



## MILES M5

# SPARROWHAWK

by **BRIAN PECKHAM**

I HAVE LONG been a fan of Miles aircraft, especially the pre-war models; one of the prettiest, in my opinion, was the *Sparrowhawk*, built for the 1935 Kings Cup race. G-ADNL was the prototype, designated M5, built for Freddie Miles to pilot. It was built in 8 weeks, modifying a standard *Hawk Major* fuselage by lowering the decking; sitting the pilot on the floor and reducing the wing centre section to the width of the fuselage, making the span 28 feet. Power was by a highly tuned D.H. Gypsy Major engine.

The 1935 Kings Cup was a two day event. Day one, a circuit of Britain, in which F.G. Miles averaged 163.84 m.p.h. to beat E.W. Percival. The second day Freddie Miles averaged 172 m.p.h. but, owing to the severe handicapping, failed to gain a place.

Later *Sparrowhawks* were designated M5A and had different fuselages.

Although raced regularly, the M5 never won the Kings Cup. Between 1950 and 1952 G-ADNL was extensively modified by Miles for its then owner, Fred Durkerley, into a twin jet aircraft, (this was described in *Aeromodeller* some years ago) and in 1957, won the Kings Cup at 228 m.p.h., the first jet aircraft to do so, but was unfortunately destroyed by fire in 1964.

I designed my model G-ADNL to suit the Club 20 scale class, and it is as accurate as I could make it from the information I have. The drawings I scaled from are shown in the book *'Miles Aircraft from 1925'*, by Don Brown, ex Chief Designer. Many photos in this book also provided valuable data and scale scribe Peter Cooksley, who was very patient with my queries, helped enormously.

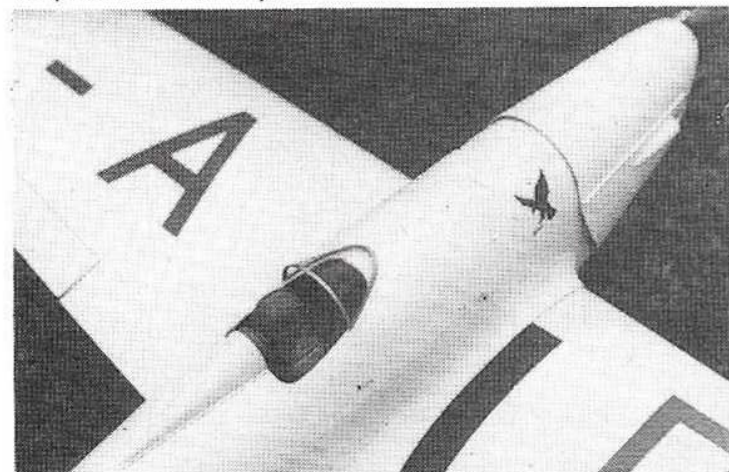
## CONSTRUCTION

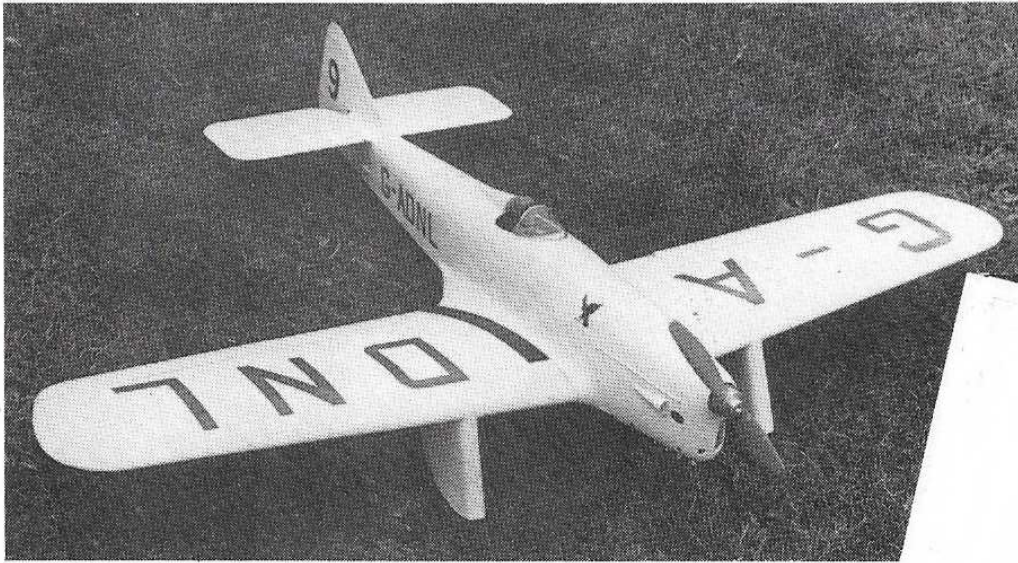
### Wings

Make up 4 wing skins from med/soft 1/16in. balsa sheet, cut the ribs and main spar from sizes indicated. The wing is built in 3 panels, two outer and the small centre section. These can be built at the same time, over the plan, commencing with the main spar, followed by the ribs and rear spars. Pack the trailing edge of the ribs with a length of 1/4in. sq. balsa to align. Fit the 3/16in. centre section leading edge, 3/32in. false leading edge, followed by the top skins.

