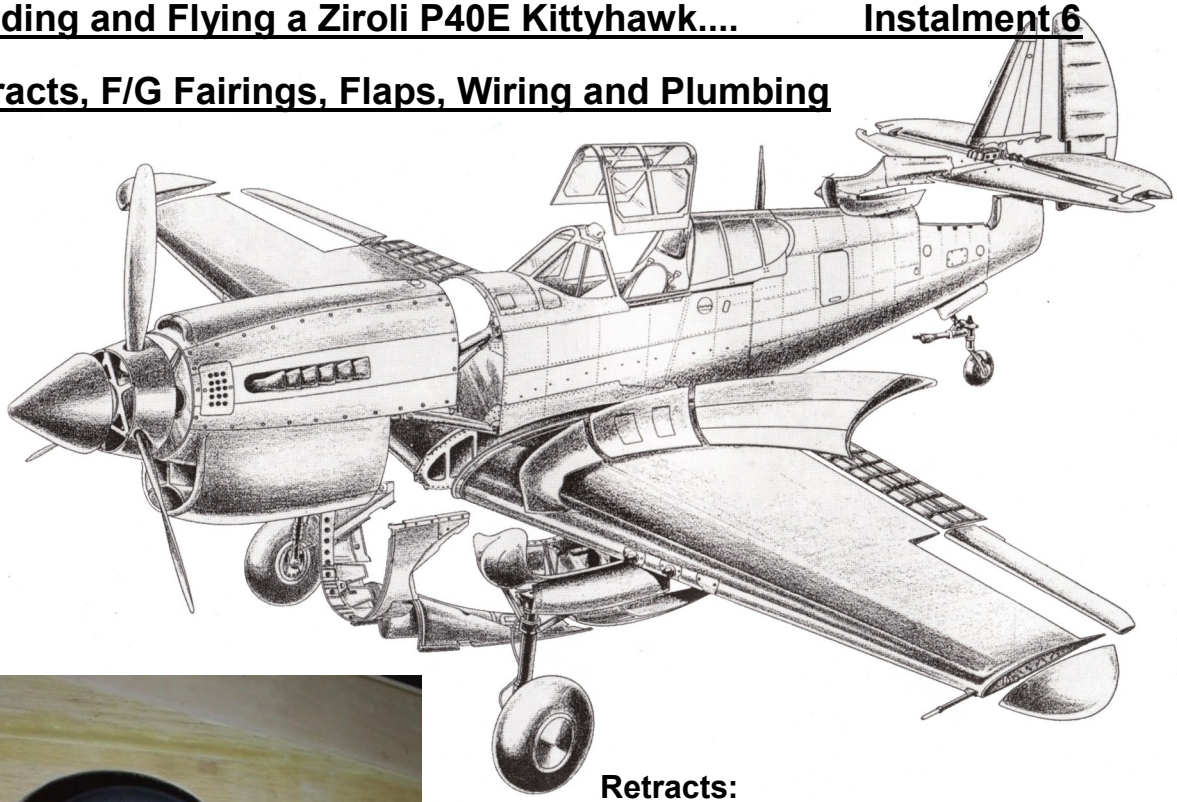
Building and Flying a Ziroli P40E Kittyhawk.... Instalment 6

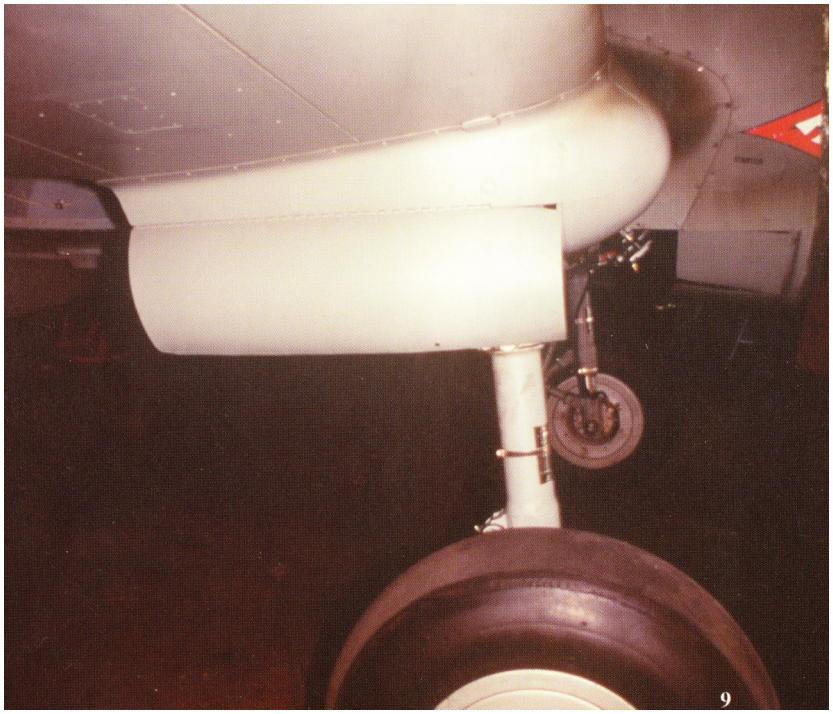
Retracts, F/G Fairings, Flaps, Wiring and Plumbing

