

# Peter Russell's

# 384E

An entry level, 32" span ultra simple, low cost, low conspicuity 'Stealth' model to

get you started into the blossoming 'Speed 400' craze

0.813 mt.  
.051



The 384 as it first appeared, powered by the very quiet ED Cadet, 1cc diesel. Its 'transportation box' can be seen behind.

Above: An experimental aileron wing was tried on the standard 384 body and tail. The rudder servo was left in place and the extra weight - actually 12 grams - made little difference. Very high rate of roll. No claims made for the vestigial 'winglets'.

In spite of our group taking great pains to avoid upsetting the neighbours (there are some houses about 1/4 mile from the field), with all engines properly muffled, no flying at "unsociable hours", et-cetera - one particular householder was making trouble for us. You know the type: "If I see somebody enjoying himself, I'm going to put a stop to it."

We were talking this over one evening and somebody said, "What we want is some sort of 'Stealth' model." The Americans were making a lot of fuss about their new 'low observable' military aeroplanes at the time. It was around the same time that I got addicted to country walks and often wishing I'd got a model with me to have a 'quick buzz around'. So the idea developed that a small, inconspicuous, very quiet, hand-launch and belly-land model that would pack away into a reasonably small box might be useful for more than one reason. The result of all this cogitation was the '384A', a 32" span, ultra-simple type with (intentionally!) folding wings and a removable tailplane so that it would pack into a box 25" x 6" x 4 1/2".

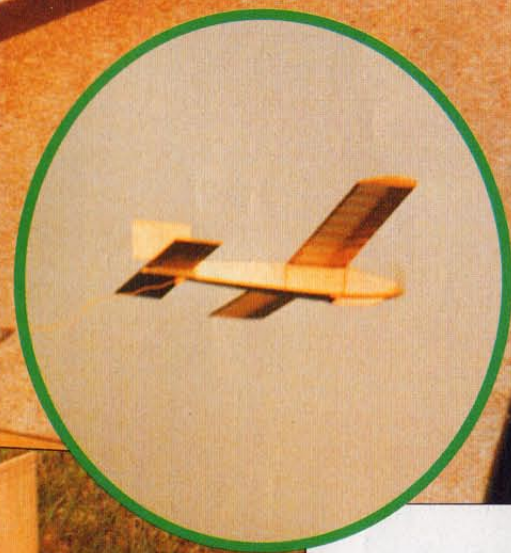
The engine is an E.D. Cadet, 1cc diesel which itself had been designed to be as quiet and easy to operate as possible. So it came about that I often set out on my walks with the fairly inconspicuous box and could rig the model and fly whenever I found a suitable spot - which was often. The model was quite

trouble free, but the smell and irritation of the diesel fuel rather took the shine off it. Also, even the quiet Cadet still made the model more conspicuous than I thought acceptable for this sort of thing.

Then, finally, one of my friends got caught up in the 'Speed 400' craze, then in its early stages. He built a model for this motor, about 36" span and 200 sq. inches of wing area which flew quite well, and, most important, it made virtually no noise at all! Putting all this together it seemed we had the ultimate 'Stealth' model aeroplane, so I quickly made a new body for the 384, identical to the original apart from the obvious differences of the engine/motor mount at the nose. The same folding wings were (and still are!) used. To reduce conspicuity even further, I left the whole model in natural tissue/wood clear doped finish. This certainly works, though it does make it a bit more difficult for the pilot to work out whether it's coming or going! On the other hand, I have often been operating from a footpath or whatever and passers-by have given me funny looks, wondering WTH I was doing standing there holding that black box with silver pole - having failed to realise that there was a model aeroplane nipping about up there in the wild blue yonder!

## There's more!

Further uses for the model have since become apparent. With the rash of Speed 400 enthusiasm spreading like a plague,



Left: Seven years later - the 384E 'Stealth', Speed 400 powered, after several hundred flights. Unlike many small models, it will cope with quite stiff breezes. And yes, it really does fold away into that box!



*Solo launching, a source of anxiety with some models, is no problem with the 384.*

*Underside of wing fold showing woven nylon tape 'hinge'. Works fine but bracing wire gives peace of mind! Bracing wire is permanently looped on right wing 'S' hook, and slips over open hook on the other side.*

many operators of what we might describe as 'ordinary model aeroplanes', that is piston powered dittos, realising that electric power is going to need a different approach, have been agonising on the best way to get started. As one S&L correspondent put it, "The more I read about it, the more confused I get." So, if you'll pardon my modesty, I've solved the problem for you - build a 384E! All the necessary gear is widely and inexpensively available, and providing that you don't make too much of a hash of building it, you know it will fly!

Actually, it might not be ideal for a complete beginner. All electric models have to be built light, but at the same time the wing loading is probably higher than most, so the structure has to be built to a rather higher standard than would be acceptable with a piston

powered model. But having said that, the structure is just about as simple as you can get and very economical on materials too. If you aren't interested in the "transportable-in-a-box" bit, you could simplify it still further by building a one piece wing and fixing the tailplane permanently in place. No problem with the flying though - if you can fly at all, you can fly this.

