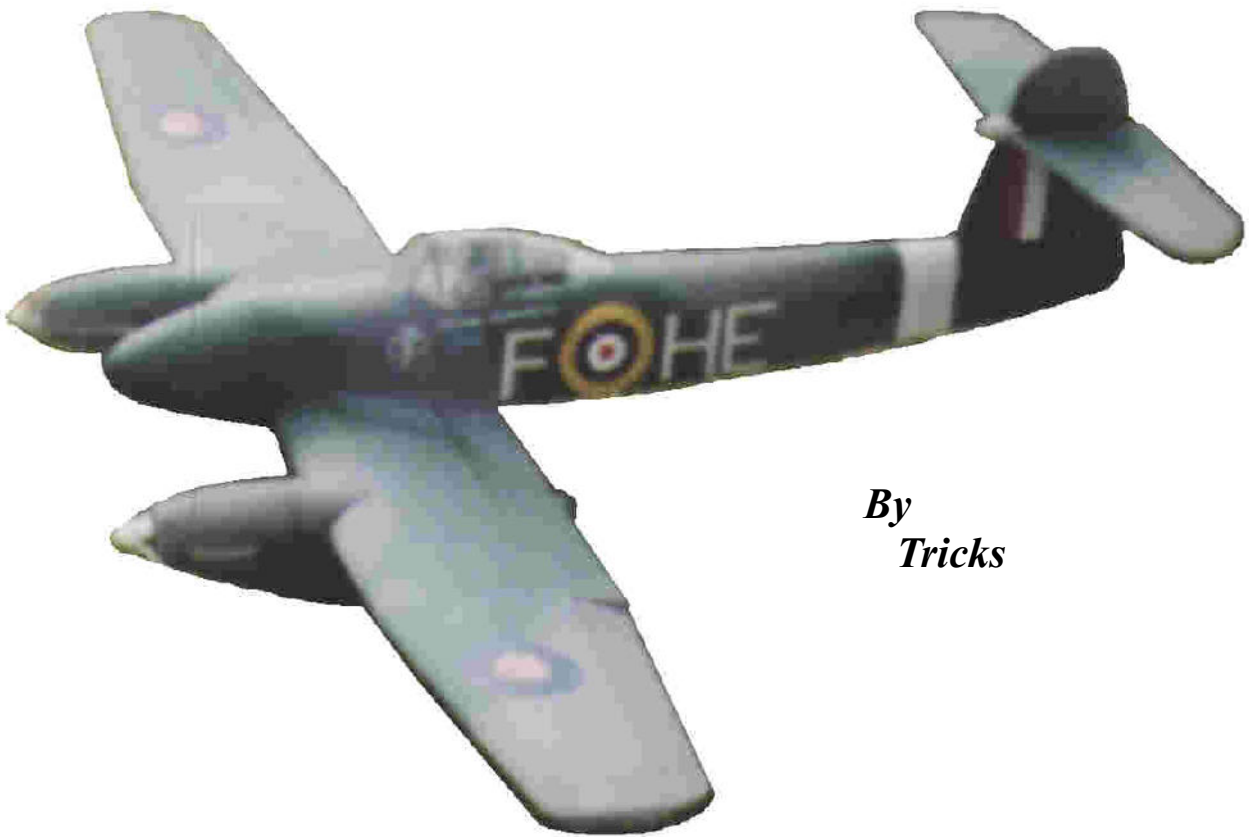


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Introducing The Cloud Models Westland Whirlwind



*By
Tricks*

Thank you for purchasing the Cloud Models Westland Whirlwind we hope you are going to enjoy building and flying it.

