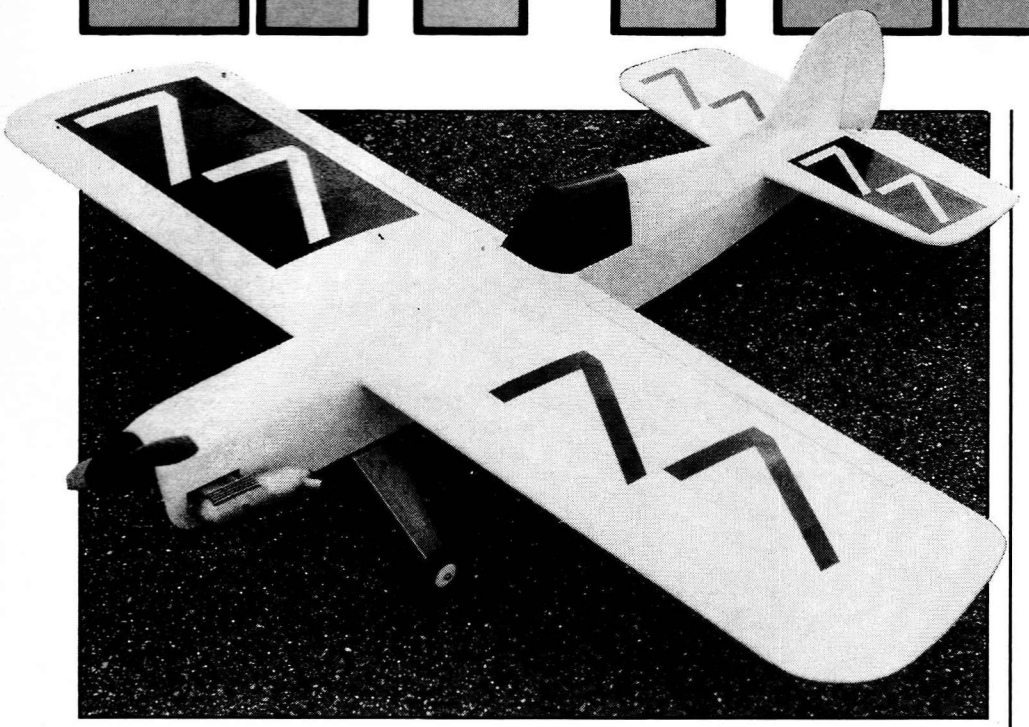
LITTLE SP



Racing lines and a stunning performance; Dereck Woodward's latest!

What's in a name?

We'll clear that question up first! This compact hotrod started life as a series of doodles on hotel notepaper while on a business trip in Florida (*someone* has to do this sort of thing). Along with a requirement for aerobatic qualities was a real turn of speed so a little model wouldn't be grounded by a touch of wind. Now we all know that racers tend to be called the 'Something' Special but this one was coming out rather small – so somehow it evolved to 'Little Special'. So now you know – oh well, never mind!

A major element in the aerodynamic thingummies is the low aspect ratio wing with its 12% thick symmetrical section. This stamps out nasty tip stalling habits and packs a lot of wing area into a small model. Light airframe weight was achieved by leaving out a lot of complicated bits – for example, making her all in one piece saves the weight and fuss of wing fixing bits and a model that small is hardly a pain to transport in one piece. A touch of lateral thinking here also gave a spacious radio bay to ease fitting – no shoehorn tactics or subminiature gear needed here.

The structure presents no more than a few novelties and has been well tested in action. Perhaps as important, several alternatives have been tried and found wanting in earlier similar types.

The woodwork

Is in two big bits, so the wing is probably the best bit to start on. I suppose a foam version is possible but if misemployed loft insulation turns you on you probably know more about the stuff than I do. This structure is refined down to the minimum number of components to do the job, starting with the mainspar, length being the same as a stock length of 1/4in x 1/8in spruce – 36in long. With no joiners we've gained strength and lost weight already!

All the ribs are identical, cut around a ply template but if capstrips don't do anything for you, feel free to adjust the rib profile to suit and leave them out – I just like them. The critical phase of wing construction is ensuring that it's all framed up warp-free when the leading edge 'D' box is completed by webbing up the mainspars. Get a warp in now and it's in for life!. Once built, this wing has the rigidity of a short builder's plank. A side benefit is that if you've only built (?) foam wings before this would be a good one to start on learning how to build decent structures...