When thoroughly dry, remove from board and assemble the outer panels to the centre section using a 1/16in. plywood brace, add the plywood reinforcing to W1 and W3 and glue the 3/8in. x 1/8in. T.E. section to the top skin. Fit the nylon outer cable and 1/8in. reinforcing at outlet position, hinge blocks, 3/8in. riblets at the horn position and lower spars to centre section.

Epoxy the undercarriage bearers in position and screw the 10g undercarriage in position with Photos below and below left prove that good scale models don't have to be .60 powered. Tail surfaces are from sheet cores with thin sheet 'ribs'.





aluminium straps, finally, attach the lower wing skins, butting these against the T.E. strip.

Sand the leading edge flush and fit  $\frac{1}{4}$ in. L.E. Fit the soft block tips,  $\frac{1}{32}$ in. ply facing to centre section and  $\frac{3}{16}$ in. riblets to each side and  $\frac{3}{16}$ in. dowel.

After final shaping and sanding, cut out ailerons from wing as shown, fit  $\frac{1}{16}$ in. facings and small control horns made from aluminium.

### Tail Feathers

Cut out the tailplane/elevator and fin/rudder to outline from  $\frac{1}{16}$ in. sheet (in one piece), add  $\frac{3}{16}$ in.  $\times$   $\frac{1}{16}$ in. ribs,  $\frac{3}{16}$ in. sheet centre section and  $\frac{1}{8}$ in.  $\times$   $\frac{3}{16}$ in. to tailplane/elevators.

Fit the shaped  $\frac{1}{8}$ in. stern post and  $\frac{1}{16}$ in. ribs to fin/rudder and  $\frac{3}{8}$ in. to base of fin.

Sand to section shaping base of fin to fit tailplane. Fit hinge and horn blades where shown, part tailplane and rudder and shape meeting surfaces to allow for movement. Make rudder control horn from aluminium, use commercial joiner/elevator horn for elevator.

### Fuselage

Make up the basic fuselage sides from  $\frac{3}{32}$ in. med. sheet with  $\frac{1}{32}$ in. ply doublers and  $\frac{3}{16}$ in.  $\times$   $\frac{1}{4}$ in. sq. lower stringers,  $\frac{1}{8}$ in.  $\times$   $\frac{1}{4}$ in. longerons and  $\frac{3}{16}$ in.  $\times$   $\frac{1}{8}$ in. stiffeners.

Cut main formers from  $\frac{1}{4}$ in.  $\times$   $\frac{1}{8}$ in. ply as indicated and decking formers from  $\frac{3}{32}$ in. with  $\frac{1}{4}$ in.  $\times$   $\frac{1}{8}$ in. stiffeners.

Assemble fuselage with F1 and F2 followed by F5 and pull into rear, joining with  $\frac{1}{4}$ in. sternpost, add decking formers F3, F4, F6, F7, F8 with  $\frac{1}{4}$ in.  $\times$   $\frac{1}{8}$ in. stringer and  $\frac{3}{16}$ ins. sq. lower spacers.

Bolt the engine mount to F1, fit the cockpit floor from  $\frac{1}{32}$ in. ply, cut out for switch and fit between F3 and F4, shaping to clear decking.

Add the front and rear decking, from softish  $\frac{3}{32}$ in. sheet in 4 pieces.

Fit a small hardwood block between the lower stringers for tailskid and  $\frac{3}{16}$ in. tailplane seat, sanded to fair into fuselage and profiled to accept the tailplane. Fit 2 short lengths of nylon tube as guides for the rudder cables in position on rear fuselage and throttle cable outer between F1 and F2. Glue  $\frac{3}{32}$ in. or,  $\frac{1}{8}$ in. cross grain sheet to underside. Fit  $\frac{1}{8}$ in. plywood plate with captive nut for wing retaining bolt. Trial fit the wing,



Above and bottom of page; close ups of the cowling and wheel trousers. These items are all formed easily by wrapping thin plywood around balsa formers.

checking for alignment. When square, cut wing fairing blades to side elevation, laminated from  $\frac{1}{2}$  in. soft balsa sheet, shape to match fuselage contour. Cut  $\frac{1}{64}$  in. plywood to shape as per plan view of fairing (allow extra length to wrap around wing LE and joint line), then carefully shape the blades to fit wing and attach to fuselage and  $\frac{1}{64}$  in. plywood with wing in position. Add  $\frac{1}{32}$  in. to align with trailing edge and following underside of wing contour. When dry, carve and sand to section. The use of ply provides a sharp edge to the fairing.