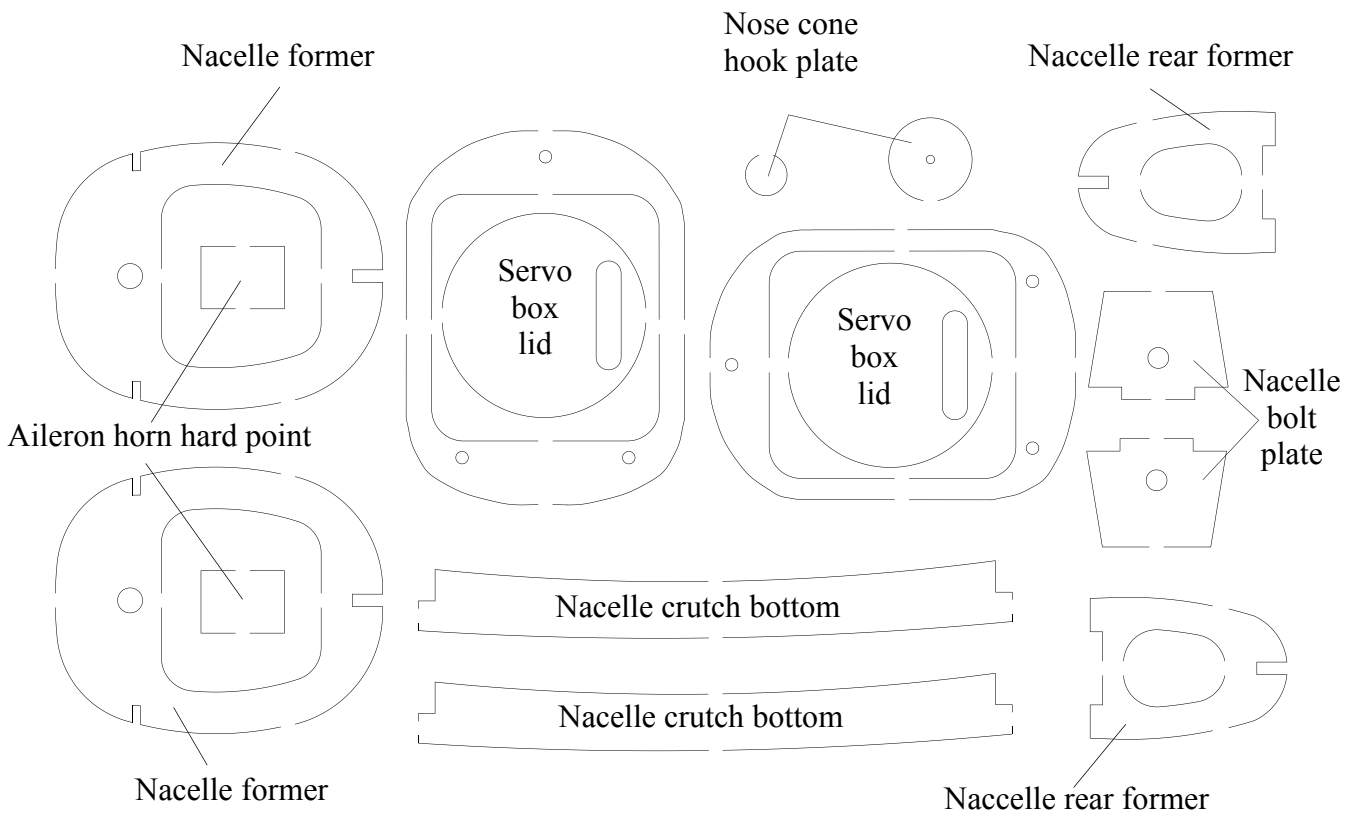
The Westland Whirlwind has been designed to be sport scale so as to make it straightforward to build and fun to fly.

The Westland Whirlwind requires two 400 motors nicad and three-channel radio using three servos and a speed controller, plus glues covering paint etc.

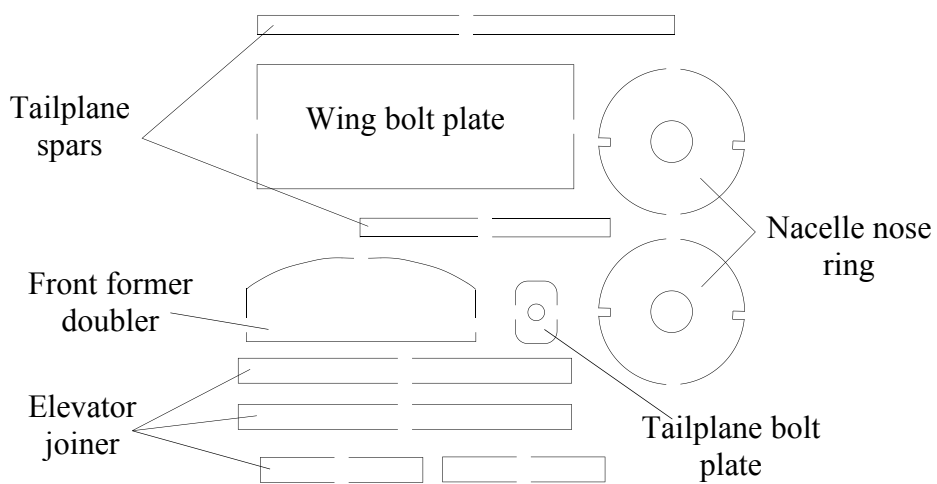
Westland Whirlwind Parts List

All sizes are nominal and for guidance

Lite Ply CNC Sheet Fuselage	1	Large lite ply sheet
Lite Ply CNC Sheet Nacelle	1	Small lite ply sheet
Birch Ply CNC Sheet	1	Birch Plywood
Fuselage Sides	2	Balsa shaped
Fuselage Side Top Stringer	2	3mm X 10mm X 650mm
Fuselage Side Bottom Stringer	2	3mm X 10mm X 460mm
Rear Bottom Sheet	1	1.5mm X 75mm X 450mm
Tail Block	1	Shaped Balsa
Tailplane & Elevators CNC	1	Balsa Sheet
Leading Edge Root	1	6mm X 13mm X 650mm
Leading Edge Tips	2	6mm X 13mm X 275mm
Centre Spar	1	3mm X 5mm X 650mm
Tip Trailing Edge	2	3mm X 16mm X 275mm
Aileron Leading Edge	2	6mm X 16mm X 275mm
Wing Tips	2	Shaped Balsa
Wing Fairing Sheeting	1	3mm X 75mm X 150mm
Wing Dowel	1	6mm X 50mm
Nacelle Dowel	2	6mm X 25mm
Wing Bolt Hard Points	3	12mm X 12mm
Servo Blocks	4	9mm X 9mm
Fuselage Top	1	Plastic moulding
Nose Cone	1	Plastic moulding
Canopy	1	Clear plastic moulding
Nacelle Left	2	Plastic moulding
Nacelle Right	2	Plastic moulding
Nacelle Top	2	Plastic moulding
Exhaust Stubs		Plastic sheet
Fin Bottom		Plastic sheet
Fin Top		Plastic sheet
Servo Box Base		Plastic sheet
Servo Box Top Left		Plastic sheet
Servo Box Top Right		Plastic sheet
Wing Root Panel	1	Foam veneered
Wing Tip Left	1	Foam veneered
Wing Tip Right	1	Foam veneered
Aileron Left	1	Foam veneered
Aileron Right	1	Foam veneered
Snake with link	1	
Threaded Extender	1	
Ball Link	1	
Threaded Rod Short	1	
2mm Nuts	2	
Wing Bolt 6mm	1	
Wing T Nut 6mm	1	
Nacelle & Tail Bolt	3	
Nacelle & Tail T Nut	3	
Screw Hook	1	
No2 X 1/2"	4	
Hinge	1	
Horns Small	2	
Threaded Rods Long	2	



