

MINIVERT

**MEMORIES,
MEMORIES...
DUDLEY PATTISON
MINIATURISES AN
OLD FAVOURITE
AND RE-LIVES THE
MAGIC OF DAYS
GONE...**



About thirty years ago (was it really that long?) I built Frank Van den Berg's Vertigo, to the front of which I nailed a twin plug Merco 61. That old Merco was not the most powerful of beasts, it was rated at seven pounds static thrust but after discarding the plastic Merco carburettor and fitting an aluminium Kavan carb, it was an extremely reliable and easy starting motor. As an aside I remember my shock and disbelief when a retailer at the Sywell Symposium (forerunner of the Cranfield and Leicester shows) relieved me of four pounds sterling for the Kavan carb. So, a motor with seven pounds of thrust in a model that weighed in at a little over five pounds!

The first flight was very interesting. Frank had shown an extremely long elevator horn on the plan which I replaced with a standard Micro-Mold horn. Like all 'club experts' I knew

better than the chap that had designed the thing!

So, what was wrong with using the outer hole on the standard horn? Well, you must bear in mind that in those far off days of proportional radio control there was no such thing as servo reversing or rate switches and a lot of the servos had linear, rather than rotary outputs. To overcome the 'handing' of servos the manufacturer, Skyleader in my case, usually supplied a radio set with three servos of one orientation and one servo with the reverse orientation. This 'reversed' servo would be marked with a coloured dot. It was usual to sort out the ailerons first in a new model as you had the choice of either hand servo, the ailerons would normally present the biggest headache if you got to them late in the installation with only one 'hand' type left and needing the

other. Without rates a linear output servo obviously cannot have the volume of its output altered, at least with a rotary the output can be taken from differing radii on the disc, thereby altering the volume.

So, I took off with nearly double the elevator throw that Frank had intended. It must have taken all of 3.2 nano seconds for me to realise that I was wrong and the chances were that Frank was right. One circuit was all that was flown that day and a few hours later, whilst fashioning a horn extension from eighteen swg aluminium, my heart did drop down out of my throat to its more normal position (despite the rumours that I haven't actually got a heart).

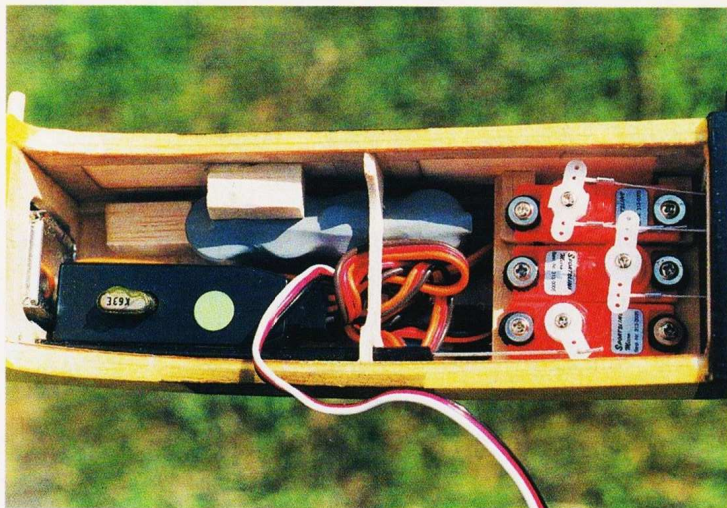
On the next outing the model behaved impeccably and would climb almost vertically out of sight, a feature that was a little more unusual in those days. The balance must have been perfect as it handled so sweetly. I had marks deducted in a limbo contest once for flying under the tape with the tail skid scraping the tarmac for some distance even though all three wheels were off the ground throughout the pass (the original model was a trike rather than a tail dragger). Of all the models I've flown, whether of my own design or others, I think that the Vertigo has given me the most pleasure on the flying field. Phil Kraft's Kwik Fli III would come a creditable second, but the honours have to go to the beast that I single handedly tamed by simply following the instructions!

