

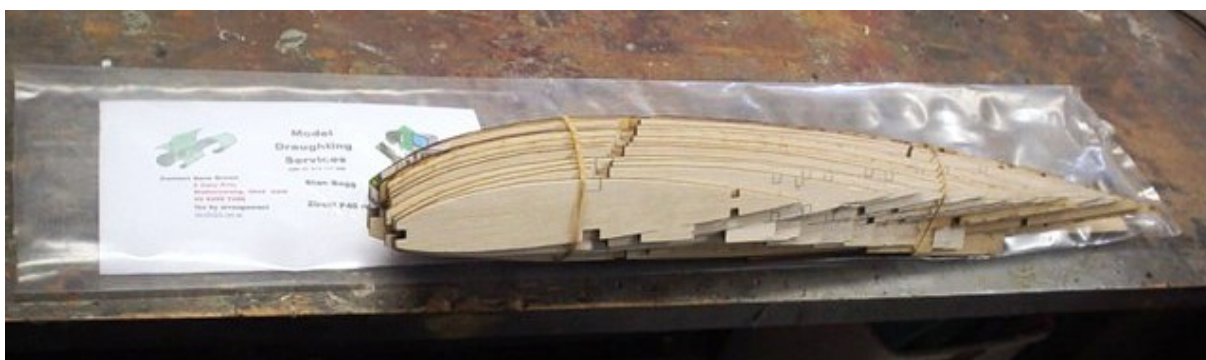
## Building and Flying a Ziroli P40E Kittyhawk....

### Instalment 3

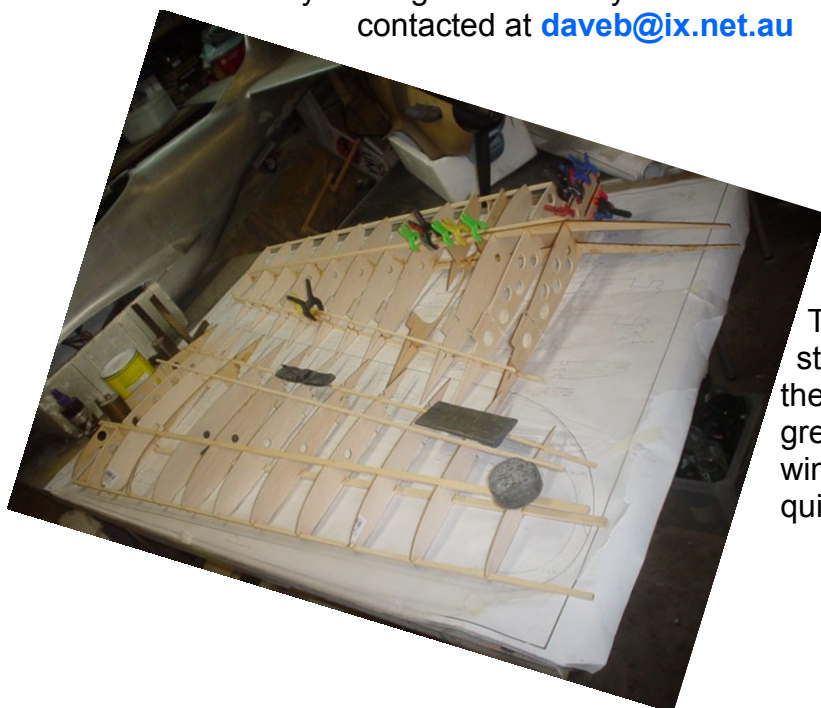


### Building the Flying Surfaces:

#### Wings:



In my opinion if you want an easy and accurate wing it really pays to get a laser cut kit of ribs from Dave Brown at [Model Draughting Services](http://www.modeldraughtingservices.com.au). The cost is not much more than you or I would pay for the raw material and the accuracy of the shape and spar cut outs cant be matched by making ribs manually with a scroll saw and or knife. Brown can be contacted at [daveb@ix.net.au](mailto:daveb@ix.net.au)



This photo shows the two wings framed up and ready for joining.

