator will require to be set with a small amount of "up," in order to maintain level flight. This can be set by using the transmitter trims during initial test flights, or can preferably be pre-set on the ground. The amount of trim required will be between 1/32in. and $\frac{1}{16}$in. measured at the trailing edge of the control surface.

If you have not flown a model of this nature before, you would be well advised to talk an experienced flyer into test flying and trimming your machine, not that much trimming should be required. The only trim adjustment found necessary on the prototype, was the up elevator trim stated above.

During all flights to date, the model has been allowed to take-off from the grass strip, there being no requirement for hand launching. In the air the machine has the characteristics of a larger model, being very smooth, yet sufficiently responsive. The standard aerobatic schedule offers no problem to this machine. Spins, for example, are very clean at entry if aileron is used with rudder, this being quite normal with most modern designs. Square loops, top hat and vertical rolls are performed with ease, there being quite adequate power using the recommended size of motor. Landings have proved to be very straightforward, the model being very docile during the approach, showing no tendency to drop a wing if brought in slowly. Overall, I have found this model to be one of the most satisfying I have flown.