

Plan feature

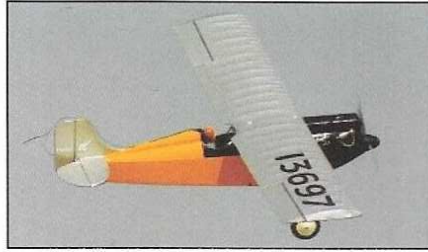
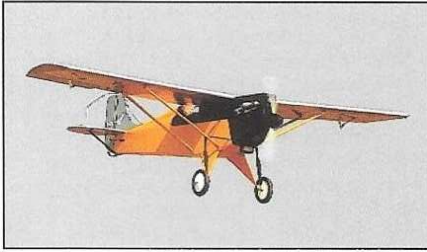
CORBEN SUPER ACE

A 1/6th scale replica for .26 to .30 cu. in. four-stroke or .20 to .25 two-stroke engines, designed by Peter Miller, built by Dave Perryman



Orlan Corben designed a whole series of different lightplanes such as the *Baby Ace* and *Junior Ace* in the '30s. The *Super Ace* was featured in a series of articles in *Popular Aviation* in 1935. The aircraft was powered by a modified Ford Model A car engine. Originally the span was 25 feet, but Corben increased this to add extra area for people who lived at high altitudes.

The model is designed to the original 25 ft. span as that was the available documentation, i.e. the



Williams Brothers' plastic kit three-views. It is as accurate as possible.

I designed it so that Dave Perryman could use his O.S. FS 20 in it. The model did fly on that power, but really needed more, so he fitted a Super Custom 30 FS which is exactly the same physical size.

Flying the model

Most of my designs fly straight off the board, but this one didn't. The first flight was made in a 10 m.p.h. breeze and the model was found to be in dire need of downthrust. The test pilot had one heck of a job controlling the model but did get it down in one piece some distance downwind.

Dave added two degrees downthrust and the following week in calmer conditions we tried again. This time there was a lack of sufficient power for some reason and I swapped Dave my SC 30 for his O.S. 20.

On the third weekend, the model took off with ease with me at the controls. This time it flew with authority and we found out why it had been so difficult to control on the first attempt. The ailerons are virtually non-effective most of the time. Apply full aileron and nothing happens. Touch the rudder and it tries to turn on its back.

Now I know of a full-size Aeronca Chief that flew in exactly the same manner and my model of the Aeronca Defender has the same characteristics. It was soon found that the *Super Ace* must be flown with co-ordinated turns. Apply aileron and a touch of rudder and she goes round perfectly - a good case for using a CAR (couped aileron and rudder) mix on your tranny.

I handed over to Stuart Pickett who flies while I take photos and he was soon doing low passes with turns round the camera as the photos show. The result of this is that we can say the model flies very well, but does call for an experienced pilot who is aware of its peculiarities.

I consulted Alasdair Sutherland, my aerodynamics guru, who suggested that this handling is caused by a very strong lateral stability, partly because the wing is well above the CG and because of the interference effect of the fuselage. Alasdair suggested that rigging the ailerons 2 or 3 degrees up might help. He did have one or two other suggestions such as slats or a turbulator strip, but these would be non-scale.

Dave Perryman is still gaining experience, so will be shelving this model until he feels more confident of flying it safely. Unfortunately he had removed the engine and radio before we could try out these ideas.

Construction

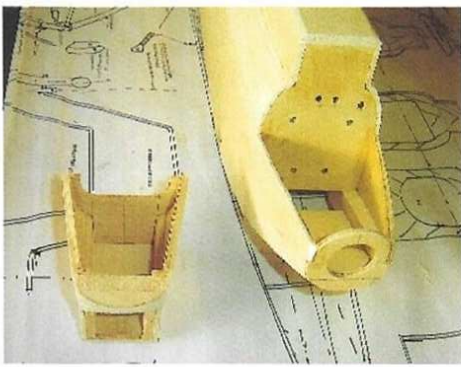
This model is remarkably easy to build because

- it is a simple shape, and
- because I spent a lot of time working out the easiest way to do things. I am lazy!

