

Miles M77

LET US HOLD A MEETING for PSS models. After all, club members already possessed some. A Spitfire and a Hunter came to mind, so surely there must be others already in existence or maybe on the drawing/building board.

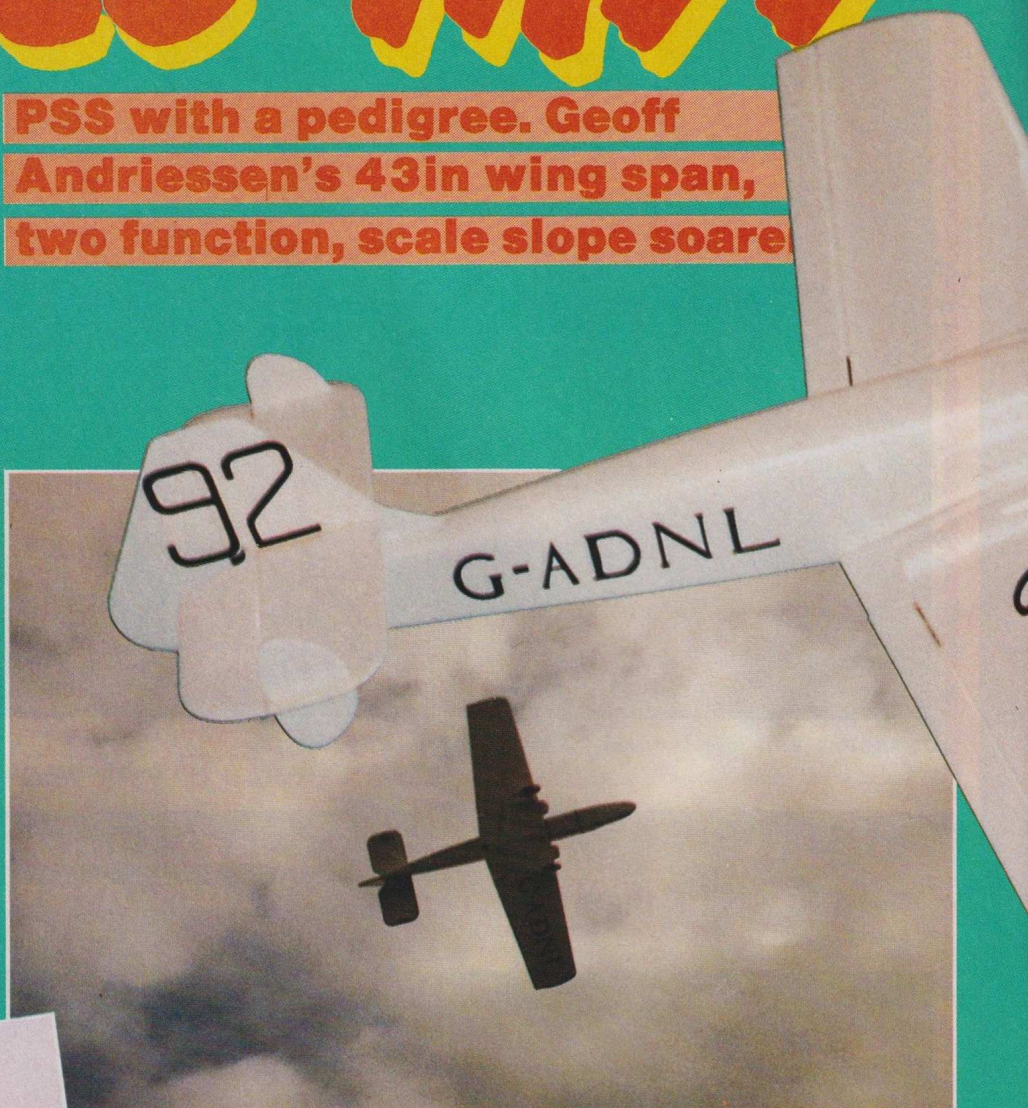
It soon became apparent that my arguments for PSS would be considerably enhanced if I put my money where my mouth was! But I like something different! Don't I? Furthermore it had to be something quick and easy to build, fairly cheap and especially no jiggery-pokery (or not much) with wing and tail areas, fuselage cross-section and so forth.

After considerable searching I happened on a design which, against all my expectations, fulfilled the requirements. Even more so: how about a twin jet racing aircraft with a fixed undercarriage, which was converted from a piston-engined aircraft also designed as a racer.