When you fit the ailerons and their torque rods, check that the rods are offset to the correct side. As everything is fitted from underneath there's ample opportunity to get the torque rods on the wrong side. How could I know why to advise you on this point?

Take care on achieving the closest possible ailerons/wings fit possible as a tiny amount of gap or slop will have a significant and bad effect on aileron response. The plan shows the needed aileron differential; this is essential for an axial aileron roll – without the differential she'll roll very barrely. There's no magic behind this, but it was proved over a lot of flight time.

For now just sheet up the centre-section between the mainspars and trailing edge – later some of this will be cut away to accept the radio fit. All that remains is to fit the tips and sand the whole wing up good and smooth, have a tea/coffee/whatever break and contemplate the other big bit.

The fuselage

About the only novelties here are the LitePly sides and the low component count. Using LitePly, now widely available, means no messing about with doublers, but I have built a similar fuselage using 3/32in hard balsa and 1/32in ply doublers in the past.

The basic assembly is to join the sides with F 1,2 and 3. Don't pull in at the sternpost yet – it'll go a funny shape (yet another gem I can report on factually!). Now form the rolled top deck from F1 to F3A from two layers of bendy 1/16in sheet. Cut to size, dampen on their outer face and tape into position until dry.

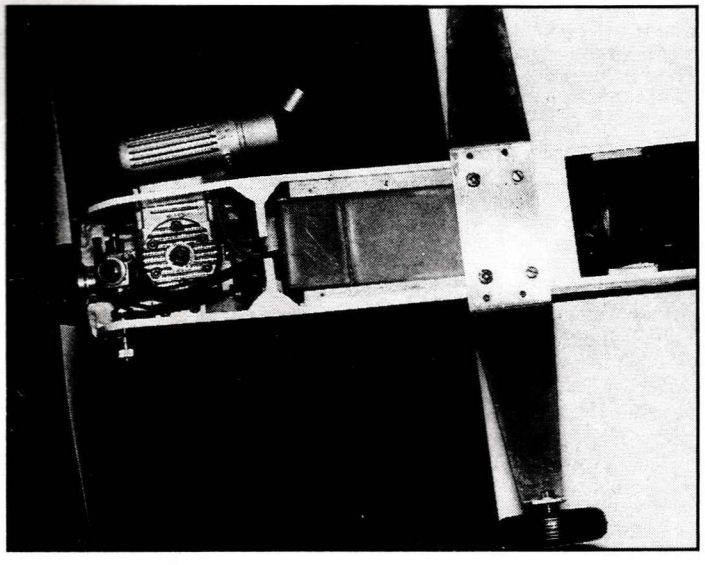
Why not just use lashings of thick sheet and triangular stock? Well, sheet is cheaper, lighter, stronger and there's no carving Equador Gold into the carpet! Once the sheet is dry use a template of the wing profile to cut the top deck out for the wing. Now you can fit the wing permanently knowing that the top deck will fit accurately later.

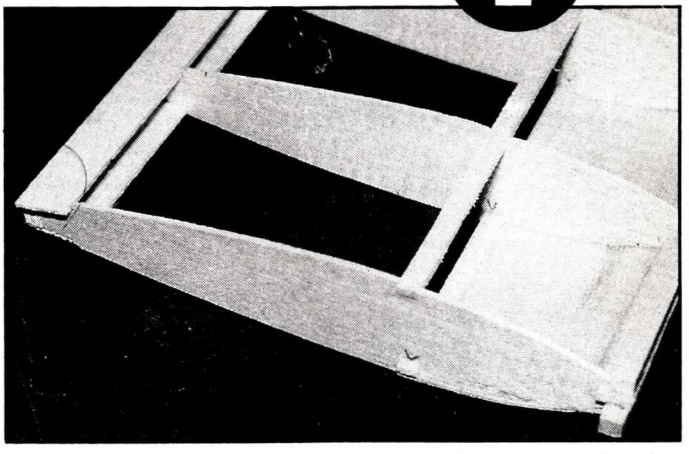
You'd like to know about that intriguing cutout in F1? It allows a SLEC 4oz. Maxi-Square tank to slip in vertically with plumbing attached thus allowing the nose moment to be kept short.

Now you can pull the fuselage sides in at the sternpost; this should produce a fuselage with all the straight and curved bits of the planform in their correct locations – unlike mine, she looks a trifle strange in planform! This is a good time to fit the tailplane and fin; if the built-up parts are too strenuous just use light wood, and do a trial radio fit while all is accessible. Why poke around in the dark when you can achieve a superb fit in comfort?