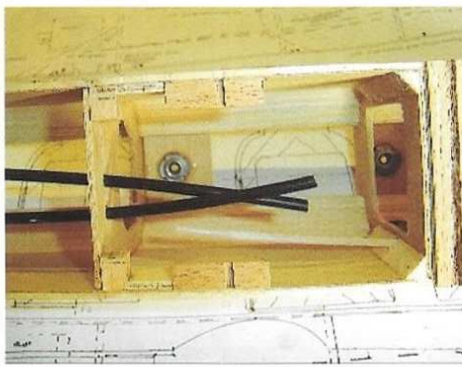
The fuselage is built in the conventional way. Two 3/32" sheet sides with 1/32" ply doublers are made up and these are joined with Formers F-3 to F-6. The rear part of the fuselage is pulled in and joined at the tail with a piece of scrap wood in the middle. This

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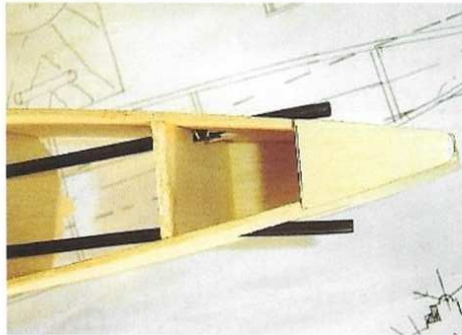




ABOVE LEFT: Engine bay and cowling. ABOVE RIGHT: Radio bay with snakes installed. Note wing bolt nuts and undercarriage mounting blocks.



ABOVE LEFT: Front of radio bay before sheeting to form air outlet. ABOVE RIGHT: Rear of fuselage with snakes fitted and skid mount.



takes the hinge at a later date.

It makes life easier if you prepare F-2 at this stage. Glue the 1/8" ply doubler behind the engine mount location and fit the blind nuts for the engine mount. Now the front of the sides are pulled in and joined to F-2 and F-1. This must be done over the plan to ensure that it is true.

Fit the main undercarriage mounting block. This is made by grooving out a piece of 1/2" sq. beech engine bearer. Alternatively, use 3/8" x 1/2" and build up the groove with strips of 1/8" ply. Glue on the rear undercarriage mounting blocks. These are made from 3/8" x 1/2" beech and are glued to the sides. They are designed in this way so that by undoing two screws and swinging out the metal clamps the undercarriage can be swung away to give access to the servos.

Glue in the other small blocks that take the various strut attachments, the assorted ply gussets and the triangular stock behind F-2 and F-4. At this stage it is a good idea to fit the engine and tank and fit the outer Bowden cable for the throttle as well as the two snake outers for the rudder and elevator controls. The tank, engine and mount can be removed

once this job has been done.

Fit C-2 and C-3 temporarily. C-2 can be supported on a scrap of balsa strip. Spot

