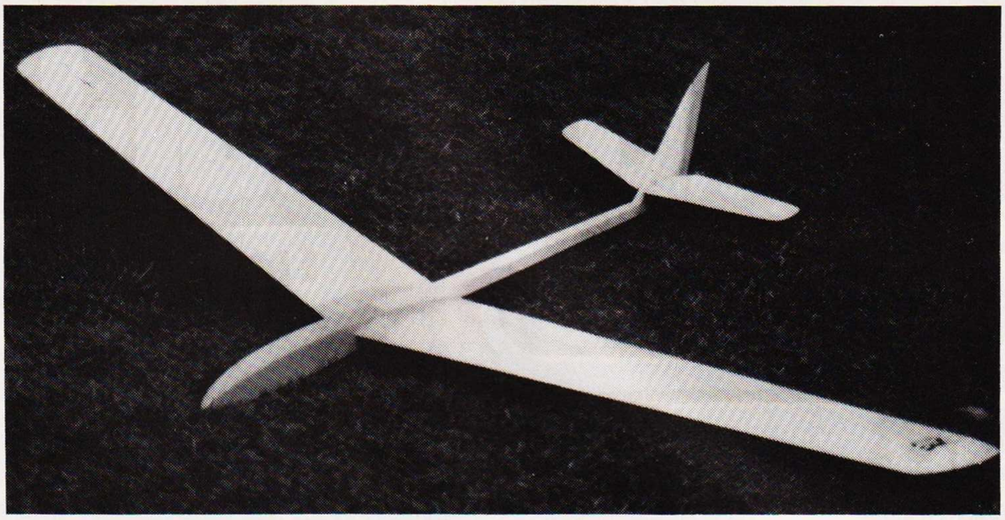
KIT REVIEW



By Chas Gardiner

IS THERE ANYONE out there who has not heard of Sean Bannister? Undoubtedly one of the best glider guiders in the world if his second place in the F3B world champs last year in California counts. Sean has a very impressive competition record which reflects the effort he puts into the sport and amongst his pioneering work is his contribution to the growth of '2 metre' gliding in this country. This class was devised in the States and adopted here with the limitation of two channel, rudder/elevator (or V-tail) only. The background, rules and general descriptions were fully covered in Sean's article in the April '82 RCM&E and I suggest you refer back to this for further information. Briefly, the competition comprises four or more rounds each round having two flights, first for a 5 minute max, then the fastest over four laps of a 150 metre course. The model should have good thermalling ability, penetration and the facility of carrying ballast for a brisk flight pattern — the 'Algebra 2M' is the Bannister answer. This model has proved to be very popular following the RCM&E plan feature and the EMP presentation takes the worst of the work out of the building.

The Kit

Tipping the contents out of the substantial box, my first thoughts were that something was missing, but what had misled me was the simplicity of the device. Wing, tailplane, fin and rudder panels, ply fuselage sides, top and bottom, tip and hardwood blocks, push rods, leading edges, drawing and hardware, what more do you need? From up here I hear you shout 'trailing edges', but you'd be wrong.

Fuselage

A slab sided plywood fuselage may not be your idea of style but for strength, simplicity and ease of construction, it can not be bettered. It is not unbreakable but it is easy to repair. The sides are reinforced with $\frac{1}{8}$in. ply doublers and $\frac{1}{8}$in. sq. longerons whilst a series of $\frac{1}{8}$in. sq. spacers stiffen top and bottom. These are wrongly shown going right across on the plan view which also does not show the ply sides or longerons. Note that the fuselage sides taper in to $\frac{3}{8}$in. at the rear to match the $\frac{3}{8}$in. sheet rudder, so check your top and bottom panels before adding the spacers. I also suggested adding a few vertical $\frac{1}{8}$in. sq. spacers inside the nose as pulling the sides together can create a 'hollow cheeked' effect forward of the doubler.

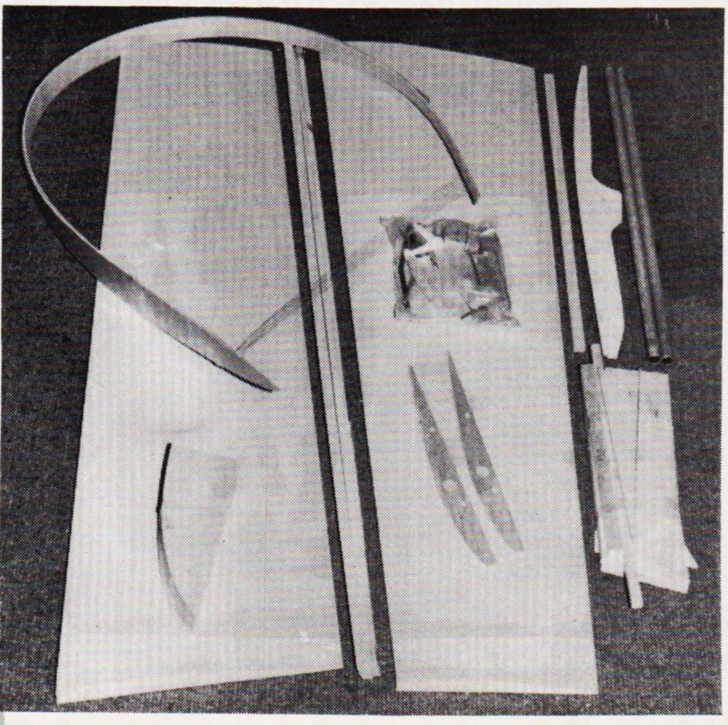
The access hatch which uses the natural springiness of ply to snap into position is neat but I am less sure about the minimal bearing area of the ply sides for the wing joiners which in my case quickly became sloppy, although EMP boss Dick. Edmonds writes that this *may* become a problem after 'many hundreds of flights'. I suggest you toughen the area by soaking a little cyanoacrylate around and in the holes before use. You could of course locate the dowels in this way to prevent any movement, but if I built another, I would probably use straight wing joiners and angled blocks with brass tubes in wings and fuselage.