Small Lite Ply Sheet



Birch Plywood

Before You Start

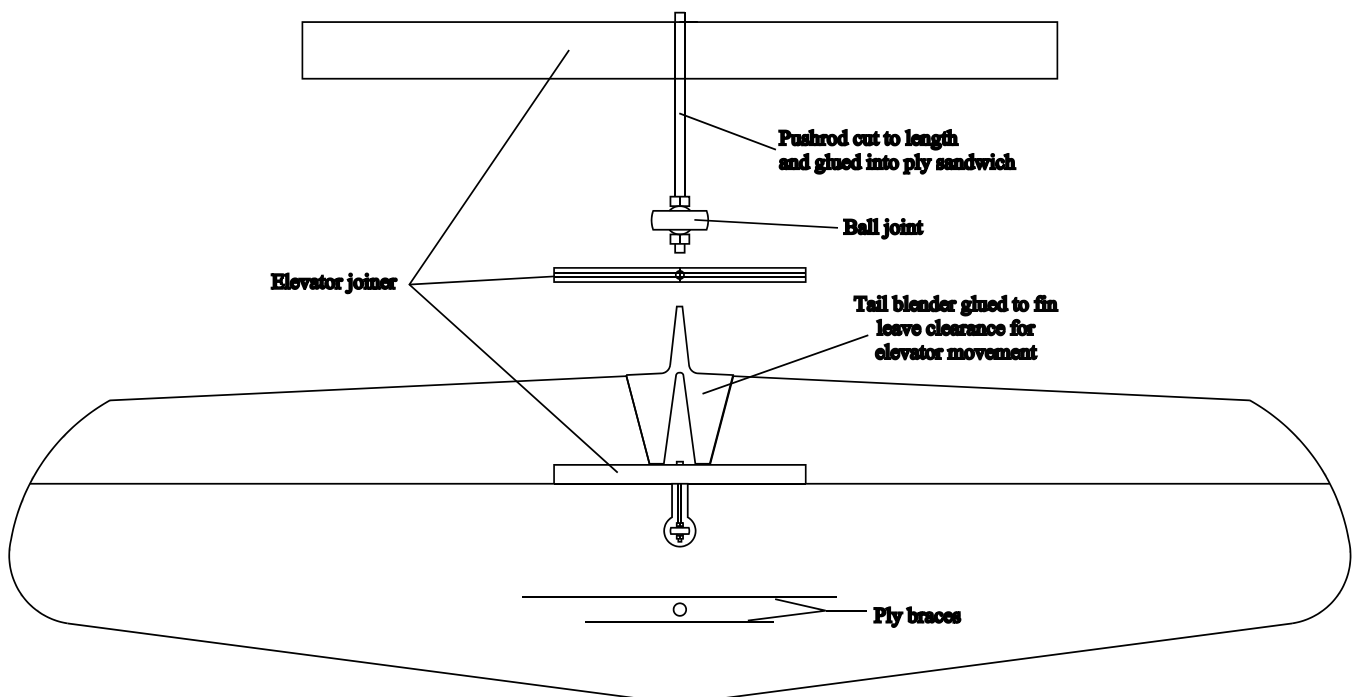
Before you start read the instructions and familiarise yourself with the parts. The Whirlwind is not intended as a beginner's model but anyone with low wing experience should find no problem flying it. It will be noticed that there is washout built into the wing tips to help prevent tip stalling, we suggest this is not changed. You may wish to add a hand hold for launching either a small inset in the wing with a grip for your fingers or an external hold could easily be added, a short catapult could also be used with a hook under the wing. If you wish to incorporate any of these items plan now how and when to make modifications.

The prototypes used Graupner speed 400 6volt motors with 7 cell 2000 nicad the propellers are Robbe 6 X 3 1/2" Folders and a 20amp speed controller was used.

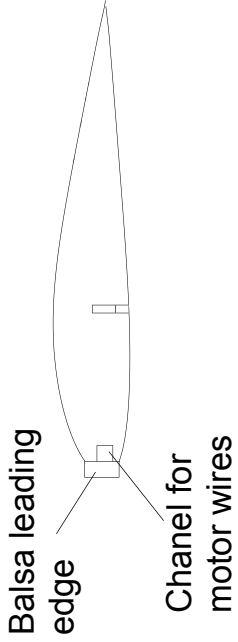
The Whirlwind can be built fairly quickly using cyno, epoxy glues and liquid polystyrene, which is good for plastic/plastic and plastic/wood joints. Do Not Use cyno, cellulose or petroleum based glues on foam parts.