An immense advantage it has over many small electric models, especially the scale low-wing types, is the ease of what has become known as "solo launching", that is, launched by the pilot. This can be quite tricky because, with the model nearly always in a semi-stalled condition as it leaves your hand, it takes you a critical fraction of a second to get your launching hand onto the stick and this, together with the difficulty of the one-hand launch of the low-winger, has led to many models getting crumpled.

The 384, per contra, is very easy to launch and, more important, providing you have set the trim properly, it will fly away smoothly for many seconds without the need for you to touch the sticks. A very important advantage!

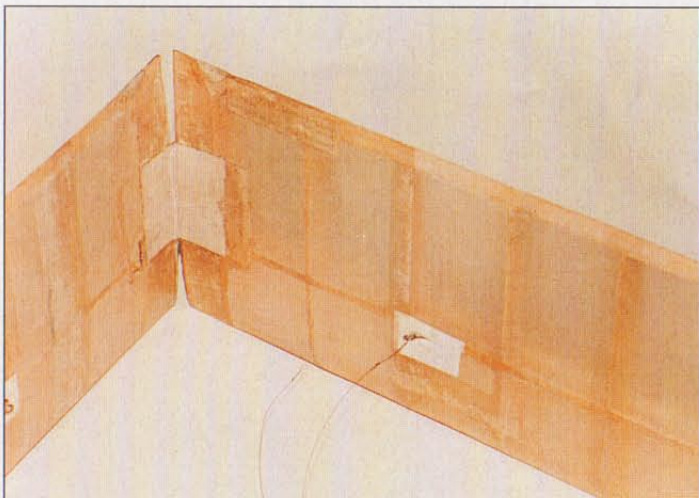
### **First, sharpen your hatchet...**

So, if you've decided to have a go, make sure you've got some cyano acrylate - CA for short - adhesive and just a smidgen of epoxy ditto. You'll probably have to buy some sheet for the body box and a few strips for the wing spar flanges, but most of the

rest might come from your scrap box. Just remember, it's got to be light, so use softish wood for everything except the more highly stressed bits. The two-strip trailing edge of the wing was used on the original because I didn't have a suitable bit of T.E. section, but it has a useful resistance to going wavy like some T.E.s do. After more than six years hard flying the original is still quite straight. If you opt for the folding wing deal, the hinge is made from strong woven nylon surgical quality adhesive tape. It isn't strong enough for regular use on its own, so the bracing wire (.010" control line wire) is essential for safety. This is made up slightly slack, fixed at one end and hooked over the fitting on the other wing, then tautened - it needs to be fairly tight - by sliding it up the notched, inclined ramps on the fuselage bottom, as shown on the drawing. The tailplane, if you want to make it de-riggable, is held in place by a single dowel peg. I've used hardwood but balsa would be OK. The pin goes through  $\frac{1}{64}$ " ply "bushes" on both tail and body. The end of the elevator push rod is sprung into the elevator horn bush and doesn't need any other form of retention.

As for adhesives, I used CA for everything except the L.E. sheeting. This is best stuck with PVA. Use the latter sparingly to save weight. A word of warning about the CA. First time, on bare, clean balsa, it sticks well and almost instantly. However, if you have to make a second attempt at a joint, or are sticking bits that already have CA on them, you can have big problems with both setting time and joint integrity. In cases like that, use epoxy for "second tries".

The structure is so simple it would be presumptuous to give you a detailed description of building it. Your ideas will be at least as good as mine, but when you come to the stage of finishing it, remember, keep it light. Mine is finished in clear dope only and weighs 15 ounces ready to go. You will probably beat that if you really try. My Speed 400, 7.2 motor is powered by a seven cell 500AR battery, but it also goes well with a 500AE. Working out where to put everything is best decided by your own choice of gear. You might be able to use non-micro equipment, and there's no reason why you can't widen or deepen the body a bit if necessary. But it's a lot easier with micro gear - mine uses the Fleet receiver, and Union 12G servos (Fleet's are nearly as small). But forget about servo trays and lumps of wood to screw your servos in. This model has them stuck in with double sided foam tape. Make up your  $\frac{1}{8}$ " balsa push rods with 20SWG wire end fittings - non-adjustable - to the length you estimate will suit the servo location. Then stick a rectangle of  $\frac{1}{64}$ " ply, doped to a glossy surface, where you want the servo to go. With the pushrod hooked up at both ends and the control surface held at neutral,



plonk the servo onto the prepared ply piece. That way, you get a perfect neutral with no need for adjusters. I don't recommend the popular "snakes" due to the weight and hysteresis involved.

The power was originally controlled by a Hitec 1003 switch. The latter, having a relay, is a bit heavy (45g) but very reliable. You would save a bit of weight by using one of the better all-electronic gadgets, however. Get the idea that I'm serious about keeping the weight to an absolute minimum?