The **Ziroli** wing is a fairly simple structure and is built directly over the plans separated by a sheet of greaseproof paper. Using **Browny's** wing kit of ribs makes the whole job quick, easy and accurate.

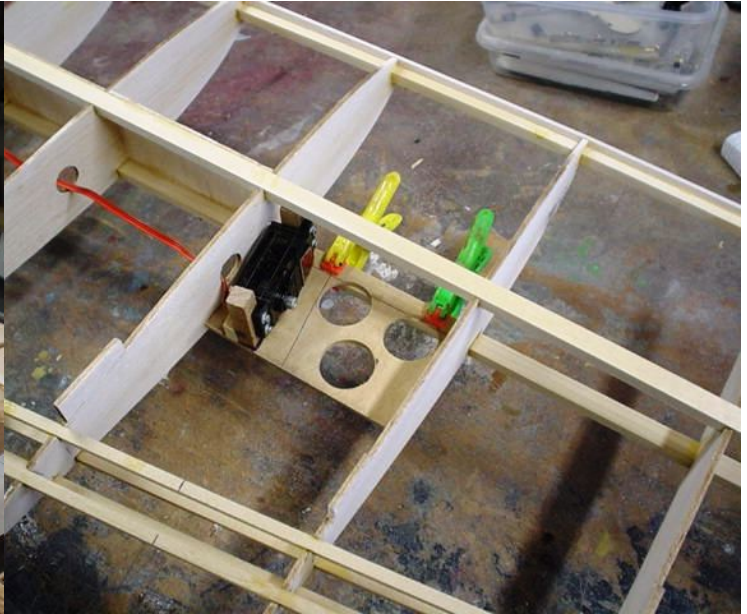


These photos are of the two wings joined with retract mounts fitted. Glues used were a high quality PVA wood glue called **Titebond III**, 30 minute epoxy and **ZAP** medium cyano. I only use the **ZAP** for tacking the pieces in place as I don't think it works well on ply and spruce joins.

Next step is to make, servo mounts, wing mounting pads and then on to surface sheeting.

The wing mounting pads are made from pieces of 25mm dowel sandwiched between 12mm ply epoxied to plywood ribs and rear sub spars, might be a bit OTT but at least the bloody wing want fall off!!