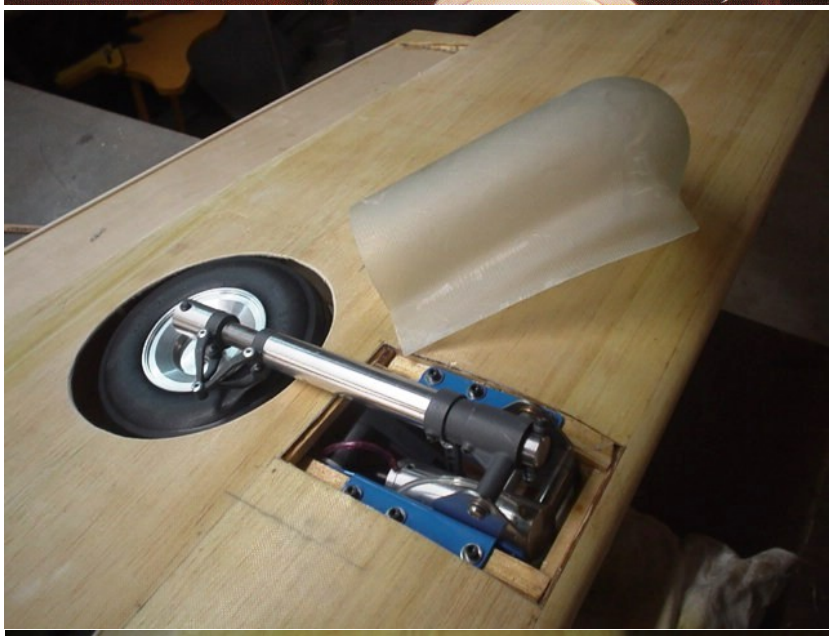


Retracts:

The wheel well holes were cut from the wing sheeting and the hoop pine undercarriage bearers were tapped to take the 6 x 6-32 socket head machine screws that were used per leg. Alignment was checked and all good so far.

I'm not totally convinced about the **Ziroli** wheels, al though beautifully made they are bloody heavy and are a different pattern to the wheels on the full size. We'll see....





Undercarriage Fairings:

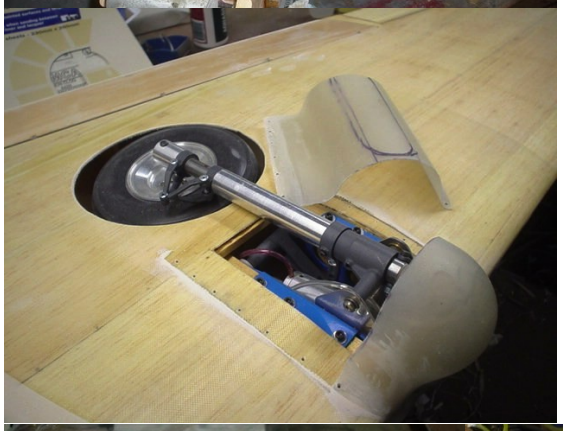
The retract mechanism has to be covered with a fairing as per the full size.

I bought a pair of these fairings from **Ziroli** when I bought the plans and I've gotta say the fit is not the greatest..A fair bit of work with the **Dremel** will be required to get them to fit into the LE of the wing.

The way I fly means that retracts need continual maintenance so I'm going to cut off the front of the fairings and **Hysol** them to the wing and attach the back section of the fairing to the wing with screws so I can get to the retracts if I have to remove them for a bit of TLC ..

