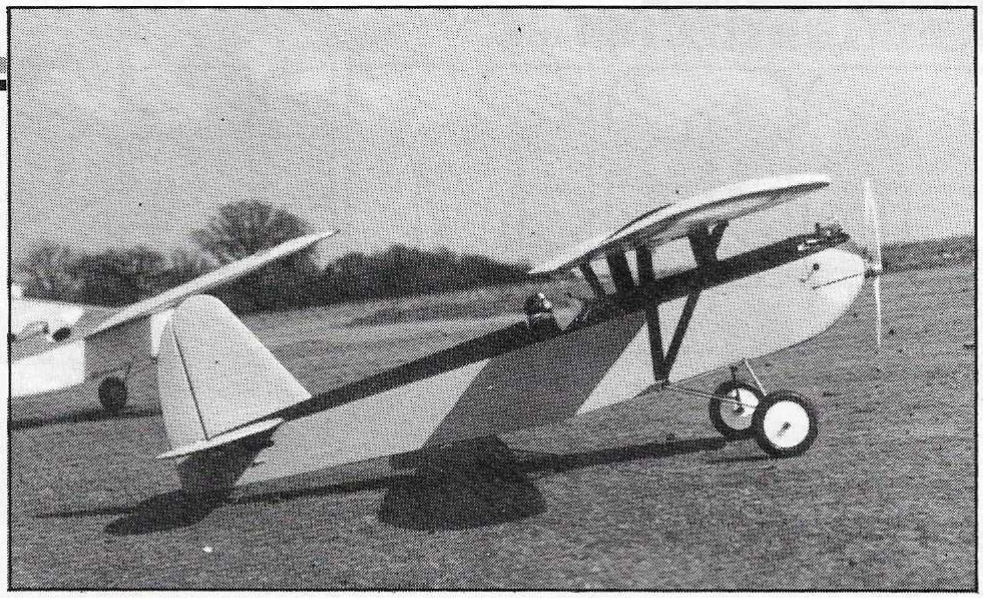
Your full size pull-out plan is for Mike Whittard's semi-scale charmer — 40inch span, .15-.20cu.in. engines and 4 function radio.



Widgette

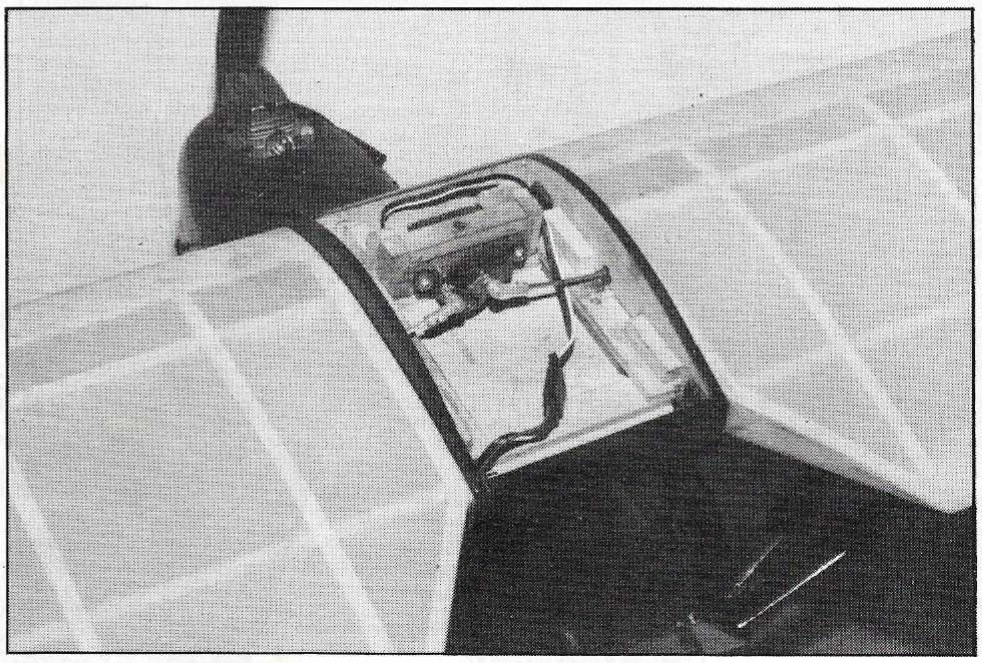
WIDGETTE ORIGINALLY STARTED some three or four years ago, and with three objects in mind. It had to be suitable for three or four function operations, it had to be simple to build, and lastly, it had to use no material over 24in. long — this because the original request came from a kit manufacturer. The original machine was duly built, and after some engine problems, proved to be a reasonable flyer — certainly it fulfilled the requirements admirably. At this stage the prospect of it becoming a kit faded, and the engine problems returned, resulting in the severe damage and eventual scrapping of the model.