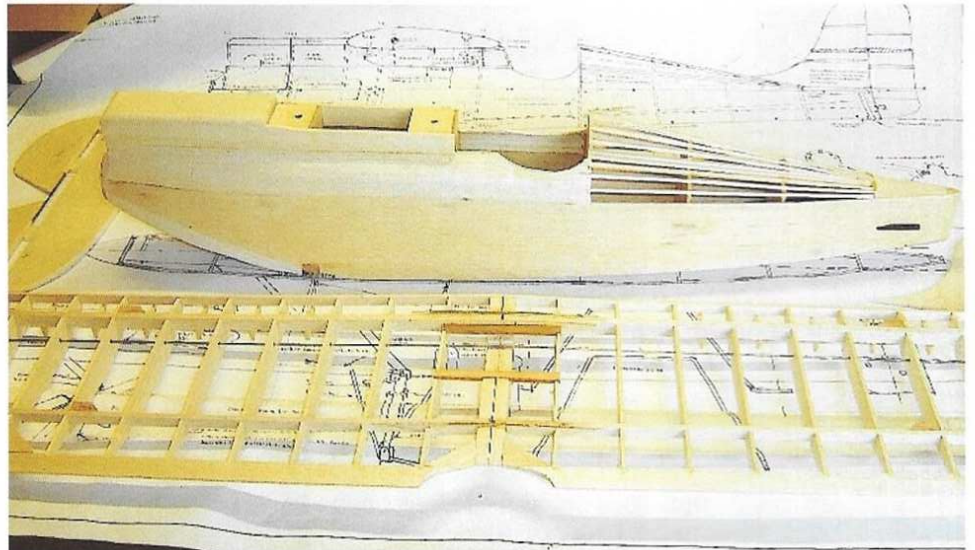
Use 1/4" wide strips at the area of maximum curvature and 3/8" wide in the flatter areas. It is a good idea to mark the planks at the join between C-3 and F-2 so that you know where to separate the cowl later.

Remove the 1/4" top sheet and fit the 1/8" sheet sides from C-2 to F-5. Add C-1 and the 1/2" sheet between that and C-2. Shape the planking and 1/2" sheet and blend to the basic fuselage sides.

Cut the 1/4" sheet top at the join and glue into place. Once this has dried you can separate the cowl from the fuselage. Glue strips of 1/16" ply inside the sides of the cowl; these must extend down into the fuselage. You may need to pack these out slightly to get a good smooth fit. These take screws from outside the fuselage to hold the cowl in place.

Make up the plates for the wing mounting blind nuts. These consist of a 1/8" ply plate under a piece of 3/16" sheet balsa. Epoxy the blind nut into place and then glue the plates between the sides and formers.

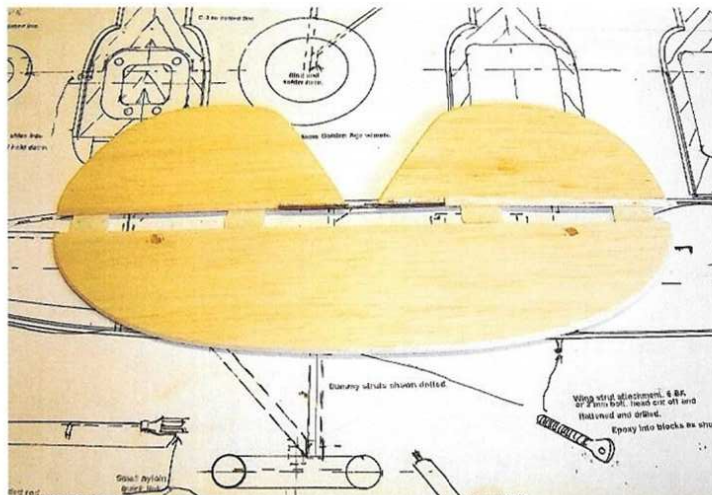
Fit the 1/2" sheet pieces under the nose and shape them as shown. Note The opening under the nose; this allows the cooling air to flow out. Leave the 1/8" sheet between the sides for the time being. When the wing is complete you need to be able to mark up through the fuselage and the blind nuts for the holes for the hold-down bolts. Once this has been done you fit the 1/8" sheet as shown.



Completed fuselage ready for covering.

glue on the 1/4" sheet top to hold everything steady. Now plank the curved sides from C-2 to F-6 with strips of 1/8" balsa.

Add the tailplane platform and tailskid mount and then sheet the bottom with 1/16" sheet with the grain across the



The tail parts are extremely simple.



Basic wing structure is light and simple.



fuselage

Fit the stringers. These are let into the sheet on F-6. Note the way that the stringers are set in the corner of the headrest - this helps with the covering. Note also that the middle stringer on the headrest ends just at F-8. All stringers butt up against F-9.