Building The Tailplane

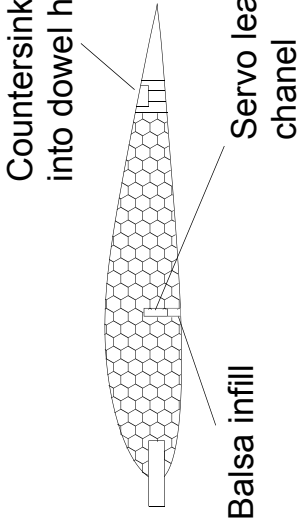
The Tailplane construction is fairly straight forward the 2 X 1.5mm ply braces are glued into the slots in the tailplane then sand the assembly flush rounding the leading edge and tips. The elevator joiner is constructed using 4 pieces of 1.5mm plywood as shown in the sketches with a pushrod cut to length and sandwiched between the 2 centre laminates the ball sitting in the centre of the tailplane cut out glue the pushrod firmly in place. The elevators are then glued to the joiner in the normal way. When dry match the tip profile to the tailplane round the trailing edge and angle the leading edge to allow movement. The tail blender parts are glued together this fits between the elevators but is glued to the fin prior to painting.



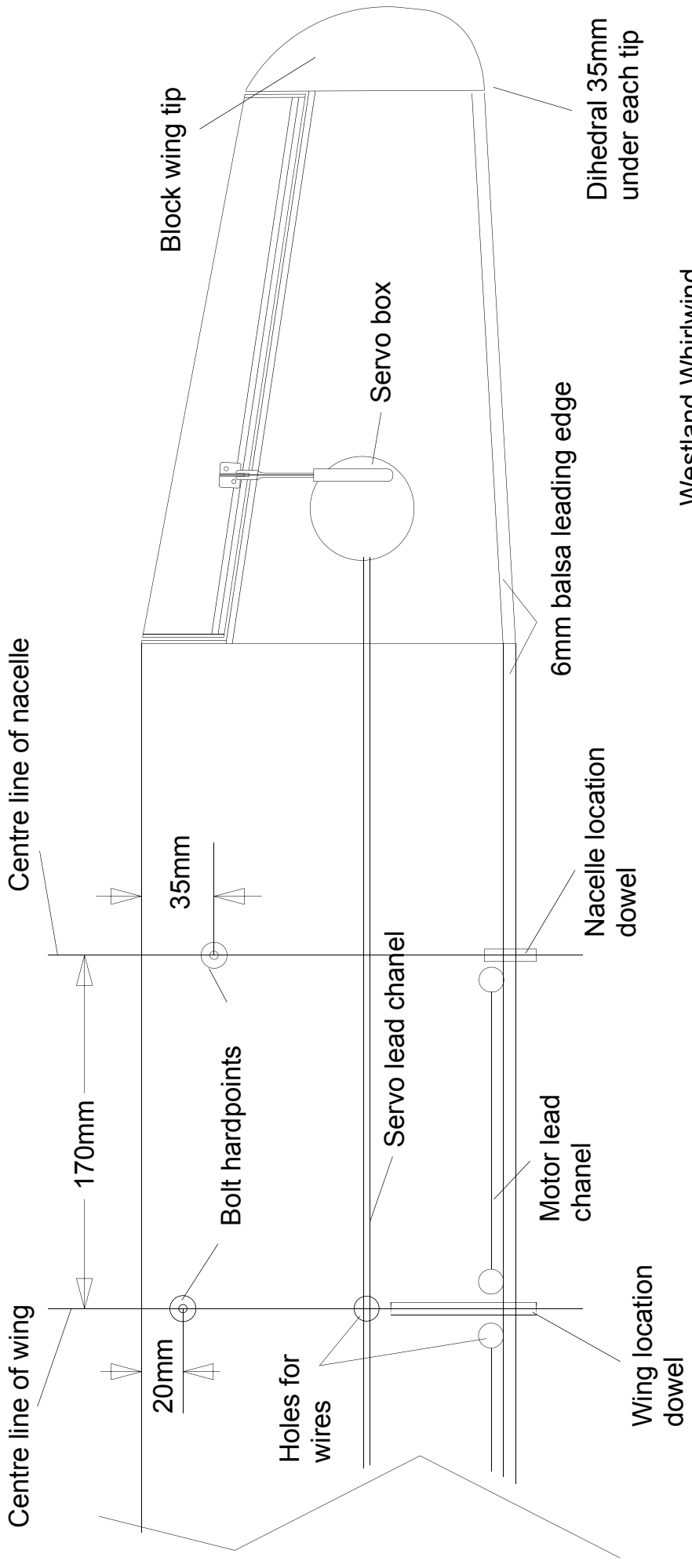
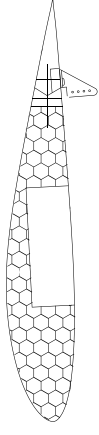
Section through wing between fuselage and nacelle



Section through wing at nacelle



Section through wing at servo box



Westland Whirlwind

Building The Wing

Refer to sketch sheet during construction. When sanding do not cut into the surface of the veneer just lightly finish.

Accurately mark the centre line of the wing then using the sketch mark the positions of the nacelles, their bolt holes and the fuselage bolt hole. It is important these are correct, as the flying performance of the model will suffer if not. Drill 12mm holes for the hard points (12mm Dowel) and glue in place. When dry drill out the centres of the hard points to accept the wing and nacelle bolts (The nacelles look neater if the hard points are counter bored for the bolt head to sit level with the surface of the wing).

Cut a channel out of the foam at the leading edge of the wing large enough to accept your motor wires leave as much of the front of the wing as possible to give a good glue area for the balsa leading edge also leave foam around the wing and nacelle dowels. The wires should come out the top of the wing at the centre and the bottom of the wing at the nacelle. Put the wires in and glue on the 6mm leading edge.

