

Herr Engineering- Little Extra



The Little Extra – that's not the air strip; it's my front garden path!

I like small planes.

Actually, I like big ones too, not to mention medium sized planes but until recently, I hadn't much experience with the small plane market. In fact I have never had a small glow motor; the only ones I have seen were a bit cantankerous; and I didn't want any part of that. I did however have some electric equipment from a previous glider... Jeti 30 amp ESC, various lipo batteries... I just needed an airframe in which to house them.

The new local, www.rcwarehouse.com.au always has a great selection of ARF's and a while ago I remembered seeing a 1/2A sized Extra 300... it is manufactured by Herr Engineering (subsidiary of SIG) and is very well constructed. Originally designed to use the Norvel 074 glow motor, I figured it would make a great conversion to electric. A deal was struck with Marshall (nice fella!) and away I went! All I needed to do now was choose a motor...

There is an almost unlimited choice of brushless motor to choose from these days, all with different qualities, current draw and performance. It is a little more difficult to choose an electric power source as opposed to a glow motor but in another way, this also gives the owner more choice.

The Little Extra is designed to be a sport and aerobatic flyer; not 3D. I don't think the control surfaces are large enough to have the control that a 3D plane needs, but there are LOTS of 3D planes to choose from. The Little Extra has unique looks and promises to be a very spirited aerobatics plane.

The modelflight website (www.modelflight.com.au) has an excellent selection page that helps you choose a motor to suit your cell count and flying weight... this way there is less chance of under-powering or over-powering your chosen plane. I ended up choosing the E-Flite 480 brushless outrunner rated at 910 kV and up to 250watts power output. I may need a higher kV rated motor, but it should be easy to change motors quite easily. I wasn't after outright speed, nor hovering capability, however I was looking for something that would fly this plane with great authority.

I weighed the following components individually upon removal from the box:

Wing and ailerons:	6 oz
Fuselage inc stab and fin	6.4 oz
Undercart, wheels, hardware	3.2 oz
Total so far	15.6 oz

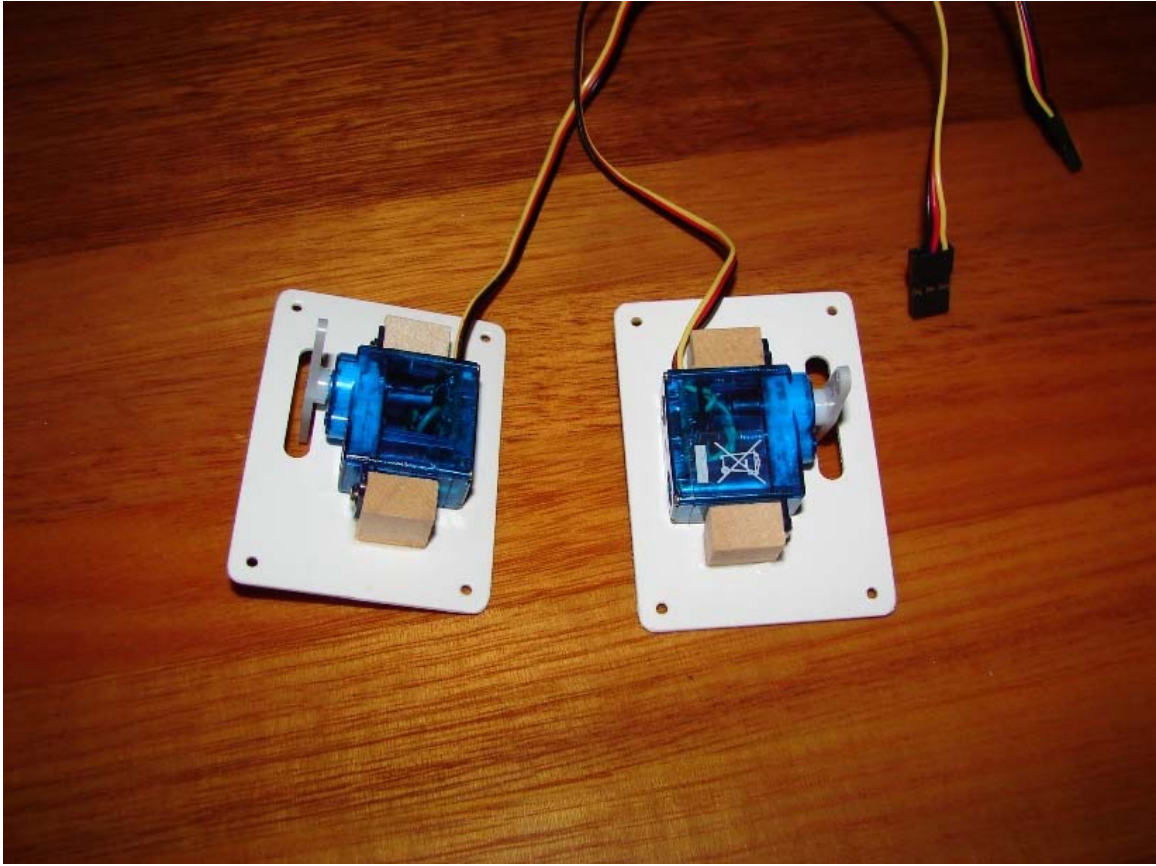
The instructions supplied with the Little Extra are so comprehensive, that there is no need for a blow-by-blow assembly here.