Use your favourite drives, the control runs are so short that it would be difficult to do a sloppy job here! All the radio bays are large enough for standard size radio units, I've done too many shoehorn radio fits to design one myself and, to save you asking – there should not be any problems

SPECIAL SUPERPLAN 1





Span is a modest 41in. and power is a lowly .25 two-stroke but you'll be amazed at the performance of this diminutive handful! Cut-out in F1 (above left) allows tank to slip in vertically and 'cowling' gives easy engine access. Above, wing structure is basic and conventional.

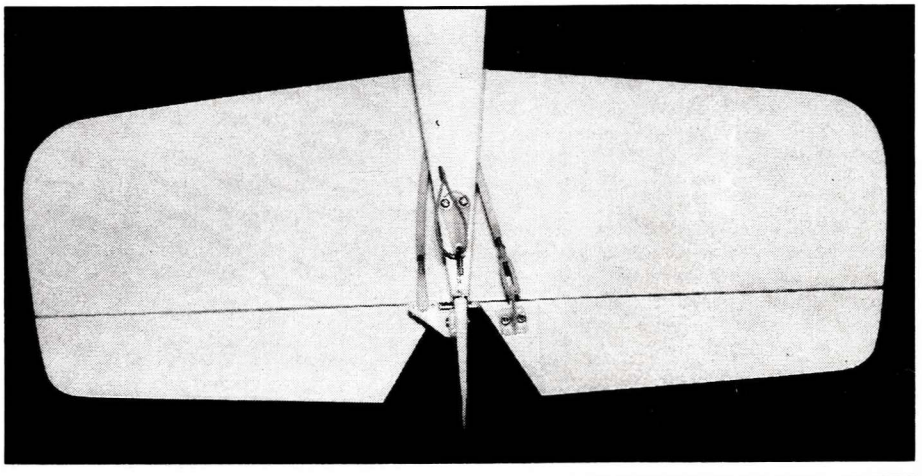
in the c.g. department due to those two servos being aft of the wing.

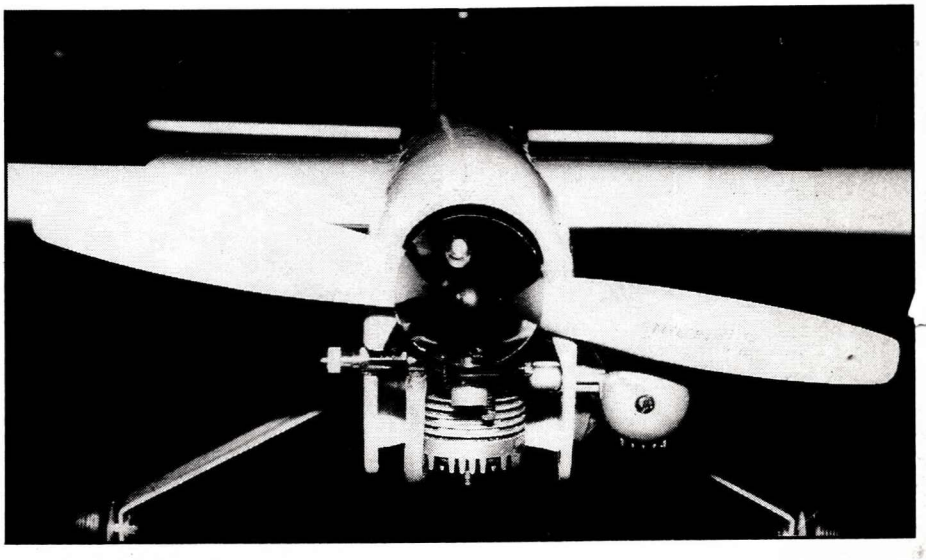
Up at the sharp end is a nominal sort of cowling to hide the engine on its commercial mount. This is a combination of extended fuselage sides and a little triangular section with sheet above so you can do a little carving and sanding. I've drawn the holes, cutouts, etc., for the OS 25 FP to give an idea how to fit out the engine bay.

Above the ply sides aft of F3 is softish 1/8in sheet. Chamfer where the sheet touches the fin before glueing to the top edge of the ply sides. Now stick them to F3 and the fin. In one move you'll have smartly curved sides and the fin gusseted in. On with the top sheet and the fin fillet, a little shaping and add the 'windscreen'. In the spirit of things a full perspex screen was replaced by cardboard (it comes free with breakfast cereal).