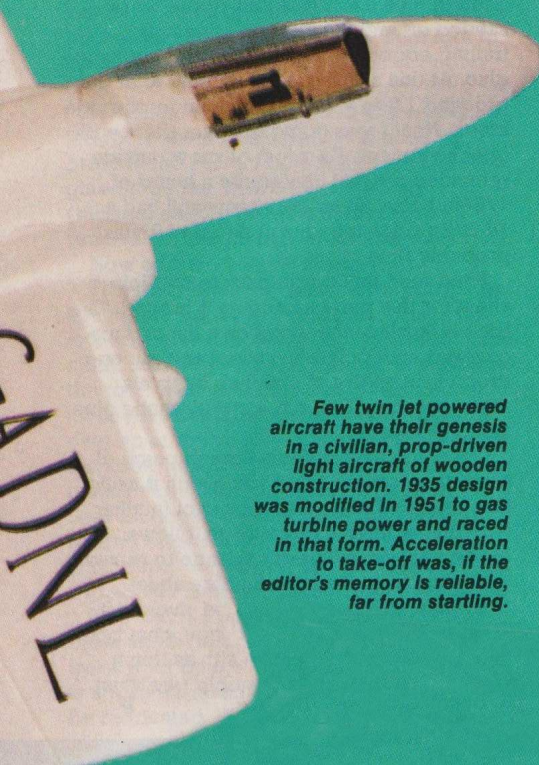
Mr. and Mrs. F. G. Miles built the M5 Sparrowhawk in 1935 and it was a "circuit of Britain" King's Cup contest. In 1951-53 Mr. F. Dunkerley had F. G. Miles transform the aircraft to a light jet racer, again to take part in the King's Cup and other races. At Shoreham, for example, it averaged 210mph (5 miles faster than the New Gull in the same race) to place 7th on handicap in the Goodyear Trophy. Later that day in the round-the-aerodrome T.B.U. (Throttle Benders Union) race the Sparrowjet averaged 185mph into 3rd place.

Anyone interested in further details of this fascinating aircraft will find them as Plan

PSS with a pedigree. Geoff Andriessen's 43in wing span, two function, scale slope soare



Sparrowjet



Few twin jet powered aircraft have their genesis in a civilian, prop-driven light aircraft of wooden construction. 1935 design was modified in 1951 to gas turbine power and raced in that form. Acceleration to take-off was, if the editor's memory is reliable, far from startling.

2292 in the Scale Drawing Plans Handbook, which I enlarged to provide the basis for the model.

This model, although scale, lends itself to the almost standard construction of most slope-soarers. The tail surfaces are of 1/4in. sheet balsa, the wings are foam veneer or 1/16in balsa sheet, and the fuselage is 1/8in sheet sides doubled with 1/64in ply, sundry chunks of block or thick sheet are used for nose, nacelles etc.

Construction

Tail surfaces

You see the results most rapidly here! Cut out from some nice light 1/4in sheet and sand to a pleasing aerofoil, I leave a square cut trailing edge on the rudder and elevators some 3/32in thick as an antifrutter measure. The fin and horizontal stabiliser are each half slotted so that they may be assembled and checked with a square prior to gluing.

A word about glue. My preference is to use a fairly flexible white glue for most joints and a hard aliphatic one where it will be necessary to sand. (I do use superglue at times for "spot-welding").

Carefully mark the auxiliary fins location, then position them accurately with the aid of a small square and "spot weld" them on with a suitable cyano superglue. Drill holes through stabiliser and into fins, dowel on with cocktail sticks or something similar. Hose some white glue around the joint for the long term bond.

Do take all precautions with any cyano glue, use a different glue if affected at all! The elevators are bottom hinged (it looks better when the model is on the ground) and this is best done at or after the covering stage. This hinging also applies if you require a working rudder, although the model is really intended for two function only.

Fuselage

Now here (as they say) is something to get your teeth into. Transfer the fuselage outline onto a sheet of 1/64in. ply. Ignore the wing cut-out for the moment. Now get a nice large sharp pair of scissors - and make

sure that you are able to resharpen and replace them before they are missed – cut out the fuselage side. It is possible to do this most quickly and accurately.

Now use this first side to mark out the other 1/64in. ply side and also the 1/8in. balsa sides and cut out these. No, you do not use scissors on the 1/8in. balsa!

Using a contact adhesive, such as Copydex glue, stick the ply and balsa side pieces together, ensuring that you finish up with one left side and one right side. The ply goes on the outside. It is convenient to leave the balsa pieces slightly oversize in the nose area to facilitate subsequent shaping. Now cut out the wing seating with a fretsaw after clamping both sides temporarily together.