The fuselage is now almost complete.

Wings

The wings hardly need any description. They are built over the plan in the usual way. The Clark Y section means that they do not need any packing of any sort.

Note that the struts are functional; they prevent the wing from twisting. The controls are also conventional except that the servo hangs down under the wing.

The 1/64" ply at the leading edge is thin enough to glue down without worrying about cutting away the ribs, etc., just feather the edges. The underside of the bellcrank bays is also covered with 1/64" ply, as this is the neatest way of making the slots for the pushrods to the aileron horns.

The wings are joined with the dihedral braces. The servo rails are fitted and then 1/16" sheet is fitted between the spars. This is cut away for the servo.

Once the wing has been completed fit it to the fuselage accurately and mark through from the bottom for the wing bolts. Drill the holes and then carefully counter-bore the top. Use a piece of sharpened 1/2" brass tube sharpened for this. Make up two 1/16" ply washers and glue them into the bottom of the counter-bores.

The wing struts are detailed on the plan. Make up the lower ends as shown and then trim to the exact length with the wing on the model. Final adjustments are made with the nylon quick links. The idea of the silicone tube is to give a firm but flexible connection between the dummy undercarriage members and the strut.

The undercarriage, etc.

The basic undercarriage is held to the model with small screws and metal straps. Fit the 16 s.w.g. wire top pieces and bind and solder the bottom joint. Solder on the bottom bracket.

The wing struts are attached to the fuselage by clipping the quicklinks to their fitting. These are made by cutting

LEFT: Showing the shape of the tip construction.

the heads off 6 BA or 3 mm bolts then heating the ends and hammering them flat to make a spade bolt. Drill the flat for the quicklink. The threaded portion is epoxied into holes drilled in the appropriate blocks.

To build the dummy portions of the undercarriage the model has to be assembled with the wing and at least the front wing strut in place. The dummy undercarriage struts are cut slightly overlength and have a piece of 6 BA or 3 mm bolt soldered into one end. This should be at approximately the correct angle.

Fit the top bracket over the silicone tube on the strut. Now fit the dummy struts to this. You will have to trim them for a good fit and you may need to heat the solder holding the threaded sections to adjust the angle. Once everything fits, solder the dummy struts to the bracket.

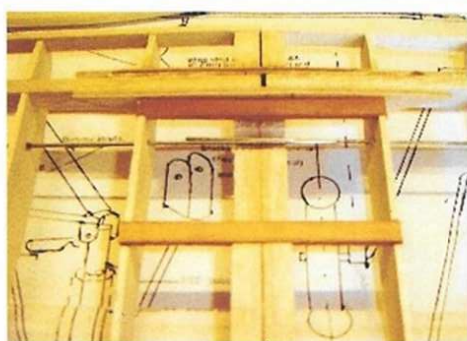
The dummy shock strut is simply made from two pieces of telescoping tube. The lower one is held with a small bolt or even a soldered in pin. The top is held with an 18 s.w.g. safety pin. Finally, a shock absorber from 3/8" balsa dowel is glued to the top portion.

In use, the pin is removed to allow the wing strut to be fitted or removed. It can be replaced for safe keeping while the model is disassembled. It can also be removed to allow the undercarriage to swing forward for access to the servos.