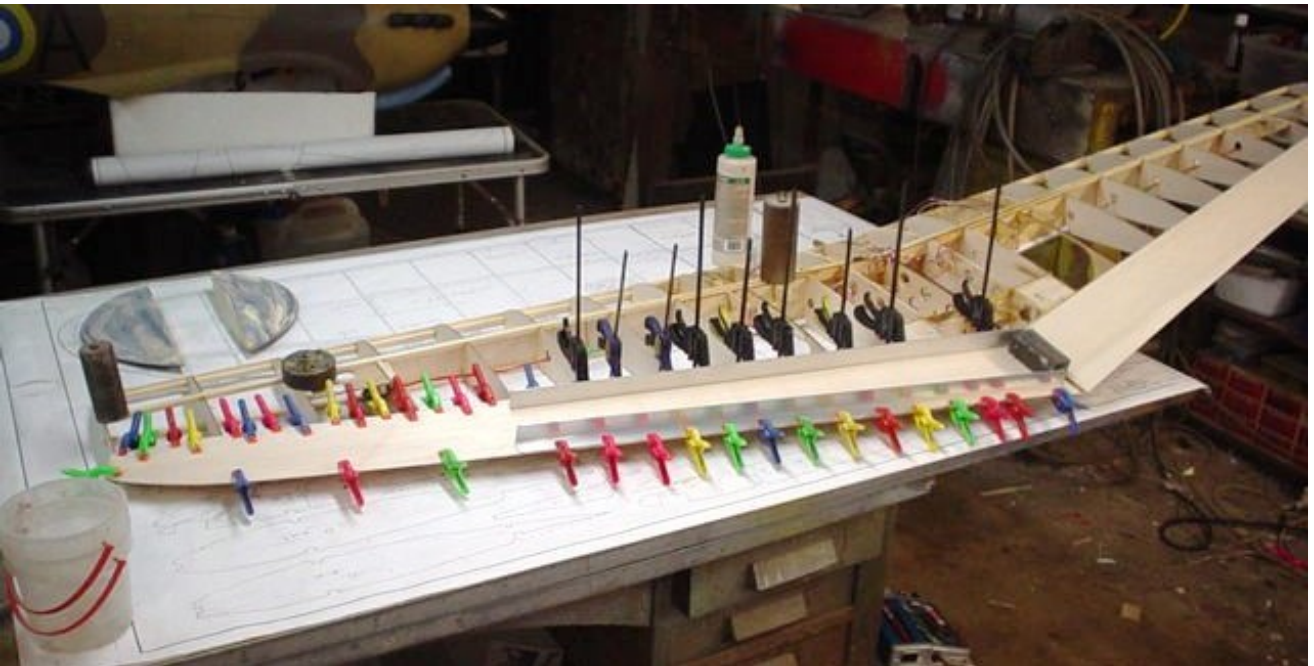




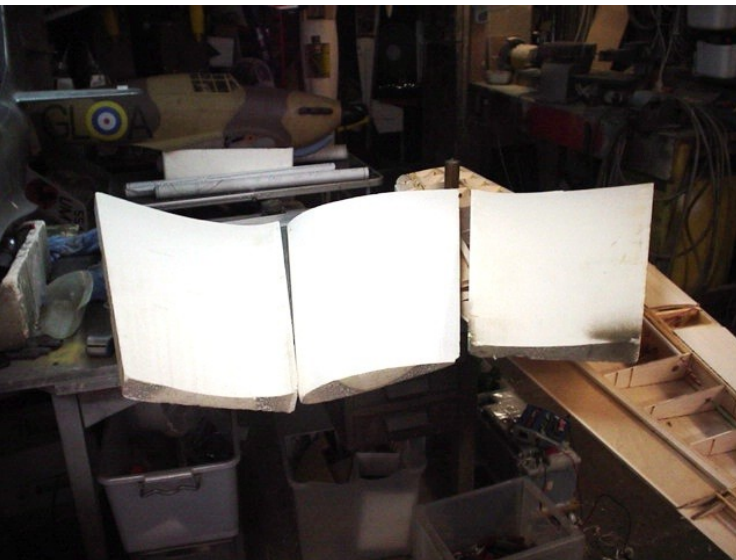
Retract mounts are fitted and the embedded servo mounts epoxied to the main spars in the above pictures.

I'm using two **BMS705MG** low profile servos for the ailerons. I've not used them before but I took them apart and the quality of the internal components and the SMT circuit board are very good. They are made by **Bluebird** and are rated at 8kg/cm at 6V. It's a bit of a gamble for me to use something I've not used before in a critical area but they look and sound OK. We'll see!





The preceding pictures show the start of the 2.5mm wing planking. In the first photo you can see the use of two aluminium right angle extrusions clamped over the sheeting to the trailing edge and sub spar to ensure the trailing edge is straight. If I can start off with a warp free first sheet I've got half a chance of finishing with a straight wing with a fine trailing edge and the same washout port and starboard.



For my two bobs worth, the easiest way to get the bottom skin on a wing with perfect and equal washout is to use foam cores as a jig.

I sheet the top of the wing then put the wing into the top foam core on a flat surface, weigh it down and then glue on the bottom sheeting with a slow drying PVA glue.

The old cores pictured above are from [Model Design](#) and have now made four sets of wings and rebuilt one after a 3D error at Richmond, but that's another story.





This picture shows the rear sheeting pinned to the wing frame and how the wing sets up in the foam jig. Its hard to get the washout wrong using this method.



Next jobs are to fit leading edges and then onto flaps.