## The moment of truth

If you've rigged it as shown on the drawings, and got the CG as shown, set the elevator trim exactly neutral with just about  $\frac{1}{16}$ " right deflection of the rudder, then launch, bung or otherwise project your model with a fastish level throw. Mine will pull away in a gentle climb, quite straight with no urgency about getting on the sticks, and as it accelerates it gets quite lively. Control deflection limits are a matter of taste but mine are, at "high rate", rudder -  $\frac{3}{4}$ " either way, measured at the extreme trailing edge, and elevator -  $\frac{1}{3}$ " each way. I set the low rates at  $\frac{1}{2}$ " and  $\frac{1}{5}$ "

respectively. If you are not used to sensitive controls it might be an idea to use a bit less of each to start with.

Climb it to a reasonable height - it gets up there quite quickly - then try to get the feel of approaching the stall. In order to be moderately aerobatic, the stall can be a bit sudden and it will drop a wing, but you have to be ham-fisted to get into trouble, so remember to fly smoothly during the approach and landing. Unlike many similar types this will do both flick rolls and fully developed spins. For the former, just ease up the nose a bit and then slam on full up elevator and rudder. It will immediately flick so be ready to release the control inputs about half way round. For the spin, simply hold the control deflections on a bit longer. Leave full power on until the spin is fully established, then you can close the throttle to avoid unnecessary stress. It recovers quite quickly but don't be in too much of a hurry to pull the nose up or you might find yourself spinning again! It won't slow roll but it does a nice stall turn. Leave the power on until it's established the yaw, then shut off and it will fall neatly into the vertical.

If you don't fancy such aeronautical

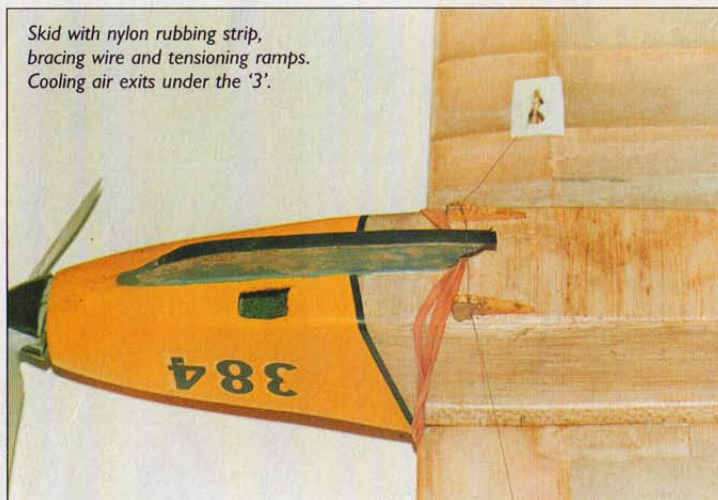
lunacy, it's still good fun just flying it around normally, so don't get the idea that it's vicious. Models this size and wing loading usually glide like the proverbial wet log but this one is different. So much so that in light wind conditions the flat glide (good L:D ratio?) can make spot landings into overshoots. The way I tackle it is to set up the approach as a deliberate undershoot. When it becomes obvious that you really are undershooting, a little burst of power can be used to get you to the required spot. Even if the auto-PCO (power cut off) has operated, some of the latest units contrive to give you an extra few seconds of 'emergency power' providing that the throttle has previously been fully shut at least two seconds. The marvel of modern electronics!

After that, you are on your own to appreciate the sheer convenience of this sort of flying and start dreaming up all the attractive projects that are made possible.

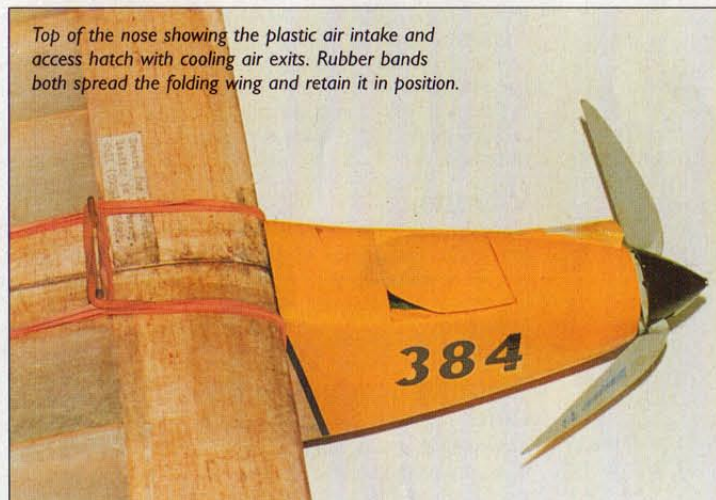
Let me know how you get on! ●



Left: Wing root with wings partly folded to show short locating dowels and 1/64" ply register. One piece wing is a simpler option - 1/16" ply dihedral braces would be necessary though  
Below: Ply elevator horn with nylon tube bush. Push rod end held in place by spring pressure. Note "stitch" hinges - cheap, simple, reliable.



Skid with nylon rubbing strip, bracing wire and tensioning ramps. Cooling air exits under the '3'.



Top of the nose showing the plastic air intake and access hatch with cooling air exits. Rubber bands both spread the folding wing and retain it in position.