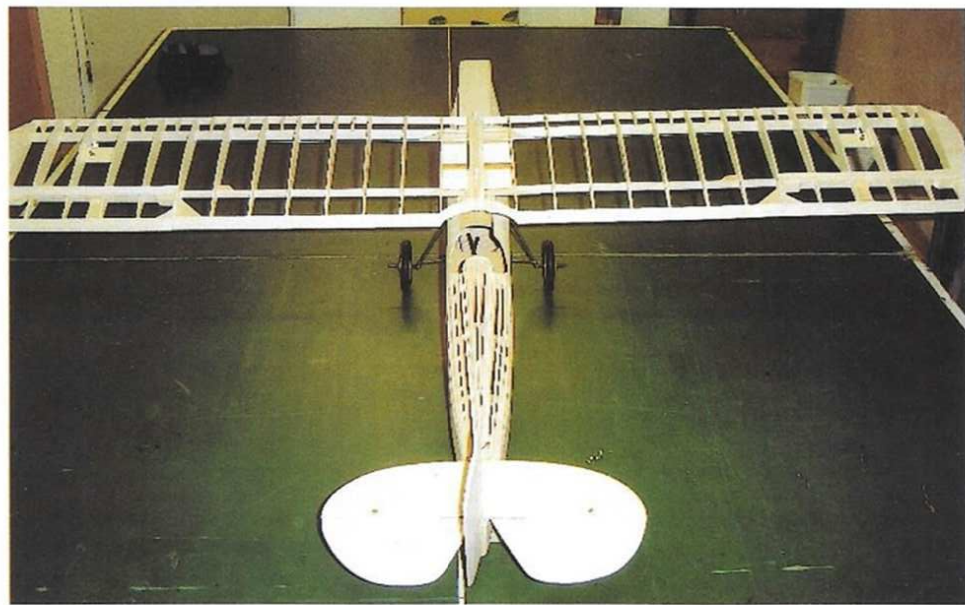
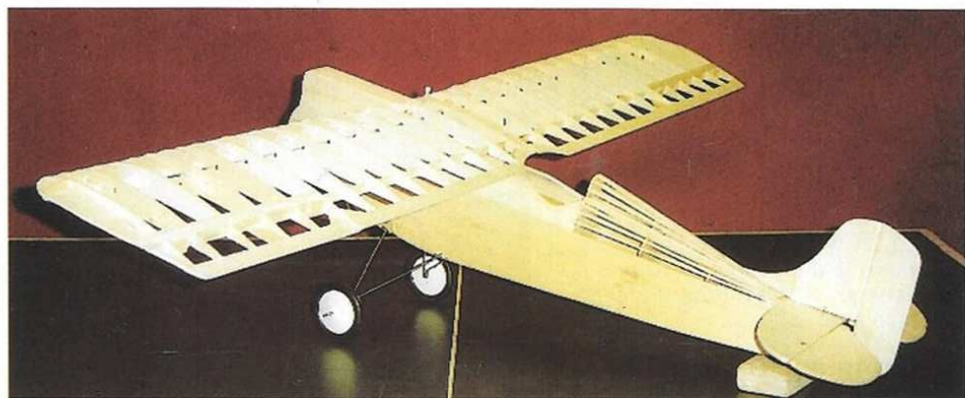
The tail components