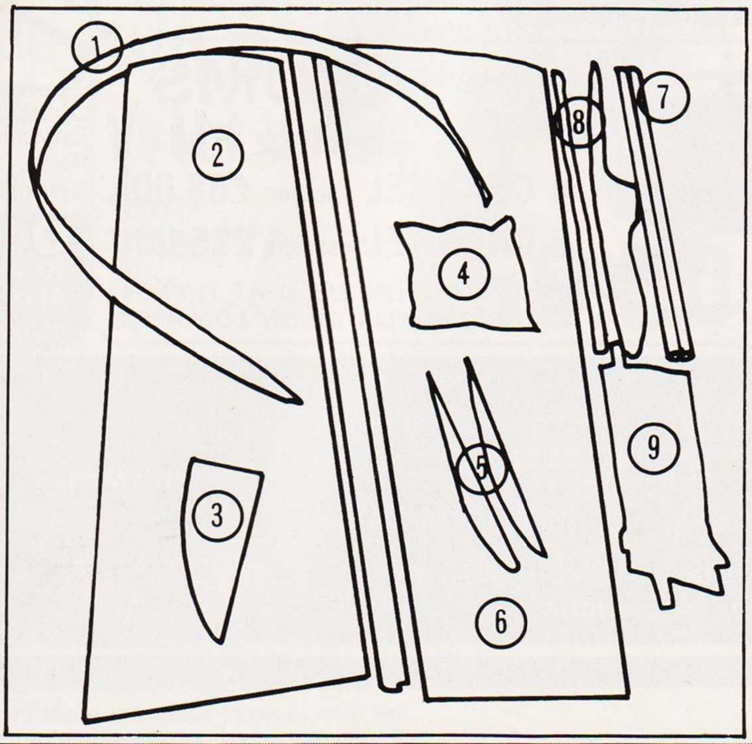
Wings

One manufacturer of a deservedly popular 100S boasts 'the easiest to build wings in the world', I am not sure about that (even in its class), but the Algebra 2M couldn't be simpler. Pre-drilled hardwood blocks for ready-cut and bent wing joiners needed only hard balsa capping before slipping into slots which must be marked out and cut in the wing roots.

Add leading edges, tips and ready-cut pre-drilled ply root ribs and 'presto'. Trailing edges? These are already in place under the nicely finished veneer panels so minimising the chances of damage as they can be sanded to a knife edge with a full skin. The complete wing panel has no spars of any kind and my impulse was to reinforce the root with a glass cloth cuff but this was rejected as we would not then have known if it was in fact strong enough — it was . . . No amount of over-stretching my $\frac{5}{16}$in.sq. bungee produced any

1. Ply fuselage sides, top and bottom. 2. Foam/veneer RH wing panel. 3. Balsa wingtips. 4. Accessory pack. 5. Ply root ribs. 6. Foam/veneer LH wing panel. 7. Wing ballast tubes. 8. Ply fuselage doubler. 9. Balsa fin, tailplane and elevator.





ALGEBRA 2M

Above: radio installation on the Algebra necessitates nimble fingers to set up the linkages.

flex in the wings or the short 6 and 8 gauge joiners. Still, if you intend to cover the model with iron-on film, perhaps some reinforcement may be worthwhile. Even tissue doped on will put a skin where it is needed most.

Tailplane

Panels are ready cut from soft even 3/8in. balsa sheet which is light and stiff. Slots for 14swg brass tubes were ready machined in and I filled the gap top and bottom with scrap 1/8in. sq. spruce, the wires matching perfectly with the elevator crank. The section used is semi-symmetrical but with the camber line *inverted*. In theory this applies a downward moment at zero incidence but in practice I didn't notice much difference either way up. Still, Sean knows best . . .