Last year, when casting around for a sports design that resembled a full-size aeroplane, the original 'Widgette' plan was unearthed. At this time it bore no name and was merely referred to as the 'Parasol'. The original plan was heavily modified to increase wing area, improve its looks and stability, and to provide better crash-resistance — not that I intend to crash models, but I do have accidents from time to time. The final result is presented here as the 'Widgette' — partly due to my earlier association with the Westland Widgeon, and partly due to the model's slight resemblance to that machine in some features.

Construct it my way

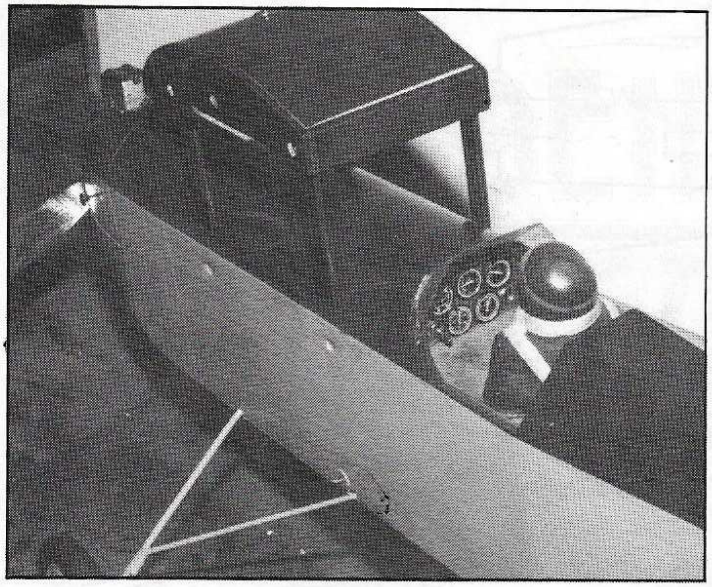
The fuselage construction is a little different to most models, but is easy to build and immensely strong. Start by cutting out to 1/16in. sheet balsa sides for the front fuselage. This is the bit from the rear of the cockpit to the 1/4in. ply former F1. Mark the positions of the cabane struts on the inside faces. Cut the cabane struts from 1/8in. ply. Make sure that it is 1/8in. ply (or 3mm) and not 5/32in., otherwise you will have to bring it back to size later. Now cut out the 1/8in. balsa doublers, the front and middle ones (with reference to the struts) with the grain vertical, the rear with the grain horizontal.

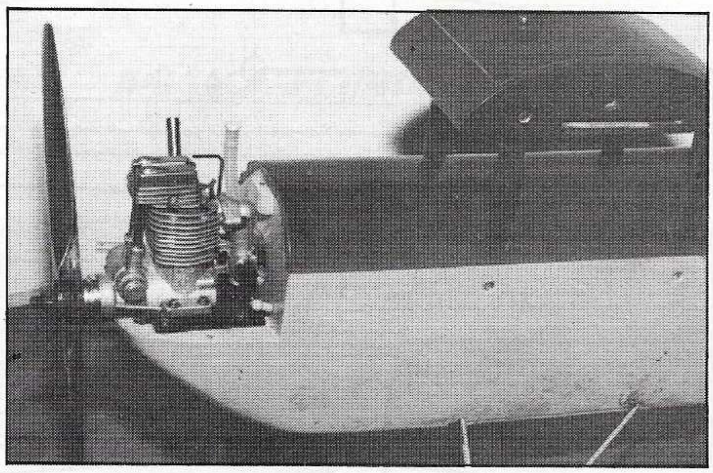
Aileron servo installation employs a 90° crank, see Figure 1, to give differential aileron movement. Wing struts on this delightful small model are not for cosmetic appearance, make sure they are securely attached to the fuselage and wings.