The fuselage very conveniently jigs itself if you build it upside down, like this: The top rear decking is made from two light pieces of 1/2in x 3in sheet. Mark the plan view of the fuselage and the position of the bulkheads on the underneath of the lower piece, now mark a line about 1/2in towards the centre following the outline from the front of the tail unit to the front of the wing. Next cut down the centre line of this piece and cut out the inner section. Remove a 1/4in strip for the fin.

It is now easily possible to razor plane the inner edges to about 45°. Assemble and stick to the top piece and you will find that you now have a hollowed-out rear decking. Do not shape the outside edge at this stage because, if you lay the decking down on its top, you will see that the two fuselage sides will sit on it. The whole lot now being upside down.

Before fixing the fuselage sides to the top decking we need some spacers or jigs. These are very conveniently made by constructing the bulkheads. Each bulkhead is rectangular and is made from 1/8in balsa faced with 1/64in ply. Ensure that these are perfectly square (yes I know that I just wrote rectangular, how about true, then?) because the accuracy of the fuselage will

depend on them.

Position the bulkheads B and C on the rear decking and tack with superglue, after checking uprightness with a square. The two fuselage sides may now be offered up and tacked to the bulkheads B and C. Draw in the rear fuselage sides to the marks previously made and pin to retain (now you know why we did not chop off that surplus wood). Tack in the remaining rear bulkheads D and E and use white P.V.A. to glue all joints. Leave to dry overnight and then add the 3/32in rear fuselage floor with the grain running across the fuselage.

Bend the front fuselage sides in now and retain by gluing in bulkhead A. Shape the 1/2in sheet for the upper and lower nose in plan view and glue to the sides. Add the internal fuselage strengtheners in the cockpit area and allow to dry.

Now for the big moment, equip yourself with a huge plastic bag, or go out in the garden with a favourable breeze blowing and start wielding your trusty razor plane. Some time later (if you haven't disappeared in a froth of shavings) a nice sleek fuselage will have appeared.

You might have noticed that the nose of the model does not exactly conform to SMAE minimum radius requirements. No matter, the pitot tube may be plugged in for scale judging and removed for flying. On the other hand, it might present us with a whole new way of landing on the slope.

The cockpit canopy is a reasonably standard bubble shape, and I do not anticipate that much trouble locating a commercial canopy would be needed. For those of a parsimonious disposition (does he mean me?) let me hint that a suitable soft drinks bottle will slice up into an attractive canopy. For those who want tinted screens a look around will reveal green and brown bottles. Very "with-it" but hardly scale.

At the other end let us slide the tail unit in – just to see how nice it looks. Whilst doing this please check that it is square to the fuselage. All OK? Good, glue it in (white

glue again) with the front of the fin against bulkhead D and the bottom of the fin against the bottom sheeting, it will sit pretty firmly.

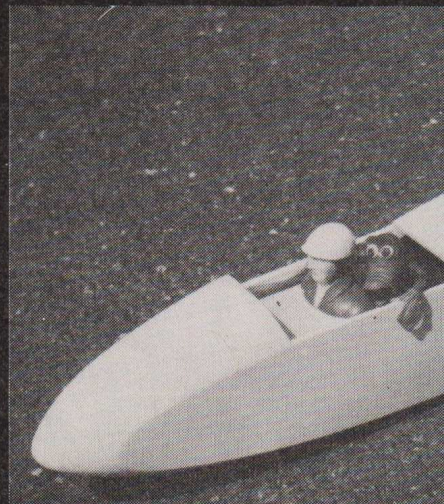
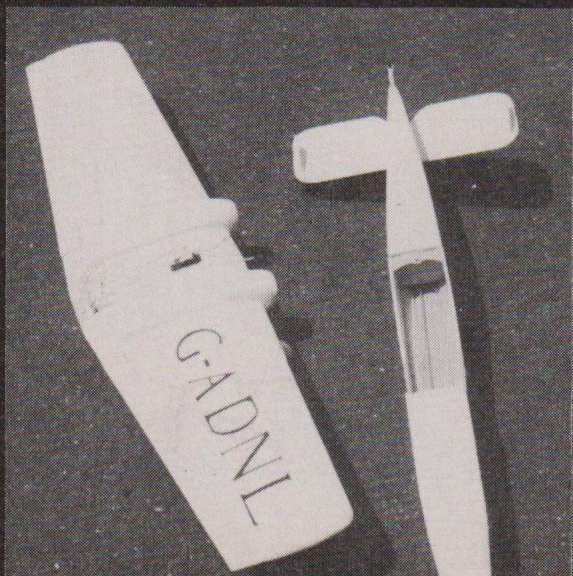
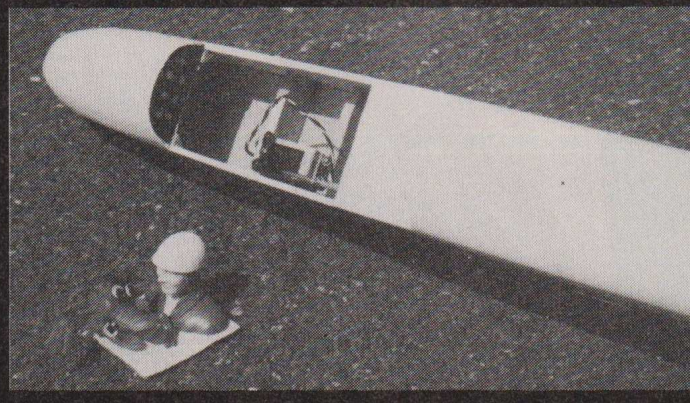
Wings