The first thing I did in assembly was the use a covering iron at low heat to seal all edges. I find that the edges are prone to pulling back when the models are stored for a long time.

WING:

This is first to finish. Simply install the ailerons and use thin CA to attach the hinges. There is a slot in each of the hinges which is used to centre each hinge. You simply put a small wedge of card in each slot, that way half of the hinge goes into each surface. This is a nice touch!





The HS55 servos are then installed onto each plastic servo cover using thick CA and the hardwood blocks supplied. Thread the servo leads through using the pre-installed piece of string and then screw the covers down using the supplied wood screws. With my HS55 servos, the leads were long enough so I didn't need to use an extension lead, however I did put some short extensions into the receiver to make plugging in the aileron servos a little easier.

Attaching the control horns and pushrod wires is very easy using the supplied instructions and hardware. The control horns have two spikes which the instructions say to apply CA and push them into the predrilled holes. I took an extra step of removing the covering from the area that the base of the horn comes into contact with the aileron. This allows a much stronger bond and reduces the chance of the horn coming loose mid-flight.

The wing is now finished!

Tail Surfaces:

Use the same hinging techniques to attach the elevators to the stab. Once done, glue to the fuse making sure it is square and level as per instructions.

Instead of using epoxy, I used CA in an attempt to save a little weight!

I also went to the effort of removing the film on the stabilizer where it came in contact with the fuselage. The instructions do not mention this step and it probably isn't necessary on such a small plane, but because I was using CA, I wanted to give myself the best chance possible.