Pick a suitable dural undercarriage; I've drawn mine on the plan for a guide but it's none too critical as long as a 9in prop. misses the ground. Search around for some narrow section wheels, she looks a little silly on fat balloon tyres – mine are actually some 'ACE R/C' wheels from the U.S. They have very good nylon hubs and a very narrow section – why is it all that UK manufacturers seem to turn out is fat balloon jobs with plastic hubs that wear out easily? (Of course, you may know better...)

In the covering department the range of options is, well, huge. The basic airframe is very rigid so it's suitable for a film job or





Short and near-straight control runs (above right) from servos to elevator and rudder; Rx aerial in drinking straw tube is neater than dangling it out in the open.

you could go the whole hog on nylon covered wings with a paint job that matches her performance - RED HOT!

The only essential is that the colour scheme should aid recognition of which way is up. With such a small and agile model it helps if the attitude is easily recognised - even now I keep riding her out of strange attitudes when manoeuvres that seemed logical at home turn out a funny shape when flown at the field. Come on guys - stamp out the red fus./yellow wings syndrome for ever. The trim on mine is from Stikatrim, a great way of doing things that I'm hooked on. Why complicate matters with such a great product to hand?

This is it!

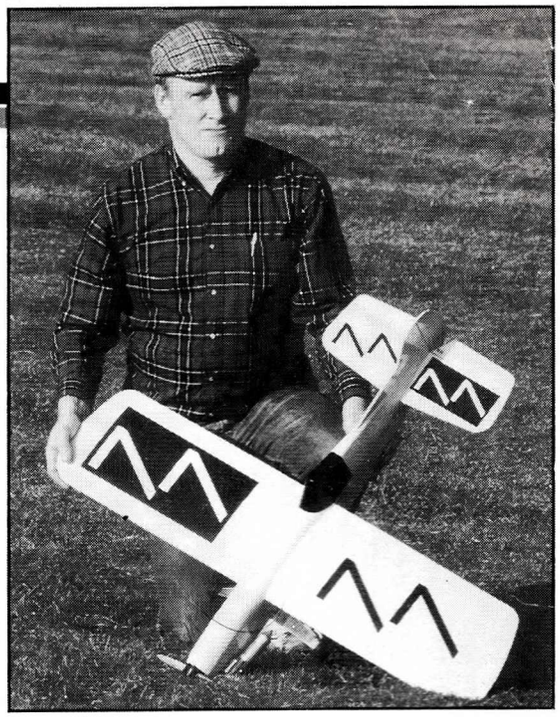
The radio's in, everything goes the right way by the right amount and we've not forgotten the aileron differential - have we? Without it the roll is horribly 'barrely'. Don't overstep the suggested control throws - if you've got tight, gap-free control surfaces (I seal the hinge lines with Scotch Brand 'Magic Tape' like the glider boys use) those controls are very powerful.

So, we're out on the strip, range checked and raring to go. From a standing start hold in some 'up', more on grass than tarmac, and ease the power on. A squeeze of right may be needed to hold a slight swing, but she's not on the ground long enough to worry. Acceleration is, shall we say, QUICK! So once up at 'three mistakes high' ease up on the power and explore the handling. As you're a real good, safe guy we'll assume the trims are close to okay so now checkout the powerful but smooth ailerons and elevators and note the slight yaw/roll couple on rudder. (Of course, if the trims are badly someplace else, you'll sneak quietly down to fix it!)

One quirk is that she'll need a notch of 'up' trim to counter the weight of a full gas tank. This is down to the weight of fuel being a significant percentage of the weight of the whole model - as there's no real fix I don't bother about this too much.

The flight envelope is up to you! 'Little Special' will cheerfully whizz around all the usual tricks with ease and can be wound up to a reasonable knife edge. Don't fall into the trap of cranking up the aileron throws to where she'll only do rolls in six-packs; this little machine is better for keeping things smooth and flowing. Four-point rolls look great and control-line style horizontal and vertical eights add a little sparkle to a day's flying. Or try a Cuban 8 like this - pull up into a climb, about 30 deg., roll to inverted then threequarters inside loop to repeat the upward roll-and-a half. Complete with a half loop out to level flight (phew - think about that a while). Or howsabout a pull-up to vertical, 360 deg. roll straight up, power off and push over a half outside loop. Now a 360 deg. roll straight downwards to pull out at start height - makes you concentrate but works a treat.