Cover tailplane, elevators, fin and rudder with heavyweight modelspan and give several coats of dope. Assemble elevators with Mylar hinges and joiner and glue in position with elevator push rod attached. Add fin and soft block fillets to lines shown.

Make the tailskid from two combinations of  $\frac{1}{16}$  in. plywood drilled for 18g piano wire, when sanded to streamline section and varnished the wood grain effect is quite good. Bend a short length of 18g wire to long 'L' shape and attach skid to fuselage by pushing wire through skid into fuselage.

Make the headrest from soft balsa block to shape shown.

The cowling is made up as shown on the plan, the 'mould' being made up of 2 in.  $\times$   $\frac{1}{4}$  in. sheet formers C2 and C3 and  $\frac{1}{4}$  in.  $\times$   $\frac{1}{2}$  in. spacers assembled as shown. The two layers of  $\frac{1}{64}$  ply being wrapped around one at a time with a layer of G.F. resin between, full details are shown on the plan.

The cowling front is assembled from 2 layers of  $\frac{1}{2}$  in. and one of  $\frac{3}{32}$  in. balsa, cross grain, glued with epoxy adhesive, a 1 in. diameter  $\frac{1}{32}$  in. ply ring is inserted to strengthen the area around the prop driver, tack cement to cowl and shape to profile then separate and hollow out. Remove C3 and spacers from inside of cowling and centre of C2, then epoxy nose block into position and sand to final shape. Make apertures in cowling here as shown for silencer, needle valve, plug access and exhaust stubs. Stubs are made from short lengths of  $\frac{1}{4}$  in. O.D. aluminium tube epoxied into  $\frac{1}{32}$  in. ply strip which is in turn epoxied into the cowling after painting. The dummy hinge is made from very small aluminium tube 'glued' into a slot in the cowling and razor saw cuts made to imitate a piano hinge.

The fuselage is completed by fitting a windscreen cut from the rear end of a suitable bubble canopy.

The undercarriage 'trousers' are formed from one

layer of  $\frac{1}{64}$  in. plywood wrapped around shaped balsa blocks, as shown on plan, and attached to the wing with  $\frac{3}{8}$  in. blocks shaped to fit the wing underside. Wheels used on the original were 'Williams Bros'  $2\frac{1}{2}$  in. diameter vintage type, these being nearest to the thin section used as the prototype.

## Finishing

For finishing, I used the dope/sanding sealer method followed by 4 coats of cream 'Perfect Paint' matt over 2 white undercoats. The panel lines were formed by 'Letraset'  $\frac{1}{32}$  in. lining tape over the undercoat — removed before spraying the final colour coat. The raised panels are cut to shape from **Fablon** and attached before the final colour coat. Any 'screw' marks can be made with sharpened alloy tube of the appropriate diameter.

The wing walkway was made from  $\frac{1}{64}$  in. plywood cut to shape and scored with a flat needle file edge, painted black before attaching to the wing.

The whole model was then given a coat of clear satin 'Perfect Paint'. Although the prototype was finished in high gloss, I think this finish looks better on a model.

The pilot is another 'Williams Bros' item, painted up and attached with clear silicon rubber.

## Radio and Motor

My Futaba 'J' series servos fitted just forward of F5 with receiver and power pack positioned at the rear of the tank (4oz.). My Irvine 20 was fitted with a Fox  $\frac{3}{4}$  in. extension. The C.G. came out about right. The all-up weight, ready to fly, was 3lbs.6oz.

The Irvine 20, turning an 8 in.  $\times$  6 in. prop, gives adequate power. The control movements are:- ailerons  $\frac{3}{8}$  in. up,  $\frac{1}{4}$  in. down, elevator  $\frac{5}{8}$  in. each way and rudder  $\frac{1}{4}$  in. each way. Their movements can be increased for better aerobatic performance.

## Flying

Take off runs are fairly long and I advise reasonably smooth grass or hard surface. Use up elevator for a few yards to hold the tail down then centralise the control and the model will take herself off. As I said before, not a pattern machine, but it will fly accurate loops, rolls, Cuban eights, reversals, etc. Landings are straightforward with power on. If landing dead stick, as with all small models, keep the nose down and speed up.

I am very pleased with the way my *Sparrowhawk* has turned out. I get a lot of satisfaction from it and I know you will too.