From the tips remove the core from the servo well and sand smooth the bottom of the recess. Mark the position of the servo wire channel from the root wing panel and either extend the slot through the tip panel to the servo well or use a drill or sharpened tube to channel to the servo well. Roughly cut out the plastic servo tub moulding roughen the outside faces and epoxy in place in the wing when dry trim level with the surface of the wing. Epoxy into the lid of the servo tub the lite ply ring when dry trim the lid level with the face of the lite ply. The servo may be mounted by servo tape directly into the wing or onto the lid using servo tape or blocks. The lid can be secured either by tack gluing in place or by putting blocks into the tub and screwing in place.

Glue in place the 6mm leading edge 3mm trailing edge and tip block. When dry sand the assembly roughly to shape allowing for the ailerons. Lay on a flat board and pack the tips (At the end of the foam) to give 35mm dihedral at each tip and 17mm sweep back at the leading edge. When satisfied epoxy the tips in place when dry run a bead of epoxy around the joint blending it out to give a strong joint. Lay the servo wires into the slot and glue in place the balsa infill. Also face the bare end of the foam at the aileron with scrap 1.5mm balsa.

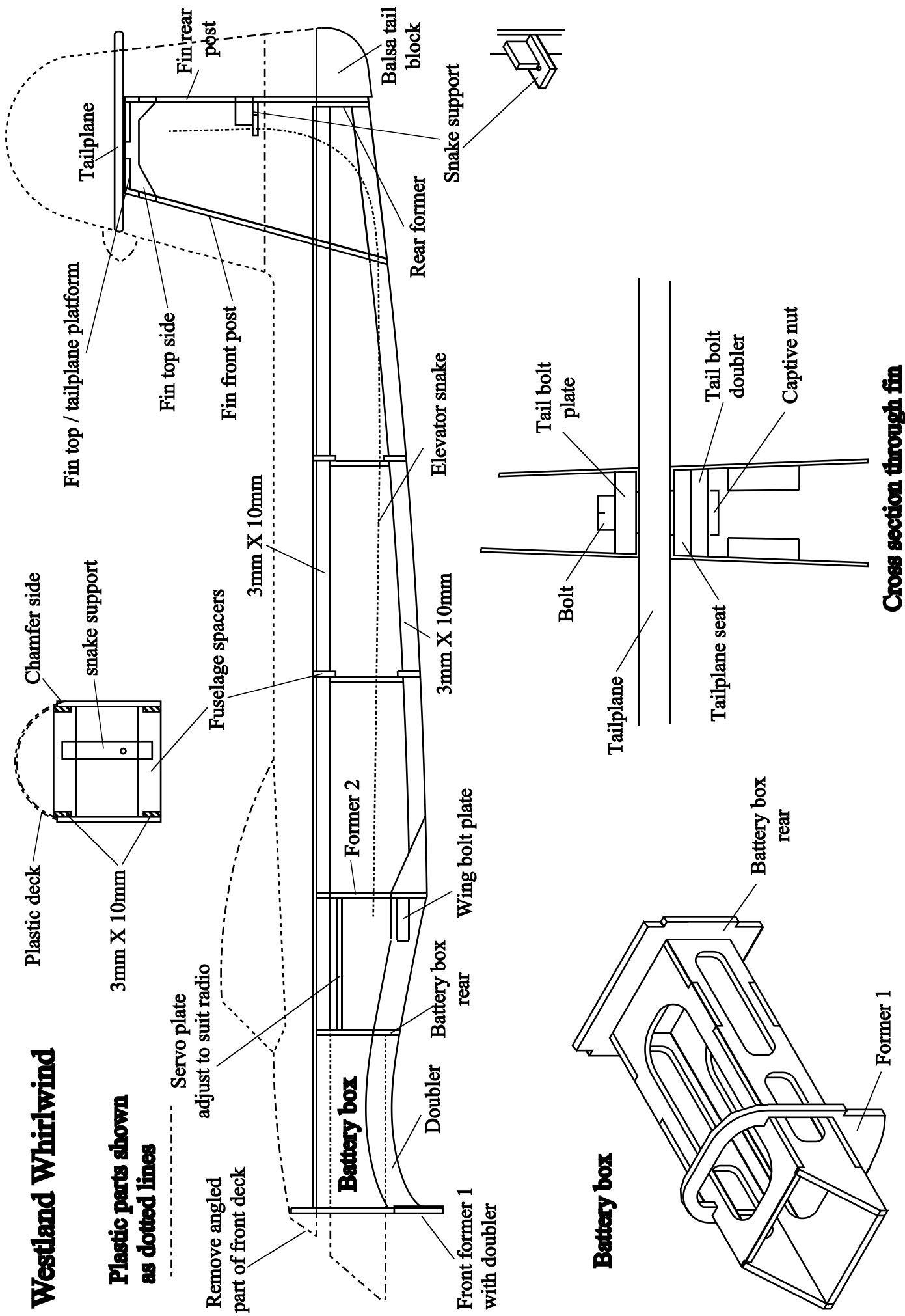
Glue in place the 6mm aileron leading edge trim the length of the aileron to fit and add 1.5mm balsa end facings also mark the position of the aileron horns and recess and fit horn hard points. Angle leading edge for movement.

Lightly sand the whole assembly to finish.

After fitting to the fuselage add small pieces of sheet to the leading edge and add sheeting to the trailing edge to allow final blending of the fuselage to the wing.