I vividly remember the models untimely end. The Swindon club chairman came up behind me as I was

Memories, memories... Dud's Minivert brings 'em flooding back.

Cinematographer Jasper Florde, who is more used to filming Steven Spielberg epics, did well to keep up with an untethered beastie.





View of wing bay shows positioning of three 9 gram servos, a mini Multiplex receiver and a 110 mAh Rx battery.

(TOP RIGHT) Note differing servo heights and handing to gain space.

Aileron servo is mounted to one side of the root rib on a simple ply plate. Pushrods are bent both to miss servos in fuselage and to allow some adjustment by increasing or decreasing bend angles.



flying to introduce me to the newly arrived RAF C/O of Wroughton aerodrome. While Jimmy was telling the RAF officer about the club and how responsible we were I thought it was time to show this new chap just what a well trimmed Vertigo could do. So the model climbed vertically for about two hundred feet, I then performed a reasonable stall turn, and started vertically downwards. At this precise moment the trusty Skyleader SL decided to 'throw in the towel' and shut down completely. After bending the elevator stick all I could do was enjoy the crash along with everyone else. Bye bye Vertigo, bye bye Merco 61. The RAF officer walked away muttering, "very impressive," well I think it was that anyway.

DECISIONS, DECISIONS!

So, when I bought a miniature radio at the Sandown show last year I wondered what I could build to put it in. The first, and obvious thought, was a Magnattila at about forty five percent, but I've built three Maggies over the years and I felt like something a little different.

Jack Bishop (no relation to 'the voice') an old friend from the Reading club (I met Jack when I tucked him up, sorry, sold him my first microlight, a Rotec Rally 2B with one hundred and eighty seven pulsating cc's of power, and he still talks to me!) had built a

half size Junior 60 for a similar engine and radio. Jack said it flew very well and although it was without ailerons it rolled on rudder extremely well. He kindly sent me a copy of his drawing and whilst I'd seen his model, which looked really nifty, I just couldn't get enthusiastic enough to start hacking at the unwilling balsa wood to create one for myself.

It was at that point that I remembered how good my Vertigo had been and immediately phoned my old Club 20 chum Bill Burkinshaw at Nexus to see if the plan was still available. Bill found one and sent it to me. On receipt I spread it out in the study and using a ruler and a protractor for the odd angle, loaded it into my CAD programme the hard way. Now, the nice thing about CAD is that once you've got the model drawn in at full-size it's very easy to retro scale the design to whatever size you like. Half size came out at twenty seven and a bit inches (690mm) wing span and that was just about what I thought I'd be looking for to suit my PAW 55 R/C diesel. So, hit the button and presto, a half size Vertigo. Some of the wood sizes do not lend themselves to half scale, for instance, the original used 3/32 quite liberally but where on earth are you going to get 3/64? Having said that my little prototype tipped the scales at 11.6 ounces (330 grams) which gives a wing loading of 12.35 ounces per square foot (37.9 grams per decimetre) which was much better than expected at the start of the venture.

I think, at this point, it's fair to warn you that if you build a Minivert you'll have to be prepared to spend time selecting your wood and you'll have to be prepared to work very accurately as any error is magnified as the model gets smaller. Having said all that about the building it's only right and proper to also point out that this is no beginners model from a flying point of view. As a general rule the larger the model, the easier it is to fly. So turn that on it's head and yes, they do get more difficult as they diminish in size. I