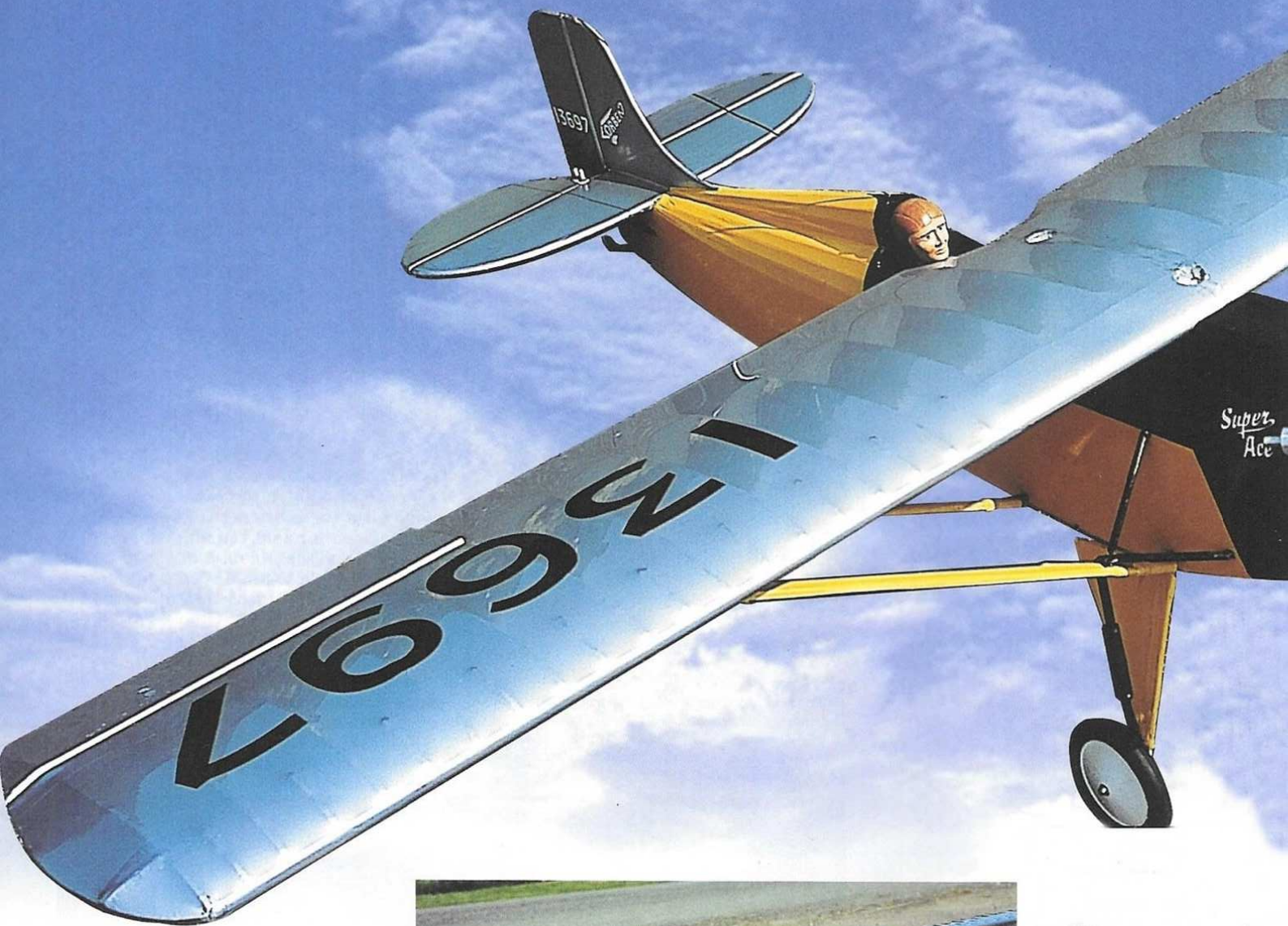
The tail is made from 3/16" and 1/4" sheet. Sand to the sections shown and add the paper strips; these will show up as ribs under the covering.

The tail strut is made from K&S 1/4" streamlined tube; this is flattened at the



ABOVE: Underside of wing centre section showing servo bearers. BELOW: View of completed model almost ready for covering. BOTTOM: Rear view of completed model - just a small amount of sheeting on wing still to be done.





ends and is then screwed to the tailplane and strut mount under the fuselage.

Covering and installation

The model was covered with Solarfilm Supershrink Polyester and Solartrim. The set of lettering was cut for it by Sigma Signs who can provide a full set of lettering and registrations.