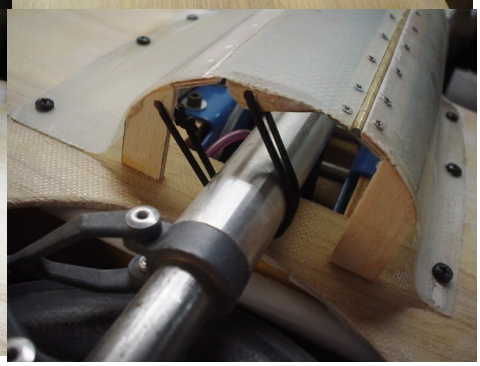
The back section has to have a hinged undercarriage door cut out and attached to the leg to open and close with the leg extending and retracting.

The retract fairings are glued to the leading edge with the usual **Hysol** and the rearmost 3/4 of the fairings are faired into the wing with the usual micro balloon bog



All that remains to be done is to cut out the gear doors from the fairings, hinge them with 12mm piano hinge and make a way to open and shut them with the oleo leg being extended and retracted and then screw it all down onto the wing..

I buy the piano hinge on line from **Lee Valley Tools www.leevalley.com** and the attaching tiny 1/4” c/sunk 0 -80 screws and nuts from **Micro Fasteners www.microfasteners.com**

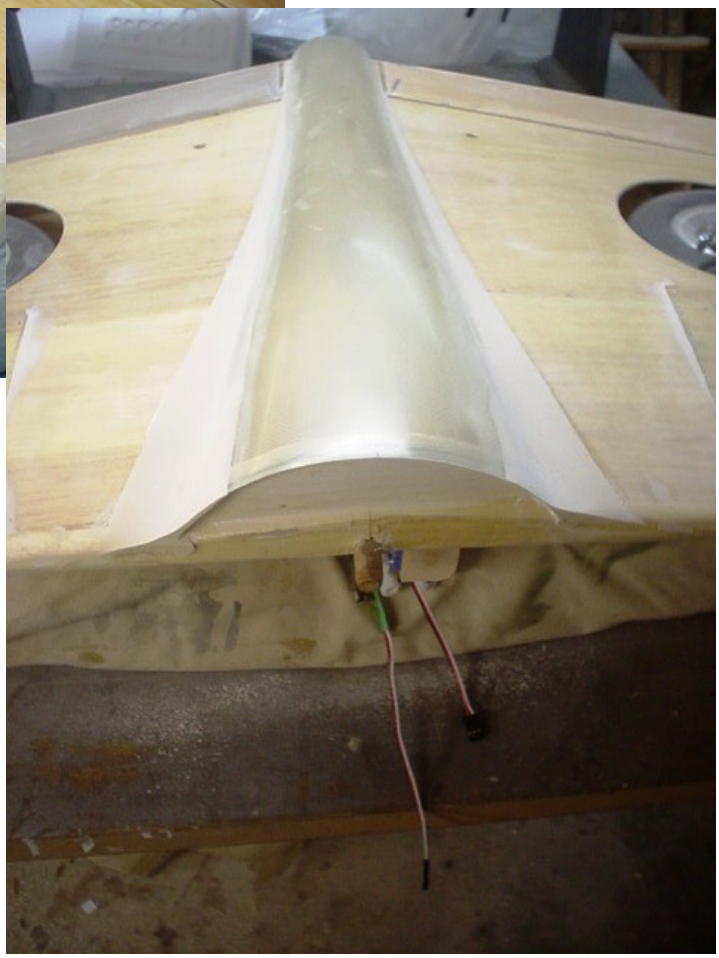


The bottom row of pictures shows a bit of hat elastic from the edge of the door to the other side of the fairing so when the leg is retracting it will bring the door down with it.

Wing and Belly Fairing:

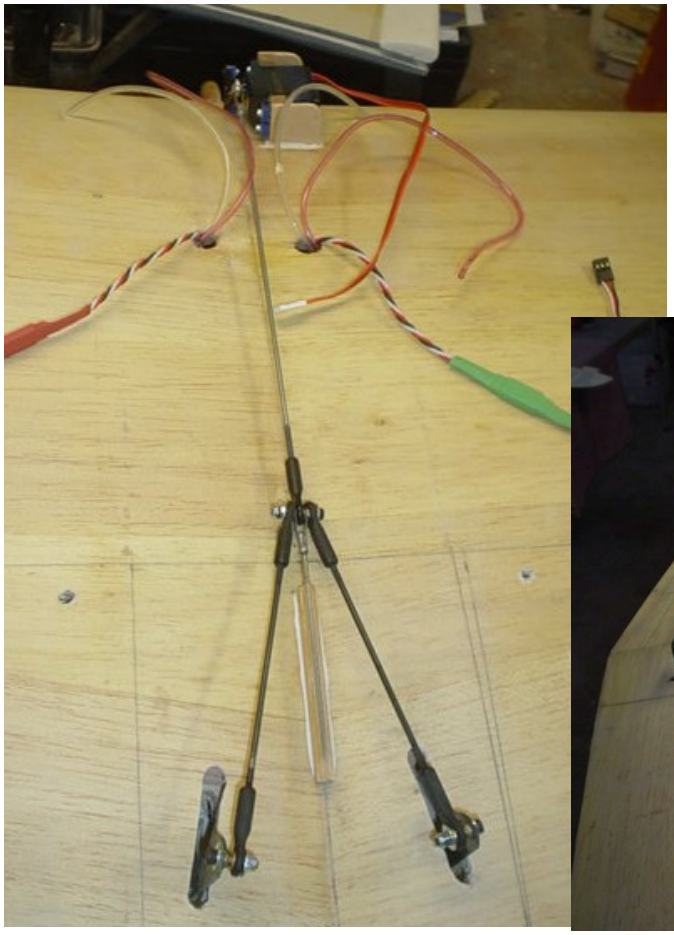
The fibreglass under wing fairing and belly fairing is cut to size and shaped to conform with the aerofoil of the bottom of the wing

The belly fairing is glued to the wing with **Hysol**, surprise, surprise and then masking tape is applied to outline the micro balloon bog that will be applied to complete the shape required.

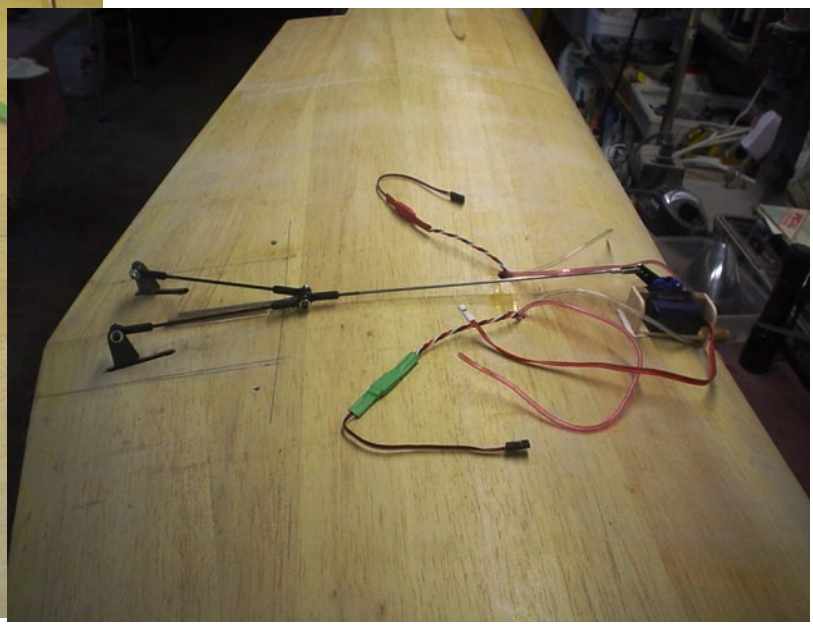


Bog has been applied and after a bit of sanding with 80 grit the job is done.

A 6mm balsa former was glued into the front of the fairing to stiffen the fibreglass moulding.



Flap Mechanism: The flaps are pretty substantial on the P40 so I had to make some calculations to ensure I didn't stall the servo when deploying them. I need about 40mm of linear travel from full up to full down.