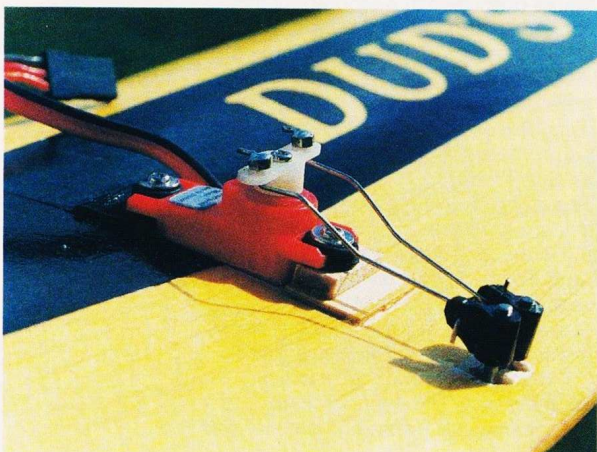
was horrified at the full-size show at Oshkosh last year to find an American retailer selling ready built models of about twenty eight inches wing span, complete with radio and engine, as first time trainers! "Yeah, they're real easy to fly fella." And there on the video behind this charlatan you could see this little model twitching all around the sky. The real aerodynamics expert will talk about Reynolds numbers and the like but a major factor when down-sizing models is wing loading. You have to work very hard on a small model for this to remain within bounds, the "I'll just add a bit there to make it stronger" approach has to be replaced with "how can I add more lightness?"

LET'S GET BUILDING...

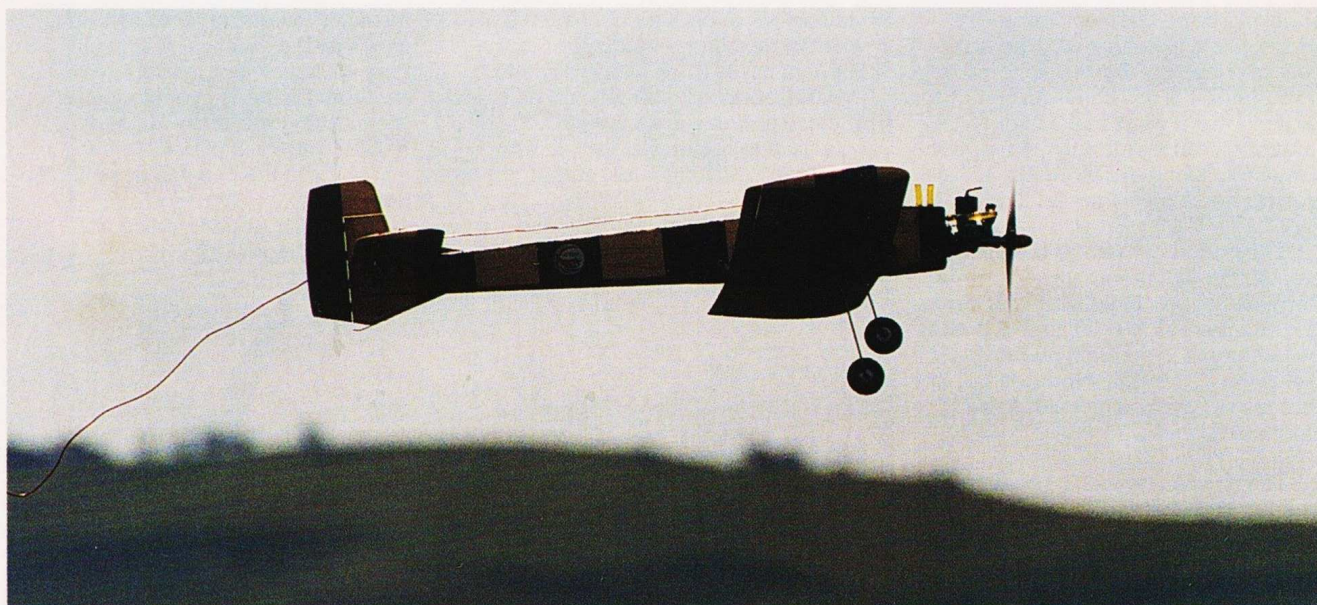
Well at least you only need a small board, so it shouldn't be too difficult to find a flat one. As it's expected for you to have some experience (otherwise you shouldn't really be tackling this particular project) I don't think it necessary for me to expand much on the instructions given on the plan, although a few tips may be of value to you:

1. I cannot emphasise too much the importance of weight. The necessity to keep things light must be at the forefront when selecting the balsa. Balsa wood varies from three to thirty five pounds per cubic foot. Good model shops will normally have stocks of between six to sixteen pounds per cubic foot. Six pounds is considered light, around eleven or twelve pounds is medium, and sixteen is hard, or heavy. About half an ounce is required at the front end to balance every tenth of an ounce that you add to the tail end. I'm in the lucky position of being able to select balsa from the not inconsiderable stocks held by my old company, Flair Products, but whatever your situation, think light at all times.

2. Use cyanoacrylate with a capillary tube and apply sparingly, this is no model for epoxy 'fillets' at every joint.



You'll love flying it so much, you won't want to stop - even when the sun goes down!



Water down white PVA when skinning the wing and tailplane as it is then easier to apply a small bead across the ribs, and more of what is applied will evaporate out.

3. It will pay dividends if you spend a little time making a ply template for the ribs. Make a template for the outboard wing ribs first which can be modified to suit as you move inboard. Use a scalpel to get really nice joints without evidence of crushed timber being left by the old blunt Stanley knife.

4. Build the tailplane first as it has to be completed at quite an early stage because the elevator is surrounded by the fin. I was tempted to change this detail but decided that it was an important feature of a Vertigo and it should therefore stay as is. Hopefully I can be excused for turning the model into a tail dragger as I was looking for a reduction in weight and drag.

5. Take note of the hinging instructions on the plan. This method makes the model so much easier to build and as a bonus you don't have unsightly

dowels piercing the surface. I've used this method for years and have never had a hinge failure. Trust me...!

6. After you've built the two fuselage side assemblies complete with doublers, longerons and uprights (do make a pair, and do make the starboard side the short one, sorry to keep on about this but it's too easy to make a mistake), it's a nice touch to place them back-to-back, and with a sanding block, sand them to an identical profile.

7. Mount the chosen engine in an appropriate radial mount (I used a SLEEC 6D mount), and fit the mount to the firewall with No. 2 self tapping screws before you add the firewall to the fuselage. It's so much easier to work with the firewall in the vice rather than attached to a few delicate pieces of balsa.

8. Fit the aileron servo as low as possible in the wing, you may have to bend the pushrods down to run close to the wing on their way to the torque rods to avoid a clash with the fuselage servos. The zig zags in the pushrods

are there to afford a measure of adjustability. No, not as convenient as a quick link, but a lot smaller and a fraction of the weight!

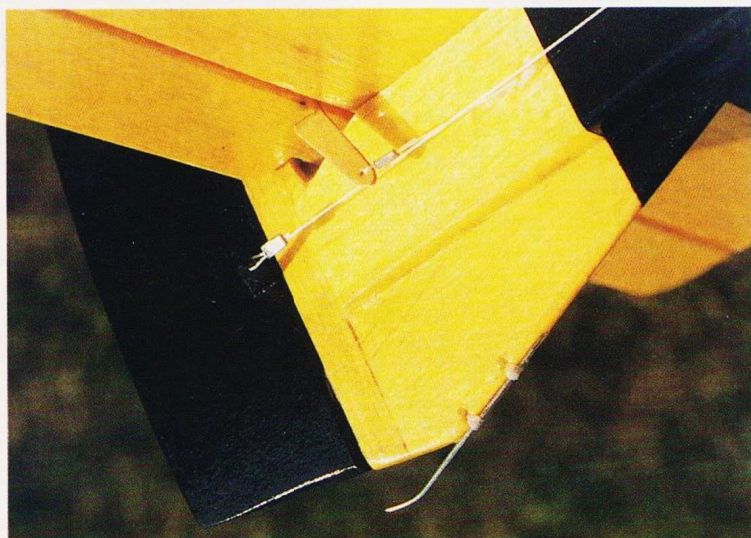
9. As noted on the plan, don't be too eager to close the box of the fuselage structure. You will be in trouble if you don't fit the servos, closed loop system to the back end, and the fuel tank (I used a Flair 15cc tin tank) before adding the cross grain sheeting to the underside.