The range of manoeuvres is limited by your imagination, even if they'll never win an aerobatic class event, but the clever trick is that a cheap aeroplane goes straight into the car easily and when it's airborne over the field it does all these tricks for ten minutes plus on 4 ounces of straight fuel per eyeball-wrenching flight.



The lad himself with the prototype at Old Warden Scale Weekend where he demonstrated **Little Special***'s phenomenal aerobatic potential late in the evening when all the scale chaps had retired to the beer tent! Model really is a little beauty and we confidently expect to see dozens about in the coming months now that you've all got copies of our Superplan. Below, there's more radio bay than with your average small model; standard receiver, servos and nicads do not need a crowbar to fit! This lot (bottom pic) holds the engine, tail and radio at the appropriate locations; it's all Liteply apart from the firewall.* **Little Special** *is quick and cheap to construct and, with an all-up weight of only 2lb 13oz ready to go, doesn't cause kitchen scale failure.*

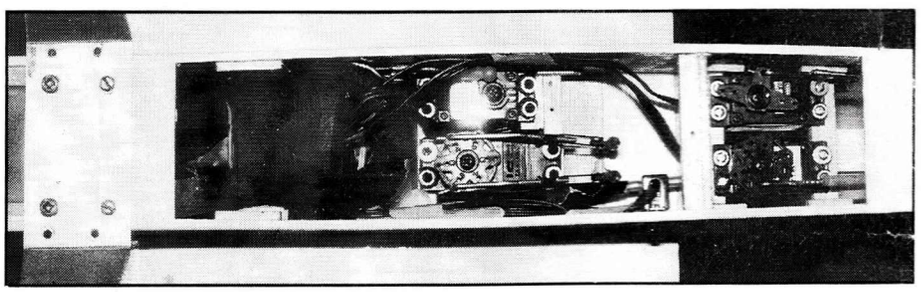
But - we don't always rush around, so pull back on the power and try the sort of low speed a lot of trainers can't manage nowadays. That stubby wing will not tipstall without deliberate intent; one of my party-pieces is to cruise down the strip with her nose well up and holding near full up elevator. Of course what's the use of an aerobatic ship that won't spin and snaproll? No problems - to spin, back off the power, ease in the up and hold the nose high as the speed drops. At the stall, full up and rudder and we're away. Before two turns - neutralise to recover, after three neutralise then apply opposite rudder a half turn before desired exit heading. Anyone can spin willy-nilly - only someone in control of things can enter and exit on headings to order (that's YOU, of course).

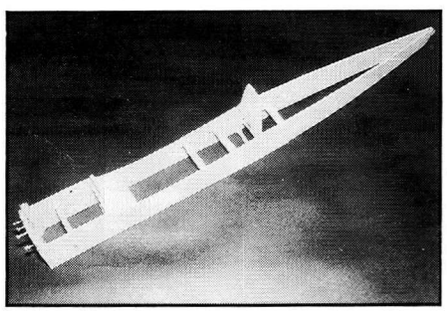
For snaps pull up hard, hit full rudder and aileron - WHEE! Try one and a half snaps, from level flight to a nonchalant inverted.

Once you've acquired a degree of familiarity with your new playmate (like when you reckon *you're* flying the model and not vice versa!) try some customising on the control throws to suit your style. For example, my idea of ideal rudder throw is just enough to get into the spin, not about twice as much. This approach tends to make flying a smoother affair all round than having masses of throw.

Before it all goes quiet -

Use your growing confidence in 'Little Special's' low speed handling to cruise round a slow, safe circuit to a tail down landing. DON'T just throw her at the floor, all the surplus energy will be dissipated in a series of ever-increasing bounds - very messy and eventually hard on props. This is one babyplane that will do a real three-point landing with a little effort.





Go on - be an individual!

As long as you don't mess with areas and moments, your version doesn't have to look like mine or anyone else's. This may be a touch at odds with one well known designer who seems to prefer you to use his colour scheme and let's not discuss modifying the outlines! So, try these for inspiration.

A proper glazed canopy; take a look at the Art Chester Jeep racer, plus a pilot in the office would look really sharp. While you're looking at real raceplanes - if you've a tarmac strip, why not try some wheelspats to hide those 'orrible black wheels?

Keep the thrustline the same, rotate the engine through 90 deg. (checkout the tank height to suit) and fit some applecheek cowls. So one goes mostly missing to clear the cylinder, it'll still look very snappy.

Whatever, it's all in the name of having fun so go to it and don't be left wondering which one is yours amongst the pits line-up. Don't forget - no matter how fast, furious and thrilling you fly - FLY SAFELY!