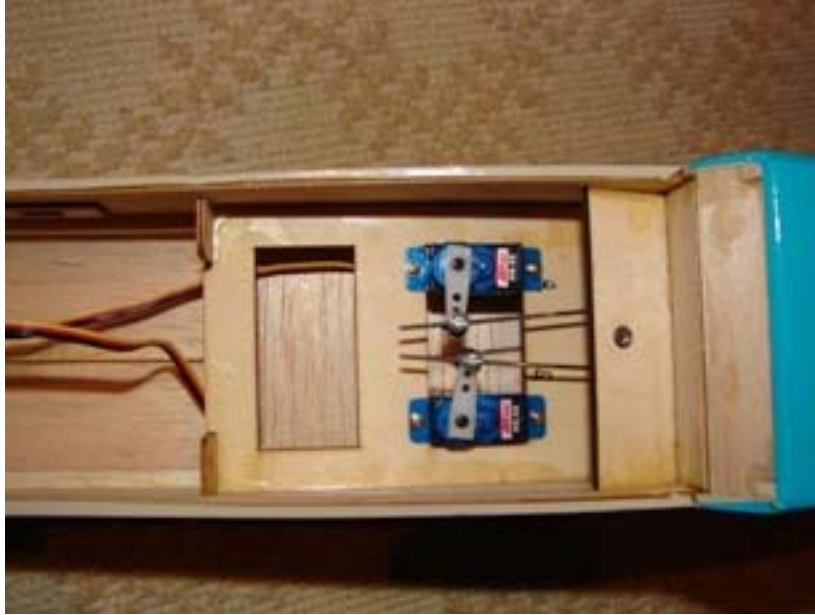


The tail wheel wire is then attached and epoxied to the rudder, before attaching the rudder to the fin. Everything interlocks and again I used medium CA to attach the fin.

The control horns are installed and the wire pushrods pushed through to the servo compartment.

Servos:

The cutouts in the ply tray are a perfect match for the HS55 servos. Instead of using the fixed method of installing the pushrods, I used mini servo connectors which allow fine tuning adjustment of the pushrods at the servo end. I like these connectors and have never had one fail.



Weight of plane with everything except:
Motor and prop
1pound 8.4ounces = 24.4 ounces

The target weight of the glow version was to be 27ounces, so clearly im not going to get it to 27!

The motor is meant to have a weight of 3.1 ounces, but I am yet to add a prop and also a firewall with which to mount the outrunner.

I am guessing at 5 ounces of extra weight to be added, so I should get to 29.4 ounces...

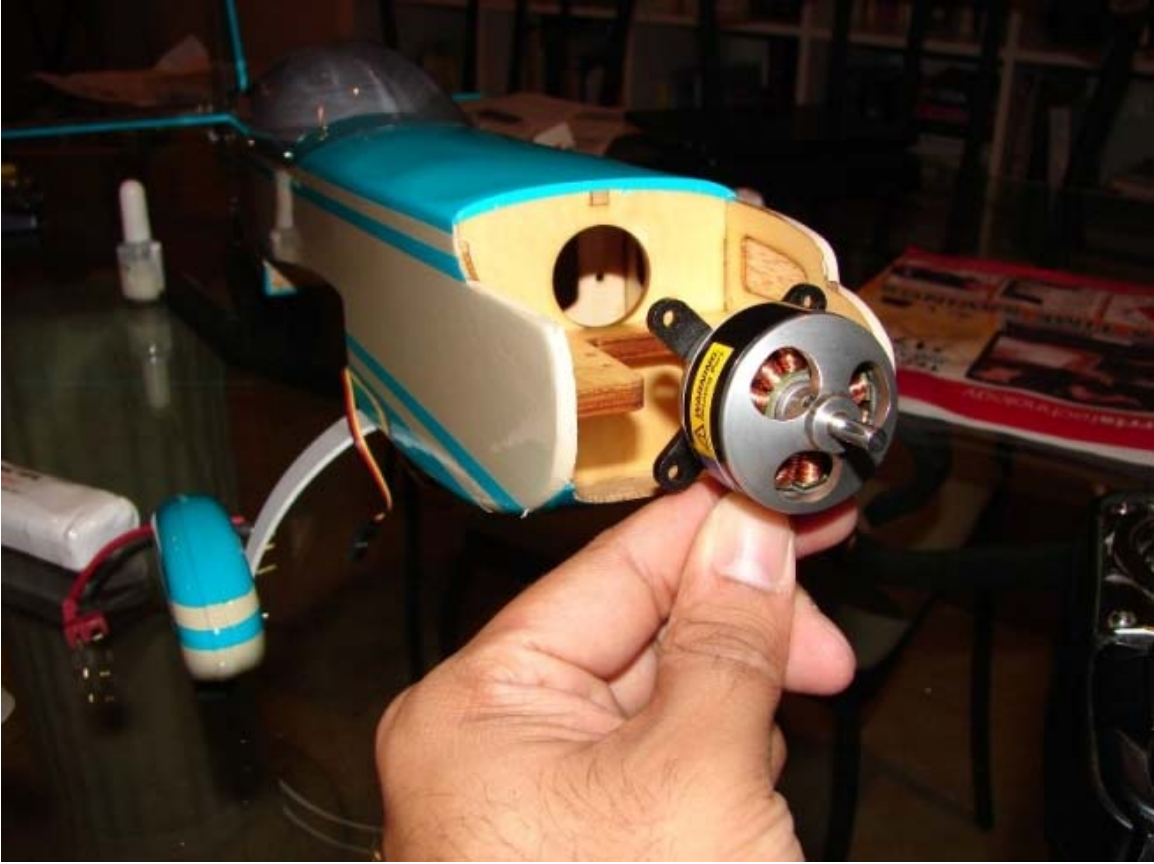
Finally, the undercarriage assembles as per the instructions and should take no more than 10 minutes. Everything fits perfectly and the best part is that the wheel pants remove with one small screw! Perfect if you are flying from a grass field.