Radio installation

Drawing details are a bit sketchy but the model uses conventional elevator push rod and closed loop rudder connections and by the time you have laid out the bits and pieces, all of which are provided, you will find the thing self-explanatory. The position of the slots for the closed loop wire outlets are not shown but these I made about 1/2in. × 1/16in., an inch and a half from the back. Push a length of 16swg wire through from the back, and solder the free end of each control wire and use as a pull through. Thread through the rudder horn and small brass tubes before squeezing these with pliers to lock when the correct length has been determined. No soldering is necessary.

Covering

My Algebra was covered all over with lightweight glass cloth doped on with four or five coats to finish, but iron-on film is OK. EMP state that it is not necessary to cover the fuselage, just dope or polyurethane to suit but I prefer the extra protection for what it weighs.

Ballasting

The kit includes two 18in. lengths of 1/2in. o.d. aluminium tube and the drawing shows a jig to line up the cutter formed by filing the ends into 'teeth'. The instructions specify a block epoxied into the inner end to stop the ballast disappearing down the wing, but you'll find it easier to bend the teeth over. I use 3/8in. m.s. rod for ballast, cut into (say) 3in., 5in. and 10in. lengths with matching 'blanks' from plastic fuel pipe or balsa and can cover most loading needs.

All up unballasted, mine weighed 41oz., heavier than the quoted figure of 39oz. but the model could be slowed down in light air. Maximum ballast pushes the loading from around 9 to 14 oz. per sq. ft. and a little application of down trim puts the model into a fast flat glide that would take you straight through the 'circle' in an 'open' comp.

Tow hook

This is a modified cup hook and although I drilled a pilot hole in the built-in hardwook block, I managed to shear it off on the screw portion. Dick however uses one on his 150in. open model and reports no problems so we presume this was a duff hook. My substitute was certainly strong enough.

Flying

First flights on the slope revealed no problems and the Algebra held its own on lift ceiling with a couple of larger soarers and accelerated like an aerobatic job with a touch of down. I was accompanied on these first flights by an old pal who had not seen a radio glider before that day, but with a bit of tuition coped quite well with the Algebra. All the usual manoeuvres are possible and it was pleasant to fly fast.

Flat field flying required a bit of delicate juggling with the c.g. and elevator incidence for best results but in uninspiring, windy, overcast at the end of December, consistent flights of around 4½ mins. were recorded with frequent times around 5½-6½ mins. so given reasonable conditions the 5 minute max should be within easy reach. The model can be flown on the stall but is happier being driven a little quicker. The thermal turn can be kept flat and tight.

For contest winning speed tasks, current pilots are recording less than 30 seconds for the four lengths and Dick. Edmonds reports this to be well within the Algebra's capabilities. The section used is based on the Eppler 176 which is slightly undercambered and has a flat run up to the leading edge instead of the more popular 193 or 205 which has a curve up to the Philips type of entry reported to have a wider effective speed range. Any choice however must be a compromise so here I guess it is results that count. The Algebra *will* give fast speed times and *will* hang up for the 5 min. max. so the kit has got a lot to offer unless you think you have enough experience to beat Sean . . .

Aileron version

Basic information is shown on the drawing for an aileron conversion but as these are not permitted in UK comps., their main appeal will be to the slope pilot who wants an aileron trainer capable of mild aerobatics, although the Algebra is claimed to be competitive in pylon race events. No flying notes are given for the aileron verson which is a pity for this would especially appeal to the beginner as an expert would I believe go for a recognised full house aerobatic model. Still, I hear a whisper that sets of plug on aerobatic wings are shortly to be available . . .

Conclusions

You are wrong Dick. This model *can* be built and flown by a beginner — especially if a few points on the drawing are clarified but anyone can ask for help, and here you have a competitive, versatile machine for slope or thermal which is simple to build and easy to fly.

Manufacturer: Edmonds Model Products, Unit 20, Vernon Buildings, Westbourne Street, High Wycombe.
Price: £29.96.
Wingspan: 2.00m (78¾in.).
Weight: 41oz.
Control requirement: Two function R/C, rudder elevator.
Control surface movements: Rudder: 4mm each way, Elevator: 8mm each way at front dowel.
Balance point: 140mm from LE.

KIT REVIEW No. 188	FUSELAGE SIDES	FUSELAGE TOP	FUSELAGE BOTTOM	FUSELAGE DOUBLERS	FUSELAGE FORMERS	COWL	WING L.E.	WING T.E.	WING SPARS	WING RIBS	WING TIPS	AILERONS	TAILPLANE & ELEVATOR	FIN & RUDDER	UNDERCARRIAGE	WHEELS	TANK	SPINNER	MOTOR MOUNT	LINKAGES
SUPPLIED	•	•	•	•	•		•		•	•	•		•	•						•
PRINTED																				
DIE-CUT																				
READY SHAPED	•	•	•	•	•		•				•		•	•						
PRE-FORMED																				
BALSA							•				•		•	•						
HARDWOOD																				
PLY	•	•	•	•	•															
POLYSTYRENE FOAM									•	•										
PLASTIC MOULDING																				
G.R.P. MOULDING																				