Glue these in place and ensure that the structures can lie in grooves forward between the doublers. Note that the front doubler stops short of the outer skin to provide a position location for F1, and that the rear doubler extends well beyond the rear of the outer stem. The 1/32in. ply inner skin is now added; you will note that the struts now slide in a vertical socket formed between inner and outer skins, and the balsa doublers. Add the 1/16in. ply F7 pieces which will locate the servo rails and provide additional stiffening for the cabane strut bolts. Join these two sides with F1 and F3, then add the two F2 formers and undercarriage blocks.

The rear fuselage is built up on two light frames which are constructed on the plan in the normal way. These can then be joined over the plan view by pinning in place upside down. When dry, the front and rear fuselage sections can be trimmed and joined. The best way to do this is to position the plan so that F3 is just clear of the building board and front and rear sections can then be aligned over the drawing — upside down — for joining, the plan enables you to ensure alignment in the plan view, and the board ensures alignment in the side view. It is necessary to trim the longerons to fit between the skins, but once glued up, results in a strong enough joint for the rest of the operation. The reason for the rearward extension to the rear 1/8in. doubler now becomes apparent, as these components now protrude through the outer faces of the longerons, and should be planed and sanded to conform to the rear fuselage taper. Now add the rear fuselage 1/16in. balsa skins, followed by the rear decking formers, skins, etc. The front fuselage top decking can now be added. Before planing and sanding to shape, make the slots for the cabane struts by passing a long series 1/8in. drill, or even a sharpened piece of 10swg wire, up through the sockets in the fuselage. Lower cowl and bearers can now be added, or use a





Cockpit instrumentation includes the main On/Off switch and a charging socket. The OS20 four-stroke engine is ideally suited for the Widgette, but a '15' two-stroke motor will be equally suitable. Three standard size servos fit neatly, line abreast, into the fuselage - it is often easier to make an orderly radio installation in a relatively confined area.

commercial nylon or metal mount. The bearer positions shown on the plan allow the use of a 1/8in. paxolin engine plate, and there is sufficient room in the cowling to take an OS20 four-stroke — as in my model — or any '15-20' two-stroke. I think the HP21 four-stroke would also fit, but the bearers and cowling may need extending to accommodate it.

Jig for accuracy

There is only one other 'fiddly' job, and that is alignment of the centre-section. You may like to devise some other method, but this was the way I did it (I've done it twice — two sets of struts, one new, one replacement!). Lay a length of wire in the undercarriage blocks, and stand the fuselage on its base. Push the four struts into their sockets and ensure they are touching the wires. Make two scrap balsa (or even thick card) jigs which *exactly* match the height from the fuselage base to the underside of the wing tongue slots, ensure their top and bottom edges are parallel. Cut a piece of 1/8in. balsa, about a foot long, and width to suit the wing tongue slots, pss this through the centre section and support it on the jigs in place on the struts. Mark the eight hole positions onto the struts from the fuselage and the centre section. Dismantle, remove the struts and drill them. Don't forget to mark the struts so that they go back in the same groove.

The wings are quite straightforward. Use ball and socket connectors on the servo as these are easy to remove. Drill through the wing tongues and box 1/8in. dia. for balsa shear pegs. These will break in the event of a blow on the wingtip and reduce or eliminate damage. In a severe blow, the cabane struts will break and save the wing and fuselage — I know, why do you think I had to make replacement struts? The wing Vee-struts are simple. One point to bear in mind is that violent inverted manoeuvres can result in these struts bowing. If you intend performing these sort of gyrations, then fit jury struts betwen main Vee struts and next rib in.

The tail needs no comment apart from the fact that the plan shows a slightly larger rudder than the photographs. It was found that the original was difficult to spin due to a lack of rudder authority at the stall, in fact it was necessary to pull the model vertical and wait for the stall with full power on. The larger rudder and reduced fin area overcomes this problem. Recovery merely involves centring the controls, and is virtually instantaneous.