Electric Conversion:

This is the bit which took the most time... mainly with thinking about how I wanted to go about the conversion.

The main difference with the electric is that the original plane has a cavity for a small fuel tank and a plate for an engine mount. The brushless motor needs another firewall for the radial mounting plate and also a tray to house the battery. In addition, you need to be able to swap battery packs. This either has to be done by removing the wing, or making an access hatch. Most planes designed specifically for electric, have an access hatch cut in as well as lots of cooling holes to allow air to pass over the battery and ESC...

After much consideration, I decided on the second firewall option and cutting a hatch in the bottom of the tank compartment.



Deciding how to mount the motor; Electric props are larger and need more ground clearance too!!

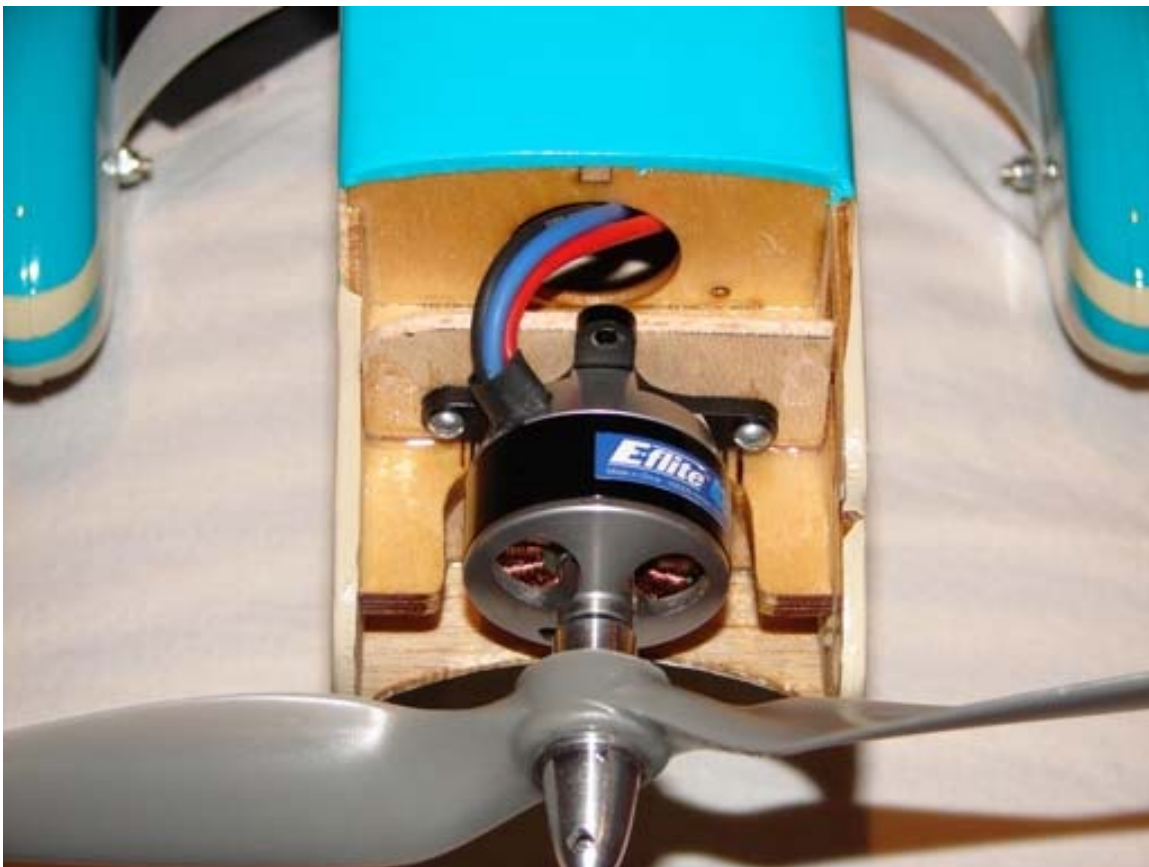


The trusty Dremel makes easy work of removing surplus ply from the engine mounting plate.

I ended up dremelling away a portion of the original ply plate to make room for the rotating can of the outrunner. Then I made a firewall out of lite ply as in the photo below.



There are only 3 blind nuts to mount the motor, but that should be plenty!



Power system ready to go!

This photo shows the plate epoxied into place. I didn't use any additional bracing as there is quite a large gluing contact area and the epoxy is good at filling gaps. If I had used medium or thick CA, I would have used additional triangular bracing in the corners.

It is important to try to keep the same amount of right and downthrust that is built into the original mount. I intend to use thin washers between the mounting lugs and the firewall if any adjustment during flying is needed.

21/5 – final weight ended up at 28.2 ounces... this is with a smaller 1500mah 3 cell lipo...

To finish off, I used hook and loop fastener to secure the speed controller in the fuel tank cavity and also to secure the receiver below the canopy. Care was taken to ensure that none of the servo leads crossed the Rx antenna as in the past this has caused interference issues. The Little Extra has a slot already cut for a switch assembly, so I used it as the exit for the antenna and simply ran it out the back and slotted it through a gap between the rudder and tail post...