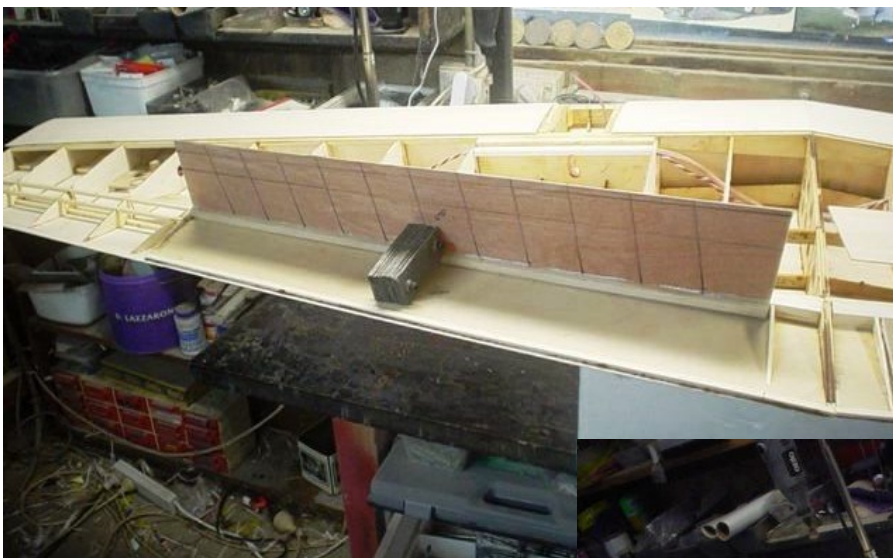
### **Flaps:**

They didn't put flaps on the full size to make it harder to land so good functional flaps on a model this size are mandatory.



This photo of the full size P40 flap shows that the flap is actuated by multiple pushrods attached to a rotating torque tube. It would be nice to replicate this but the trailing edge above the flaps would end up being very thin and fragile as well as the torque tube being complex and heavy.

I'll make the flaps as per the plan and actuate them from a single horn at the root

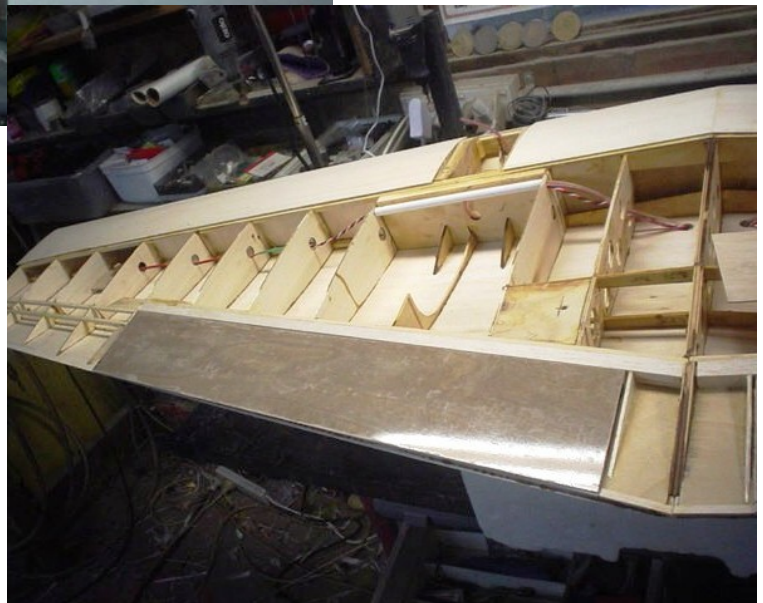


The flaps have to be super stiff so they don't twist when they are actuated from the root only so I started by laminating 1mm ply with 6oz fibreglass cloth on the bottom and 2oz cloth on the top laid up on a sheet of glass coated with release agent.

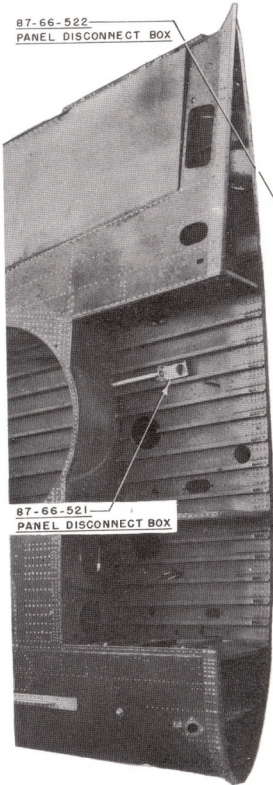
Leading and trailing edges were added and ribs fitted between. The flap was completed by epoxying a sheet of 0.6mm ply to the top. On completion they were so stiff that I could have saved a few grams by using 2oz cloth instead of the 6oz.