Omit adverse yaw

Fuel tank and batteries go up behind F1, wrapped in foam. My Widgette uses a 4oz. SLEC Square tank — enough for eighteen minutes at full-throttle. Receiver tucks in between batteries and servos, with the aerial run through the fuselage to exit just in front of the base of the rudder. I've used a closed loop rudder link and push-pull rod on the elevator. The ailerons are connected with Bowden cable from the servo to the bellcranks to allow for the angular movements. The aileron servo should be fitted with dual output arms at 90°, set at 45° each side of centre thus:

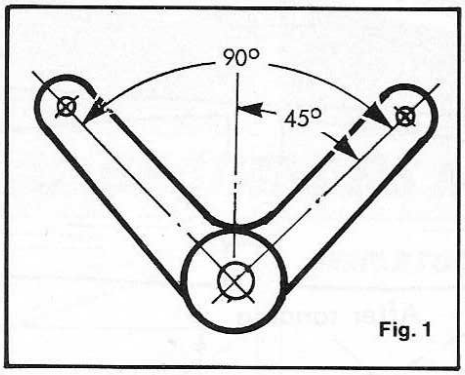
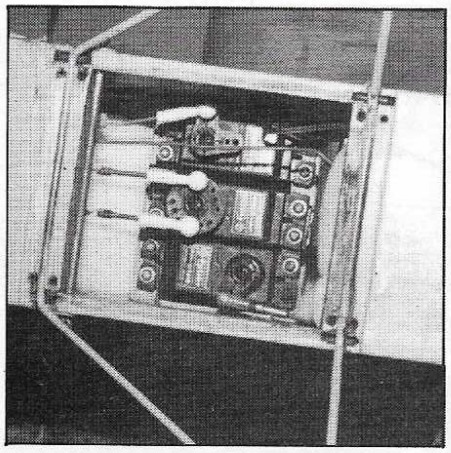


Fig. 1

This will give the correct amount of aileron differential and prevent adverse yaw. I've shown, and used, Vintage style wheels and tail-skid, as this is in keeping with the intended character of the model. However, a steerable tailwheel will improve ground handling on tarmac, and softer tyres will reduce the tendency to bounce.

The finished weight, covered in Solartex and fuselage sprayed comes out at about 3 1/2lbs. The CG should be a 2 1/2in. to 2 3/4in. from the L.E. Flying is no problem. Depending on the engine/prop. combination, a touch of rudder may be required during the start of the take-off, after that it's all trims neutral — or should be if you've built it right.

Final tip, when rigging, hook the struts on from the root end, engage the bottom hook in its eye and then the wing tongue thus:



this way they won't come out if you happen to make a hard landing. There is no need to separate the Vee-struts from the wings as they will lie flat against the bottom of the wing when detached from the fuselage. Remember to carry some scrap 1/8in. square balsa to make shear-pins, and to push them out for derigging. Do check that the strut hooks are engaged properly, and if you notice a strut dangling in flight, land immediately — these struts are intended to work. The wing tongues will support the machine in normal gentle flight, but you need those struts for anything else.

Scale trainer

The Widgette will perform all normal aerobatics, but I don't indulge in negative G manoeuvres due to the Vee struts bowing. It has been flown inverted with no problems, but is not cleared for it until the extra jury struts are added. I fly mine regularly as it's absolutely reliable, non-fussy and a most pleasant model to fly. It also makes a good trainer for these scale competition manoeuvres such as the procedure turn, stall turn, etc., as it can be slowed down to give a very realistic appearance without showing any nasty tendencies. They say that all aeroplanes bite fools, but this one is most reluctant to even nip an idiot.

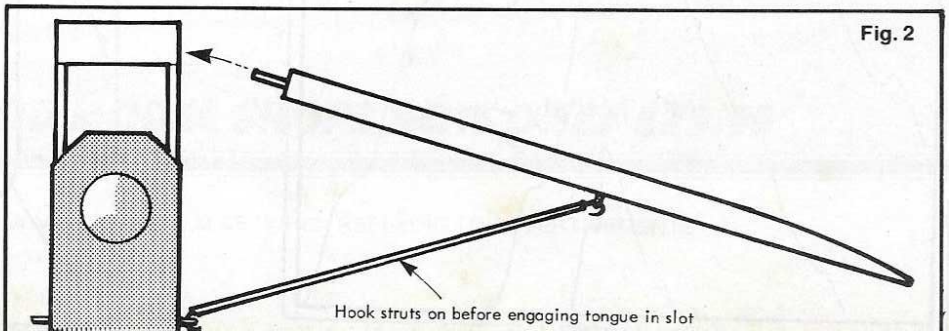


Fig. 2