These are a fairly typical pair of foam wings, more like power model wings really because of the slotted beech U/C blocks. The root and tip templates are included on the plans and so if you have the necessary equipment (a hot-wire bow) it is a few minutes' work to cut out some cores. Mind you, I always find that I need to cut half-a-dozen cores before the knack really comes back. However, this time I only had enough material for one pair of cores, so with my daughter at one end of the bow and myself at the other, they had to be good enough. The odd ridge and ripple were sanded off and the leading edges and trailing edges were glued on with aliphatic glue. At this stage it is convenient to fit the grooved 1/2in x 3/4in beech undercarriage block. Next I was going to cover them with obeche veneer. Four feet of snow outside reminded me that I had quite a hoard of 1/64in balsa. Some 3in sheets still had a 16 1/2p price tag on so I decided it was probably time to use it!

I had read that it was easy to butt-join sheet for this purpose and so it proved. The trick is to place the wood on a flat surface covered with polythene sheet and put one drop of superglue at one inch intervals along the join. Then run some aliphatic glue along the seam.

Once you have a wide enough piece of sheet to cover the wing you attach it using Copydex or similar. For those not familiar with the technique proceed as follows:

1. Use a tack cloth or dry sponge to remove all dust from the foam and the sheet surface which is going to be stuck to it.
2. Using a piece of scrap sponge, coat both surfaces thoroughly but with as thin a layer of adhesive as possible (we must keep the weight down).



3. Leave to dry for 10 minutes, the surface should now be tacky but not wet.
4. Take a deep breath and lower the sheet onto the foam in exactly the right place. This is best done in the following manner. When the leading edge (from 1/2in sheet) is glued to the core it is unshaped and should protrude above and below the foam by about 1/4in. Use this edge to position the front of the sheet and then roll the rest of the sheet down and back to the trailing edge.

When cutting the cores and veneering them aim to have slight washout, amounting to 1/8in at the tip.

The purpose of this is to reduce tip-stalling tendencies; a notorious bane of some scale models. One other action which has been taken on this design is to keep the thickness/chord ratio constant from root to tip unlike the original which has very thin tips.

When the two wing halves are veneered the roots should be carefully sanded to provide the correct dihedral angle and then glued together with 5-minute epoxy (missing out the bit which will require removal for the fitment of the aileron servo).

Now add the aileron torque rods.

The wing root may then be reinforced by a number of different methods. This is my favourite one. Obtain some lightweight glass cloth, cut two pieces for the upper surface at the root, wide enough to span half an inch more than the fuselage width with a slight overlap in the middle. Cut another piece for the underneath, wide enough to span two inches more than the undercarriage track. Leave a generous overlap at leading and trailing edges. Now mix up some Tufcote and "dope" them on. The result is very light and should reduce "dings" from the spats.

I carved the engine nacelles from solid balsa stock (mainly to use my power fretsaw kit on something really meaty). This is a mite extravagant and they may readily be fabricated. Please note - do not get over

enthusiastic and glue them to the wings yet. If using Solarfilm it is much easier to cover separately and then to join.