Westland Whirlwind

Plastic parts shown as dotted lines



Building The Fuselage

Refer to sketch sheet during construction

Take the two fuselage sides and glue in place the wing seating doubler, flush with the front and bottom of the side (**MAKE ONE LEFT AND ONE RIGHT**). Along the top of the fuselage sides mark down 8mm and 3mm from the front (the thickness of former 1). glue 3mm X 10mm X 550mm balsa strip above and behind the marks this will leave the top edge protruding above the sides. Also along the bottom rear of the sides glue flush with the lower edge 3mm X 10mm X 480mm. Glue the doubler onto former 1 and the doubler onto the wing bolt plate.

Construct the battery box assembly. The easiest way is to dry fit the top, bottom and sides together, with the battery box rear and former 1, which (with the ply doubler facing the rear), slides over the front of the battery box up to the location lugs on the box. Check the assembly is square and the joints tight and then run thin cyano around all the joints.

Now offer the assembly up to the fuselage sides, former 2 is flush with the front of the fuselage sides and the formers fit inside the doublers and stringers. With the fuselage upside down on a flat surface and the front bulkhead over hanging the board the top of the fuselage sides should be level. Glue the battery box in place. Pull the rear of the fuselage together with the wing bolt plate (doubler upwards) fitting into the slots in the side doublers, former 3 against the bolt plate and square to the top of the fuselage. The fuselage rear bulkhead fits 3mm (the thickness of the fin post) in from the rear of the fuselage, check the fuselage is straight this is important for the fit of the top deck as well as the performance of the model. Glue the assembly together.

Build the fin assembly. First insert the captive nut into the tailplane seating (the sides of the flange on the nut will require filing away to fit between the fin top sides) glue the nut in place then sand the seating level debur the thread and check the bolt fit. Continue with the pushrod support gluing it to the fin tailpost. Now fit the side plates onto the fin tailpost and the tailplane seating into place use a square to check that the platform is at right angles to the tailpost, now add the fin leading edge post to the assembly.

Remove the last 3mm of the stringers from the rear of the rear former to allow the fin post to slide between the fuselage sides. At the rear of the plastic moulding you will notice on the outside a slight web. Allow either plastic cement or thin super glue to creep into this web and once set trim and remove this web from the rear of the moulding. From the plastic top deck remove the front angled portions and trim the moulding 3mm from the bottom. Offer the moulding up to the fuselage trim it to fit over the deck former and onto the sides of the fuselage remove the top rear of the moulding to allow the fin frame to pass through then put to one side. Dry fit the fin post assembly springing the fuselage over the front post check the tailpost is square to the top of the fuselage and the tailplane platform is parallel to the top of the fuselage also check that the tailpost is square to the wing seating. When satisfied run cyano around all the joints. Slide the top deck over the fin post assembly now slide the two fuselage top spacers between the rear sides with the tab sitting below the stringer slide them back until the sides take up the same curve as the top deck glue in place. Now glue the lower spacers in place vertically beneath the top spacers.

Decide on the location of your elevator servo and RX cut the servo plate to suit and glue in place, slide the elevator snake outer through the fin assembly and between the fuselage spacer's mark and drill snake supports and glue in place.

Use modelling pins pushed in along the outside edge of the fuselage sides to help position the top deck and masking tape to pull the deck down onto the sides. **DO NOT GLUE DECK AT THIS STAGE**

To help with the fin and nacelles it is useful to glue a sheet of sandpaper to a piece of flat wood. Rough trim the lower fin parts cutting in half along the centre line to make a left and right. The fin halves are butt jointed. Trim the top to leave a flange (approximately 3mm) back to the rear fin post, remove the flange from here back. Trim the flange off the leading and trailing edge, then use the sanding board to adjust the moulding to fit over the fin assembly. The trailing edge ends up about 2mm thick and the leading edge a nice curve. Adjust the height by trimming the bottom of the moulding to fit over the fuselage/fin rebate. Use masking tape to assist holding in place whilst fitting. When satisfied use masking tape to hold the fin leading edge together remove from the fuselage and run liquid polystyrene down the inside of the joint this will capillary into the joint when dry remove the tape and run liquid poly down the leading edge. With the top deck taped in position spring the fin mouldings over the fin frame tape the trailing edge together and use a few strips of tape to hold the fin to the fuselage top make any final adjustments if necessary then run liquid poly around the joints inside the fin and around the outside of the fin deck joint when dry remove the tape and run a little more glue into the joints. Lift the deck fin assembly enough to run a bead of thick cyano or epoxy along all the joints. i.e. top of the fuselage sides top front former and top of fin frame, then pull the moulding assembly back into position using masking tape check the step in the fin aligns with mark on fin frame for tailplane position. Sand the bottom of the fuselage smooth and sheet with 1.5mm cross grain balsa add the blender block to the rear fuselage.

Offer up the tailplane and adjust the seating so the tail fits snugly and square to the wing trim the fin to allow elevator movement glue two pieces of scrap plastic inside the rear (rudder section) as tabs to locate the top section of fin.

The top section of the fin is made in a similar way to the base section rough trim the moulding to give a butt joint leaving a return at the bottom of the fin for the bolt plate to glue above be careful to align the bolt plate so the top and bottom fin sections line up. Check the fin is the same width as the lower section particularly at the trailing edge where it sits over the tabs on the lower fin. The tail is removable so a hole is cut in the top to allow a screwdriver in to remove the tail.