Flying:

Wow! This thing takes off the ground like a scalded cat!

With the thrust of the E prop (10x7), the motor virtually "yanks" the plane off the ground in only a few metres. After the adrenaline dies away, I throttled back partially to allow the minor trimming required. A few clicks of aileron keep it level and no elevator trim was required.

Loops are as big as you like and the prop is handy at controlling the speed of the plane on the descent side of the loop. Rolls are crisp and quite axial. On low rates you can count the rolls but on high rates it is almost a blur!

The little extra looks great performing low passes, stall turns and all the basic aerobatic manoeuvres. It is such a gentle flier with an athletic ability which allows more spirited flying for the more adventurous. You can gnash at the sticks for a full 12 minutes or perform leisurely touch and goes and marvel at the dying sunlight glinting on the wings as you bank away from the strip...

Depending on throttle usage, flight times vary between 10 and 15 minutes... at this point, the battery voltage has dropped enough to invite you to land and taxi back to save yourself a walk!

Finally the best part of this e-conversion is the fact that you don't need to lug around

- fuel

- flight box
- cleaning equipment
- starting equipment

All you need is a few batteries, your transmitter and the Little Extra. I fully recommend the conversion and gladly provide my contact details should anyone have any questions or of course, suggestions for improvement.

Fly Safe

Michael D'Silva
mikedsilva@optushome.com.au

useful links:

www.rcwarehouse.com.au Call Marshall for a great deal!

<http://www.rcgroups.com/links/index.php?id=4805> - another electric conversion

<http://www.flyelectric.com> - Peter Pine is a fellow Australian who can supply almost any electric accessory you can think of and has a very fast freight service

www.modelflight.com.au – Lots of electric motors to choose from