If you have carved the nacelles out of solid there is one nice little bonus. The bit from the middle of one nacelle is almost exactly the right size and shape to carve two spats from. Look closely at the drawings and you will notice that only in front of the diagonal line through the spats and legs is the construction wooden. Behind the line the shape is moulded from white silicone rubber (bath sealant). Do this by pressing a wooden pattern of the rear end of the spat into plasticine, then fill the hole with some silicone rubber and leave to cure. Use a spot of silicone rubber to stick the moulding to the spat.

Finishing

The original is painted glossy white overall, so for a lightweight finish Solarfilm is quick and convenient. It certainly produces a "glossy racer" appearance and the registration and racing numbers may be cut from either Solarfilm or Solartrim. Finally, the nacelles, after covering, may be glued to the wings using white silicone rubber and fillets may also be made from the same material.

Flying

This must be one of the few non-swept-wing aircraft which needed no nose ballast. A 500m AH button-cell nicad in the extreme nose brought the CG to the position shown on the plan.

It so happened that I finished the model ready for the first test flight at 4 o'clock one winter afternoon. It was fairly mild with a south-west wind of about Force 3 reasonably onto my local slope. The chance

of these conditions repeating themselves within two or three months was pretty remote so I straight away climbed the hill. Yes! As I reached the top it started to rain. A few minutes later the rain eased - and I had got my breath back.

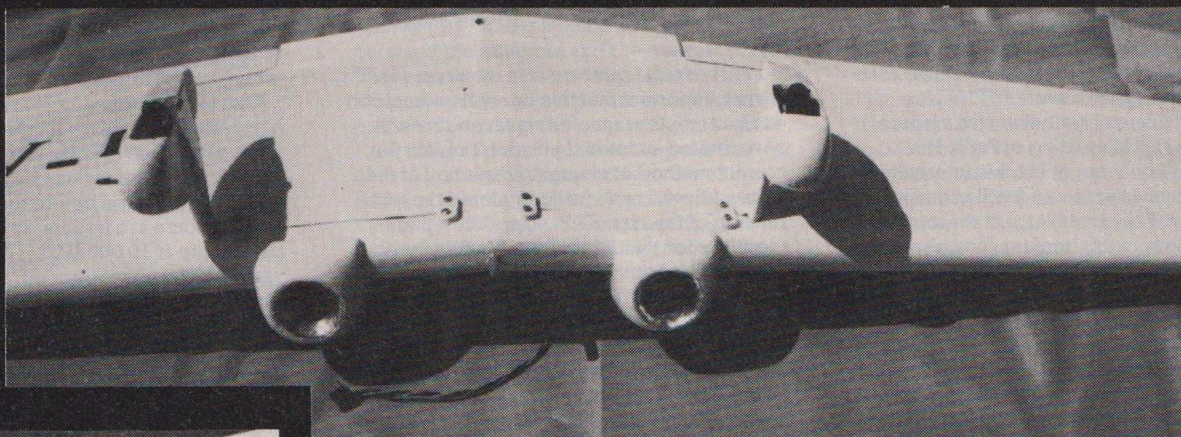
A final check to ensure that the control surfaces moved in the hidden direction and then ready for launch. The wind was light enough for me to hold the rear fuselage and rest the wing on the remaining fingers of the same hand. Off she went and to my great delight climbed much faster than I had expected. The all up weight is 2 1/2lb and the wing area is close to 2 1/2 sq ft giving a normal 1lb/sq ft which, in conjunction with the semi-symmetrical Clark Y H modified (twice) produced a good soaring performance for a small 1/8th scale model.

Turns were quite crisp without any nasty yaw effects from using ailerons alone and fast pylon turns such as the full-size one indulged in, were most realistic in appearance. The elevators had been set for a low throw. This, with a forward CG, meant that up elevator could gradually be applied until a situation was reached where with full up the machine "mushed" gently without a stall developing and remained on an even keel.

Definitely no tip stall - or any other kind under those conditions.

It was possible to get sufficient height for some fast runs and on one of these the Sparrowjet was rolled. The dihedral had a large effect on the rate of roll as it rotated, first slowing and then speeding up once past the inverted position. I suspect that more practice on my part and a bit stronger wind would both help here. However, as our editor says "was the Sparrowjet ever rolled!"

The landing was soft and could hardly have flexed the undercarriage, but then the landing area is superb on this hill. Usual landing sites will test it much more stringently.



Forget your 'Hawks', 'Hunters' and 'Lightnings' for a while and try your hand with a PSS model of refreshingly different lines. Spatted undercarriage has survived OK to date. Transparent canopy can be a commercial canopy item, or cut from a large soft drink bottle.