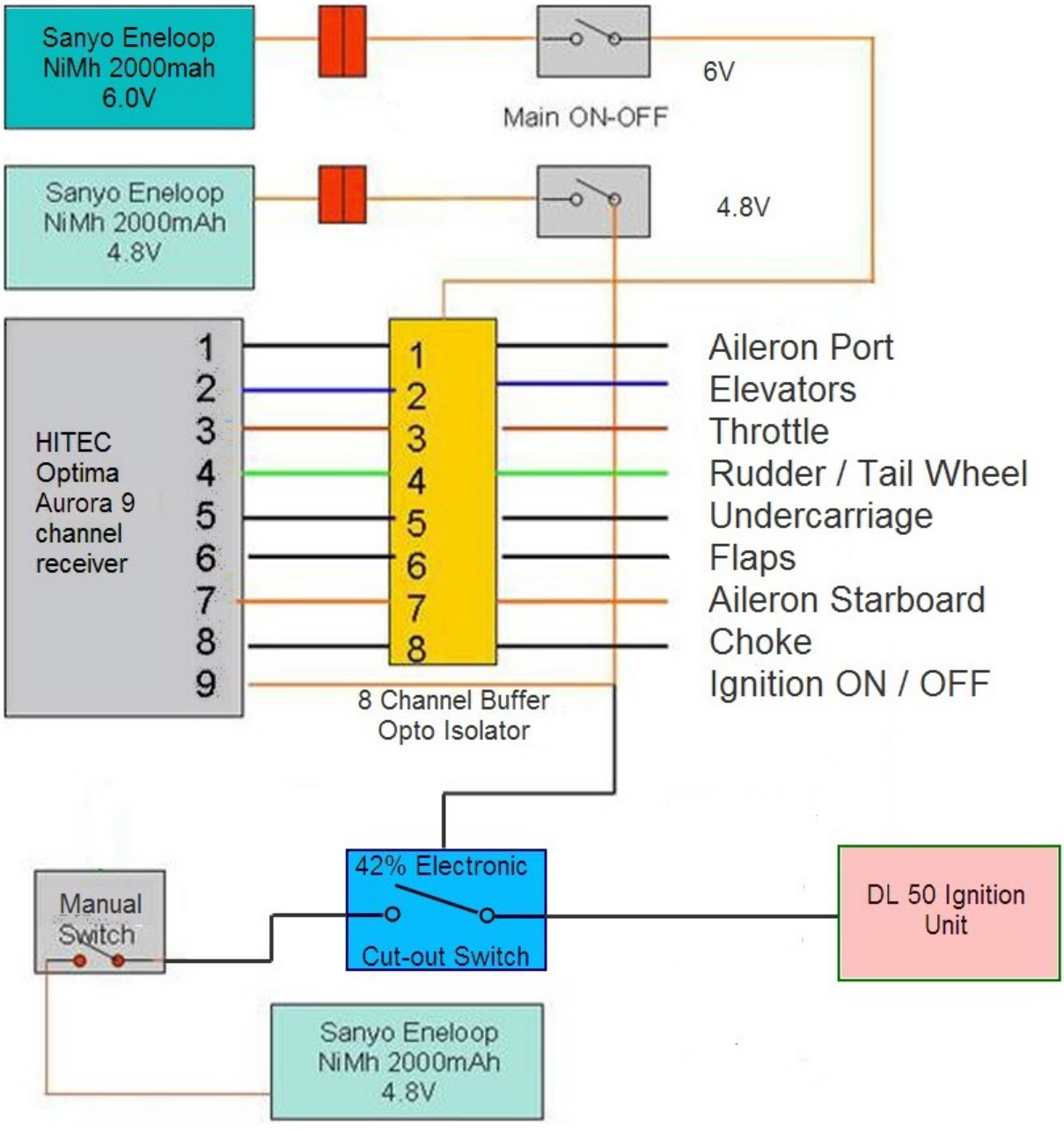


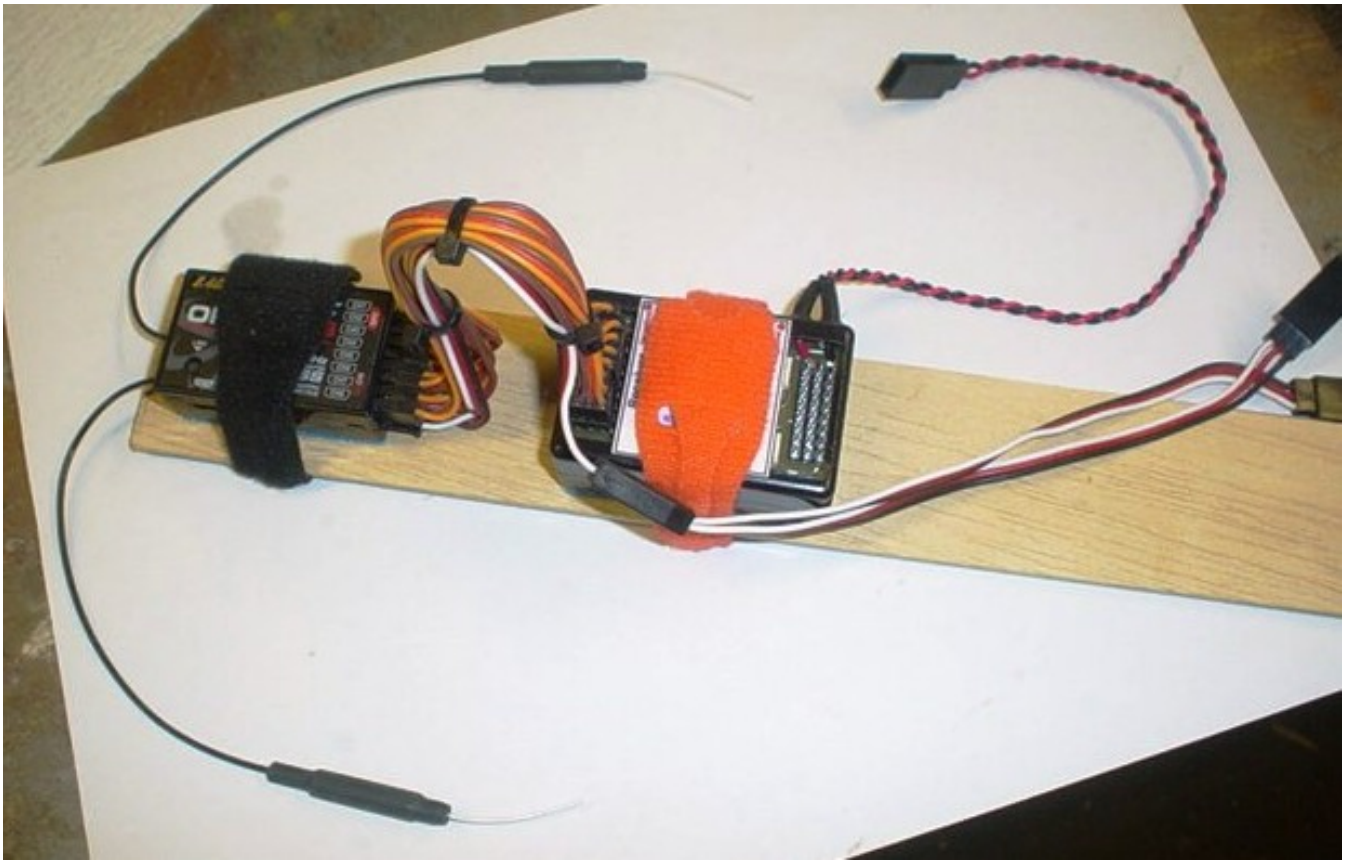
I started with 37mm long servo arm, the flap horns are 50 mm so I've got a 3.7 to 5 mechanical advantage there. The servo I am using is a **Bluebird BMS660MG+HS**, this is a metal geared servo rated at 14.2kg/cm 0.17secs on 6 volts so 14.2kg/3.7cm servo arm = 3.84kg of force at the end of the servo arm, divide 3.84kg by the 3.7cm servo arm multiplied by the 5cm flap horn = 5.2kg of force to drive both flaps down which is about a third of the total weight of the model. Should be OK I hope..

The actual mechanism consists of three 4-40 metal pushrods fitted with ball connectors on the ends in a Y configuration. The pushrods are stabilised with a centre track with the slide at the junction of the three legs. The long leg of the Y that's connected to the servo enabled me to have minimal protrusion into the fuselage when the flaps are operated..

Wiring:

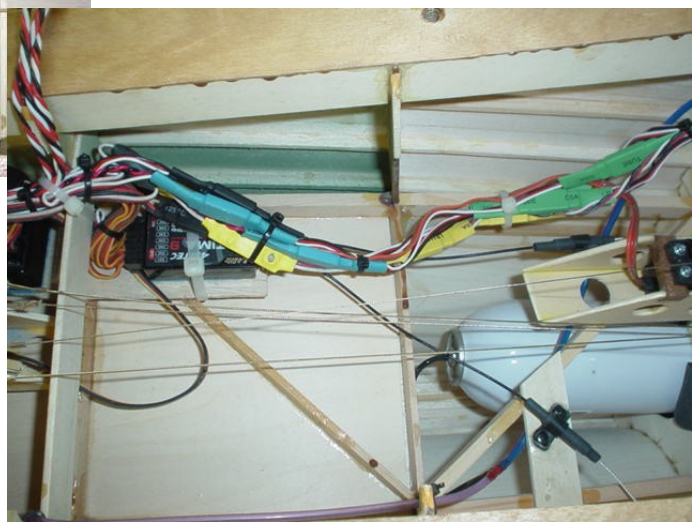
After wiring and the re-wiring the Hurricane I've decided to return to basics and keep the wiring of the Kittyhawk pretty simple (KISS). I need to power the **Hitec Optima 9** receiver, the **SM Services UK** servo buffer, the **Rexcel** ignition unit, The **42% Products** electronic cut off switch and 10 heavy duty servos.. I need a separate power supply for all servos and a stand alone power supply for the receiver so the receiver doesn't suffer a "brown out" with current draw for the servos causing a voltage drop sufficient for it to want to reboot. For the servo buffer I use a unit from **SM Services UK,** this is an 8 channel buffer with opto isolation P/No. SM33. The added bonus of being opto isolated is preventing any ignition crackles from getting back to the receiver. All the batteries are the low self discharge NiMh type that I find excellent, 6000mah on board in three small AA packs would have been fantasyland not so long ago and as a bonus I don't need voltage regulators. The **42% Products** electronic ignition cut off switch that I buy from **DL Australia** requires a manual arming switch in series with it as it draws about 10ma of current when all is switched off and it is still connected, a bit of a trap that I found out the hard way.....RTBI...or read the bloody instructions .....





This picture is of the **Hitec Optima 9** receiver connected to the **SMS** servo buffer with the supplied small fly leads, both units are attached to the base board with Velcro pads and a Velcro strap over. The base board will be glued to the fuselage frame floor.

Batteries are made up from low self discharge NiMh cells of 2200mah capacity. One battery of 4.8V powers the receiver exclusively and the other of 6V powers the servos exclusively. A further identical 4.8V pack mounted forward of the firewall powers the ignition.



All fly lead connections are securely fastened with heat shrink tubing and the made up loom is cable tied to the spruce frame.

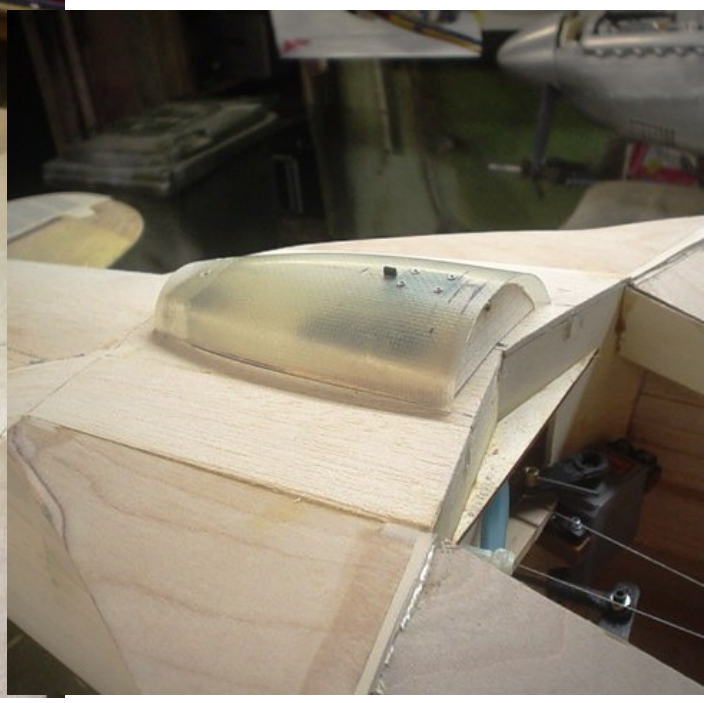
Hiding Switches and Retract Valve:

This photo is of the auxiliary panel which will be hidden under the extension of the under wing fairing.

The panel consists of two ON / OFF switches, one for 4.8V direct to the receiver and the other is 6V to the servo buffer and an input valve to the retract tank.

The fairing is hinged and latched by using a spring loaded hatch latch from **Trim Aircraft** into the small vertical former at the front.