10. I strongly recommend the use of tissue and dope for covering. I gave the prototype a coat of sanding sealer overall, gave a light sand and applied Flair Lite Flite tissue with full strength shrinking dope. I found it necessary to work quickly as the tissue was dampened with water before application and in a warm workshop if the panel of tissue started drying around the edges before it was down on the structure I started to run into 'premature shrinkage' problems. A brush and a jar of water by your side would be a good idea.

11. After two coats of thinned non

*(BELOW LEFT)
Detail of tail skid,
elevator horn and
closed loop lines
to rudder and
elevator.*

*Simple
undercarriage
fixing.*



shrinking dope the black dope trim was applied. Note that only the first coat of dope is of the shrinking variety, if you persist in its use for further coats thinking that it won't make a lot of difference you'll probably end up with something that looks more like a starved horse than a model aircraft.

12. The temporary closed loop lines are used to pull through the permanent lines. Make sure that the line you use has a 'solid' feel to it when pulled hard. I used the tyrelene line that is put in the Flair Albatross 100 kit for the airbrake operation and this works well.

13. The finishing touch is a coat of fuel proofer sprayed lightly overall.

LET'S GO FLYING

The new PAW 55 was a little devil to start for the first time (sorry Gig) but after it had its first run with the recommended seven inch prop for about three minutes it was transformed and is now easy starting and a lovely little motor.

I asked Barry Conway to hurl it for the first time as I thought I might be better employed on the sticks. Barry is an ex RAF fast jet pilot, an ex airline pilot, a present light aircraft pilot and R/C modeller and he came back, as quick as a flash with, well OK, but don't blame me if it goes in. Confidence or what?

As Barry let the model go my mild apprehension slowly turned into a slightly smug smile, I do like that satisfied feeling that every modeller must get in the first few seconds of a new model's life when it becomes apparent that everything has worked out and there is going to be no imminent disaster.

Loops, rolls, stall turns, spins, all no problem. Even consecutive bunts were no problem. Considering that the tank has a fixed pick up I was quite surprised. Of course, I shouldn't have been because I'd phoned PAW for advice on the tank installation and had been told by Gig to stop worrying and get on with it. Good advice from he who knows all about diesels, and the sort of advice that I used to have to give out on an almost daily basis at Flair. This aeromodelling lark is supposed to be a hobby but it takes on a life or death mantle with some folk.

A word of warning on choice of radio equipment. There are now some really tempting, extremely small receivers around made specifically for indoor models. They'll almost certainly have too short a range for a Minivert. Ensure that what you get, or what you have already is fully suitable.

Why did I choose a diesel? My plan from the outset was to have a practical model that I could pop into the baggage compartment of the Robin (Dr 400 variety, not the Reliant variety,

although both do have only three wheels) next time I visit Bembridge, Popham or Sleep on a nice day, and join the modellers that abound on each of those airfields in a bit of R/C. So, I only have to remember the model, lacky bands, a can of fuel and a transmitter!