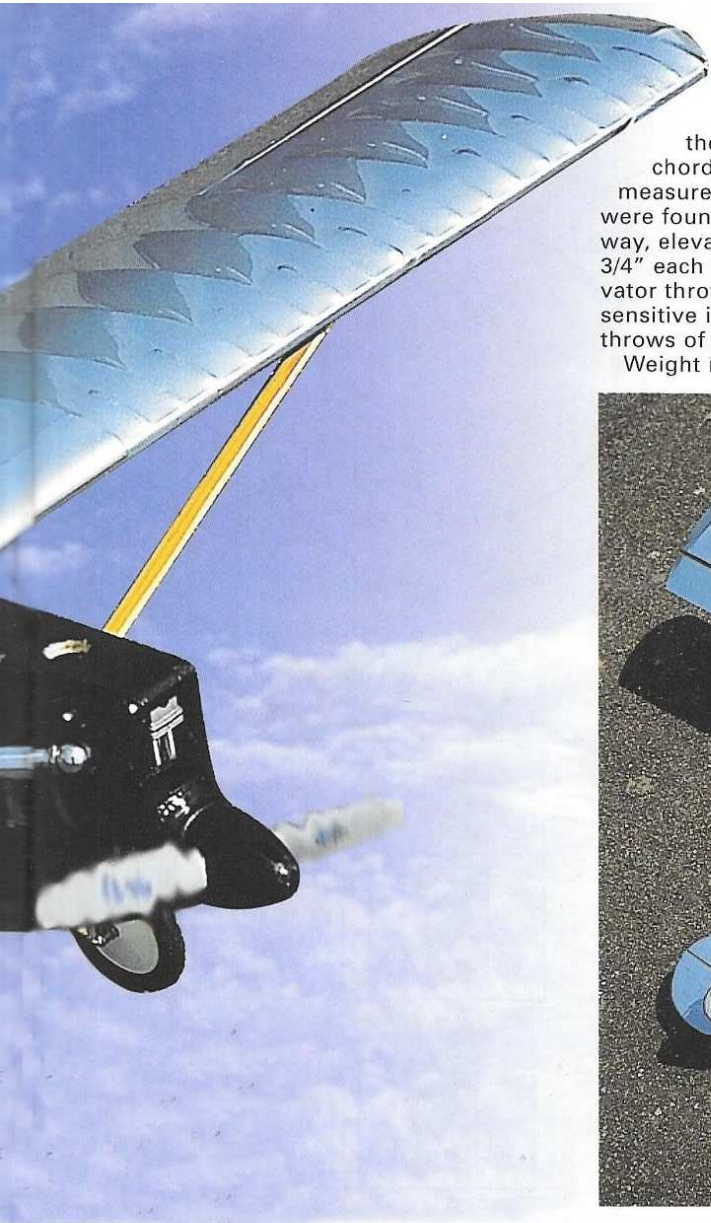
The radio was fitted as shown on the plan. The aileron servo location is unusual. It was found that a longish downward prong on the pushrod connected with the output arm and could not come out once the servo was screwed in place. The battery can be moved around to get the correct CG location.

The engine needs to be installed with 2 degrees downthrust - a couple of washers under the rear of the lugs will work or, better still, use the plastic thrust line wedges available commercially. It was found that the engine tended to overheat a bit if run flat out on the ground but it remained per-



Specification

Model:	Corben Super Ace
Type:	R/C Scale
Scale:	1/6th
Designer:	Peter Miller
Span:	50"
Area:	418 sq. in.
Length:	34 1/2"
Weight:	56 ounces
Wing loading:	19.3 oz. per sq. ft.
Power:	.26 to .30 four-strokes or .20 to .25 two-strokes
Radio:	Four channel



fectly cool in flight.
CG was set at 2.1/16" from the leading edge or 25% of the chord. The control throws were measured after the last flight and they were found to be: Ailerons 1/2" each way, elevators 3/4" each way, rudder 3/4" each way. I was amazed at the elevator throws as the model was not at all sensitive in pitch even with elevator throws of twice the range I normally use. Weight ready to fly was 3 lb. 8 oz.

Summary

This is a very pretty little model which is interesting to build without being difficult. It does require an experienced pilot who is aware of the characteristics. I would be interested to hear of other pilots' experiences with the model.

A full set of registration numbers and smaller logos, etc., can be obtained from Sigma Signs. Email them at sigmasign-writing@ol.com or phone them on 07713 577050. ■