The wiring and tubing from the panel are gathered together under the panel to form a loom. A piece of heat shrink tubing is fitted over to ensure there is a bit of protection from possible chaffing on the tail wheel steering or rudder cables. The wires and tubing will then be connected to batteries, receiver, servo buffer and the retract valve.

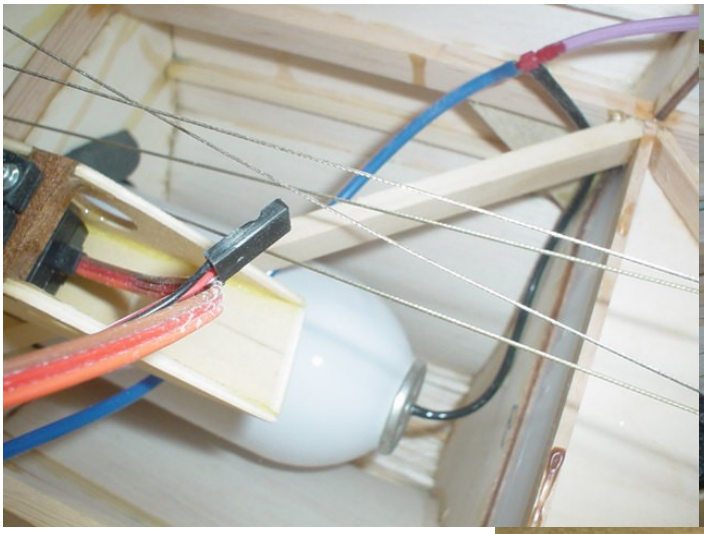


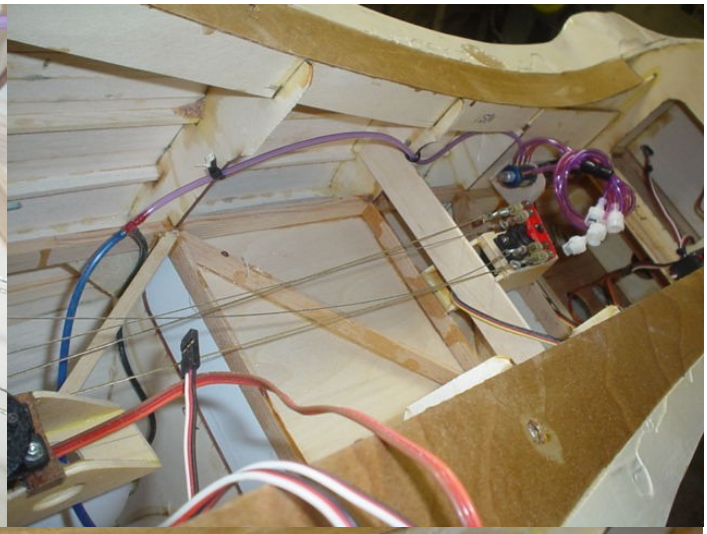
Plumbing:

The P40 retract plumbing is pretty simple. There are no extra gear doors that require sequencing like there is on a Mustang so a basic **Robart** kit can do the job.

I have started with the largest air tank **Robart** make and fitted it in a frame behind the head-rest. Flexible tubing comes from the tank to a T piece that is connected on one side to the inlet valve hidden under the belly fairing and the other side to the inlet of **Robart** two position valve operated by a small servo. The paired extend and retract tubing are colour coded off the valve and are further protected against incorrect assembly to the wing plumbing by using male connectors on the extend tubing and female on the retract tubing.

It is important to me for the retract operation to look real and to achieve this I have inserted air restrictors in the tubing to slow the retract action but left the extend operation to operate at normal speed. All very simple and reasonably priced for a reliable system. I get all my **Robart** stuff on line from **Duanes Planes**.





That completes the building phase. The next instalment will cover glassing fuselage, priming etc. as we move on to the decorating phase.

See you in a couple of weeks

Stan

Late break **P.T.O**

Late Lucky Break:

After I had completed this instalment I was surfing the **rcuniverse** site and came upon a forum about building **Model Design** P40's, one of the contributors was modelling Judy Pay's P40F but he had the wrong pattern wheels.. Judy's plane has the outside wheel covers, Trent's model had the simulated spoked wheels that I needed. To cut a long story short, after an email or two we agreed on a swap to our mutual delight.

Judy Pays full size P40F restoration based at Tyabb

The wheels I sent Trent.

Ross Pay's full size P40E restoration based at Scone

The wheels I received from Trent

Both happy !!