I will decorate the inside surface with fake ribs and the two longerons to make them look something like the full size.

The flaps are hinged with 5 **Robart** pin hinges per flap



## Wheel Wells:



Before closing the wing I have lined the wheel wells with **Ever-green** plastic corrugated sheet to simulate the original as shown on the left

## Ailerons:

Both ailerons were cut off the wing along the sub spars using a razor saw,. The wing TE was sheeted and after sizing the ailerons, front edge and ends were also sheeted. The ailerons were then sanded to fit the cut-out exactly. Next step is to bore holes in the wing and front of the aileron for inserting and epoxying the four **Robart** pin hinges per aileron.





**Wing Tips fitted and then wing finished:**

The old wing tips above were one of very few items salvaged from my last wreck. They are solid balsa and, as you can see from the different shades of paint, have been fitted to all three of my previous Kittyhawks. A bit of a clean up, a lot of sanding and they will go again..

The wings are now finished awaiting glassing





Glassing the wings:



Glassing is complete. The centre section of the wing to the outside of the wheel wells is glassed in 2oz cloth top and bottom, the rest of the wing is glassed with 3/4oz.



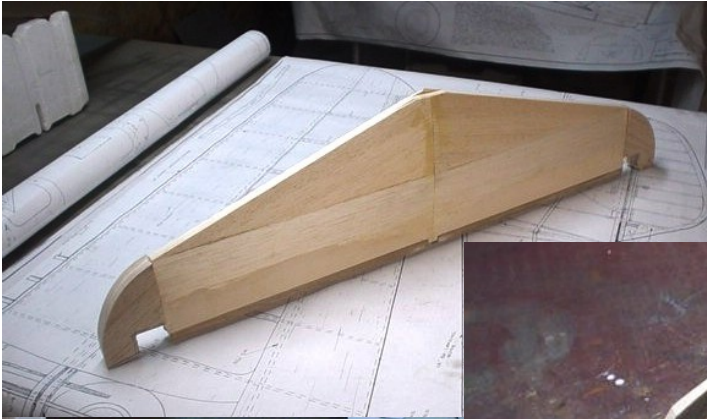
Glass cloth from **Fiberglass Aust** in Willoughby resin is **ZAP** Finishing Resin





### Rudder and Fin: -

Usual build up, Fin covered with 2.5mm balsa, rudder covered with **Solartex**. The rudder's leading edge will be notched out at the elevator line for a more scale appearance. Actuation will be by s/steel fishing trace pull-pull to a servo mounted somewhere about the C of G.



**Stabiliser and Elevators:-** Standard build up, stabiliser covered with 2.5mm balsa, elevators covered with **So-lartex**. The elevator actuation will be by a plugged square carbon fibre tube with two carbon fibre horns keyed and glued with **Hysol** to it sandwiching a heavy duty ball link. The assembly is pinned in place by two carbon fibre rods all glued to the reinforced end of the elevators with **Hysol** and faired into the leading edge with balsa. The ball link

will be screwed to the carbon fibre pushrod tube and the pushrod will run through the rudder post and down the centreline of the fuselage and will be totally concealed



Elevator joiner and horns, all carbon fibre and **Hysol**. There is hardly any weight in this build up but would have been relatively heavy if I had made this as per the plan. The plans call for 3/16" wire to be used as a joiner and external horns to be fitted at the roots of the elevators.....A bit agricultural I thought !

The main structures are now all built and the plane is, probably, about 40% complete. The more exciting bit is to come when it is all assembled. To do this I will need to glass the stabiliser and rudder fin, set up wing and stabiliser level and at the correct angles of incidence, glue stabiliser and fin in place and then bolt wing to the fuselage for making the wing fillets. While I've got the fillet bog going I will make the rudder and stabiliser fillets as well

The next breathless instalment will go back to the fuselage to fit the motor, exhaust system, cowl and other bits and pieces then I can start to put the thing together.

Cheers  
Stan