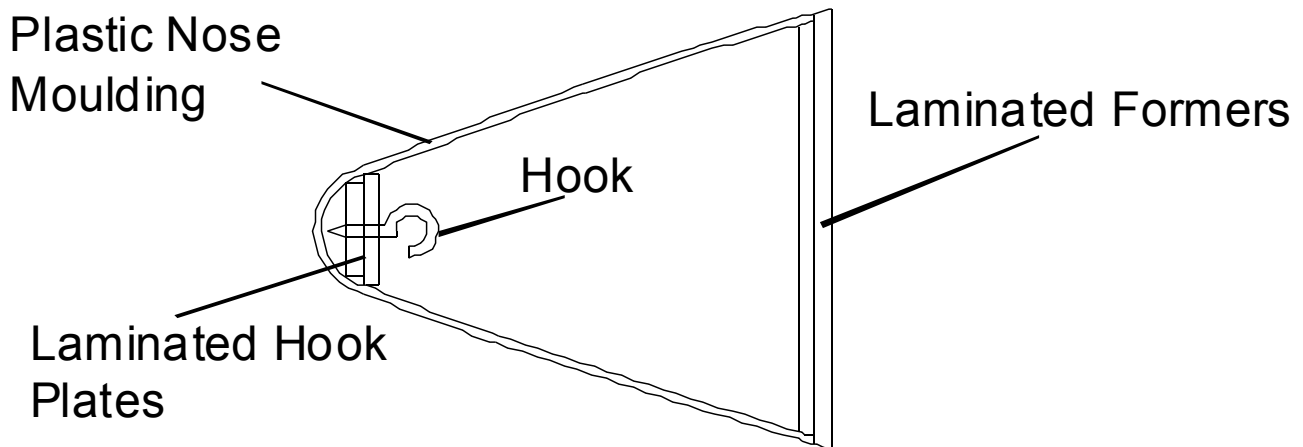
The two pieces labelled tail blender fit around the fin at the trailing edge between the elevators to blend in and end at a point at the tail.

If you have not yet built the wing do so now then continue.

Lay the wing in place on the fuselage and drill a 6mm hole through the front bulkhead and into the wing for the wing location dowel. Then drill through the wing bolt-hard point into the wing bolt plate and fit the 6mm captive nut in place.

Nose Cone Assembly

Glue the two round hook plate discs together then screw in the hook and glue the assembly into the nose cone. Sand flush the rear face of the nose cone moulding offer up the smaller nose cone former and lightly sand to fit inside remove as little as possible for a tight fit then glue

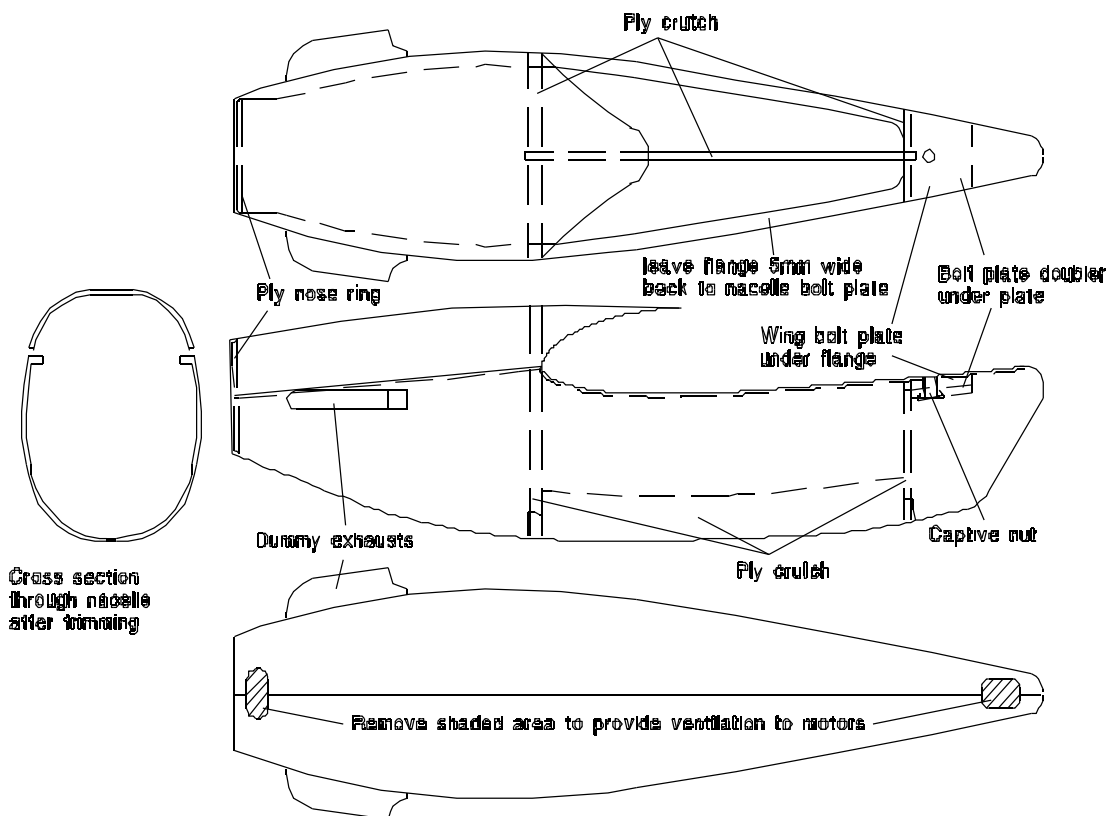


Dry fit the nose cone to the former and carefully sand the outer former to the nose cone contour try not to sand the moulding. Remove the moulding and line up the former with the front of the fuselage. Drill through the two holes into the front former to accept the plastic tube. Trim of two pieces of plastic tube to 10mm and glue them into the holes in the nose cone former assembly. Glue the nose cone to the former. To locate the nose loop onto the hook in the nose then fit a hook into the front bulkhead. Mark around the nose cone then remove it and blend the fuselage bottom to the nose. Glue scrap balsa onto the wing centre to blend the wing into the fuselage.