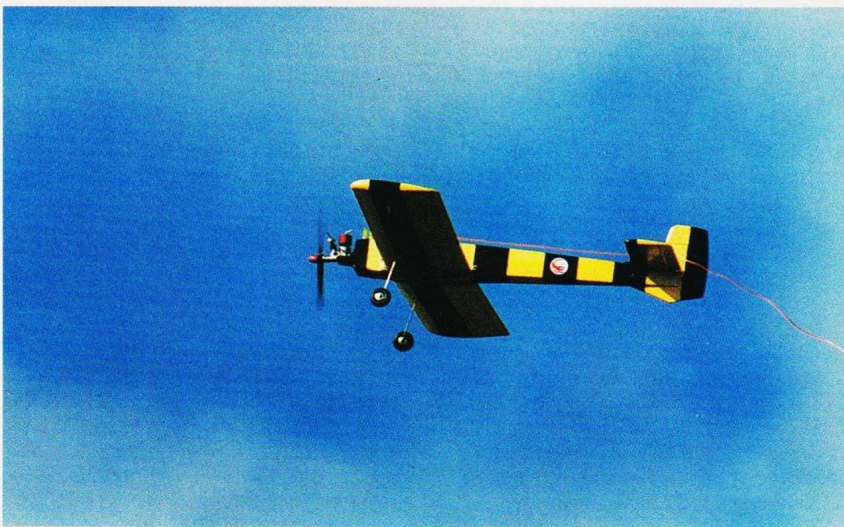
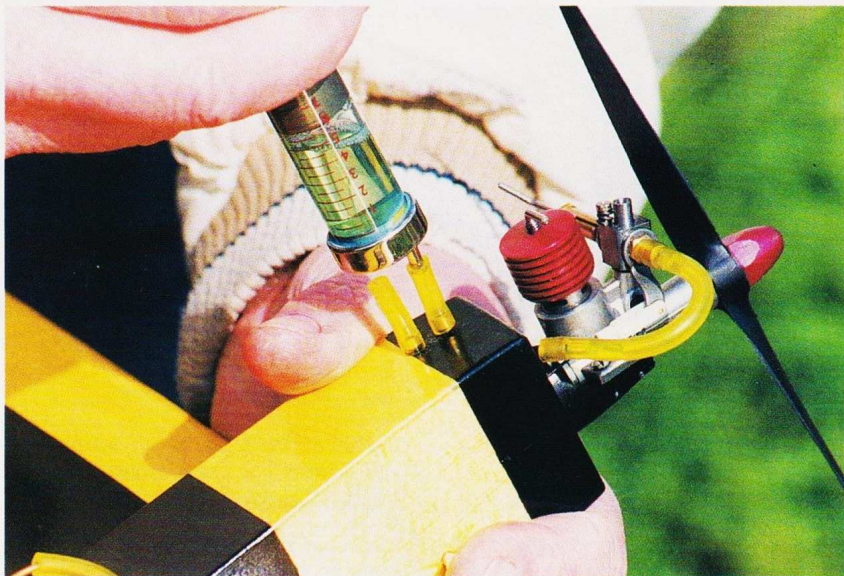
The size of the model also lends itself to a small case made from Liteply

so that it can go by air as hand luggage. Did you hear that Svein? See, I can bring my own model to Norway, so there! (There is one thing about dreams, they are endless). And RCM&E have just proved with this plan that some of the best things in life are free.

Good luck, good building and happy landings.

.55 cc's of pulsating power. Nurse, 'the screens', and a quick fix of ether please!

Minivert is the ideal suitcase model - it'll even go in the glove box of a Robin!



DATAFILE

Name:	Minivert
Designed by:	Dudley Pattison
Aircraft type:	Aerobatic sportster
Wing span:	27" (690mm)
Wing chord:	5.1/16"
Wing area:	136 sq. ins.
All-up weight:	11.6 oz. (330 grams)
Wing loading:	12.3 oz / sq. ft.
Fuselage length:	21.1/2" (approx.)
Rec. engine:	PAW 55 R/C diesel or equivalent glow.
Engine mount:	SLEC 6D
Fuel tank:	Flair 15cc (0.5 oz)
Control functions:	Aileron, elevator, rudder, throttle
Surface travel:	Aileron - 1/8" each way Elevator - 1/8" each way Rudder - 1/4" each way
C of G from l.e.	1.8/10" (45mm)