Building The Nacelles

Construct the nacelle crutch from the light ply parts keep the formers square to the base the 2 formers are parallel to each other use a nacelle side moulding to get the correct angle for the bolt location plate and doubler..

Take a pair of bottom nacelle mouldings and trim their top faces back to about 5mm as shown (keep the scrap), also remove the areas shown to assist cooling. Clean up the two inner faces to achieve a neat but joint, use the front ply ring and lite ply crutch as a guide to width and to keep the front circular. When satisfied mark the position of the crutch base. Cut a number of strips of scrap plastic 5mm wide, glue these strips along the joining inside face of one side of the nacelle so as to form a tab either end of where the crutch sits, also glue in position the front ply ring and crutch. When dry glue in place the other nacelle side; hold in place with masking tape until dry.



Drill the front of the nacelle to accept your motor location screws and cut away any of the flange along the top of the nacelle to allow clearance. Make sure you cut away any areas required for ventilation of the motor.

Note it is important that the thrust line of the motor is correct, the motor shaft should be parallel to the centre line of the nacelle and to the top face of the nacelle side mouldings. If necessary pack the motor top or bottom using a shim of ply or plastic before screwing the motor in. The motor can be removed for finishing. To refit the motor with the leads connected, slide a piece of tube through the hole in the front of the nacelle and over the motor shaft, slide the motor into position and screw in place.

After Building The Wing Offer up the nacelle to the wing and drill through the nacelle hard point and through the nacelle bolt plate, locate the captive nut. Bolt the nacelle in position, drill through the former for the locating dowel, glue the dowel into the wing leaving about 10mm protruding from the leading edge. Offer up the top portion of the nacelle and trim the rear part away to fit over the top of the wing. It is best to remove a little at a time to achieve a neat fit, clean up the lower face to achieve a good fit to the rest of the nacelle, when satisfied glue to the bottom part of the nacelle. When dry fill any imperfections and sand with fine wet and dry.

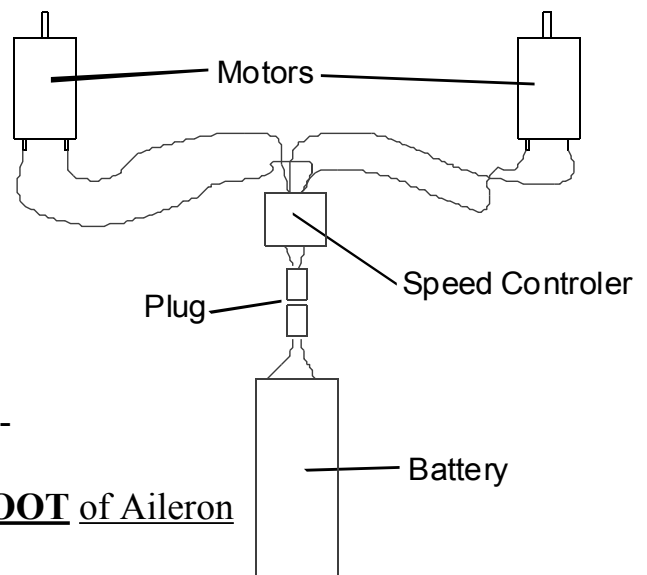
Finishing

Trim the canopy to fit over the cockpit area use sharp scissors warm the canopy gently if the temperature is low so it is less brittle.

As this is not a first time model you will probably have your own preferences when it comes to finishing. The original model was finished with tissue and dope be careful to seal any exposed foam areas the plastic parts need not be covered just lightly finished with fine wet and dry. The model was then spray finished with enamel. Lettering and markings was applied with stencils though decals would be good. Panel lines were added using a soft pencil.

Securely fit all the control surface hinges
And fit the aileron horns.

Fit your motors and wire up. The
Prototype used the layout left always
Disconnect the battery when not in use.
Make sure your speed controller is
Of a suitable rating for the motors
And that the motors are adequately vented.



Finally fit your radio the control movements are: -

Aileron 9mm up and 9mm Down Measured at **ROOT** of Aileron

Elevator 8mm up and 8mm Down

Check your centre of gravity the model should balance 55mm from the leading edge of the wing. If necessary ballast the model to suit. The prototype weighed in at 51 ozs.

Flying

Check control movements are correct and their sense is correct. Check the centre of gravity. Make sure your motors are run and checked for direction and the battery is charged. If possible choose a day with a light breeze for the test flight. It is preferable to have an assistant for the first flight. Switch on the radio start the motors launch the model slightly nose down into wind and allow it to climb out gently. Keep the speed up this is not a model to be hung on its propellers treat it with respect until you have some height and can explore its capabilities. When you have some height try a few turns throttle back and explore the glide and the stall. On early flights keep to a reasonable speed and make your approach to landing straight in until you are confident. We have found the Whirlwind to be a steady flyer with no vices it is quiet aerobatic and very pleasing to the eye, we hope you have as much enjoyment out of the Whirlwind as we have.