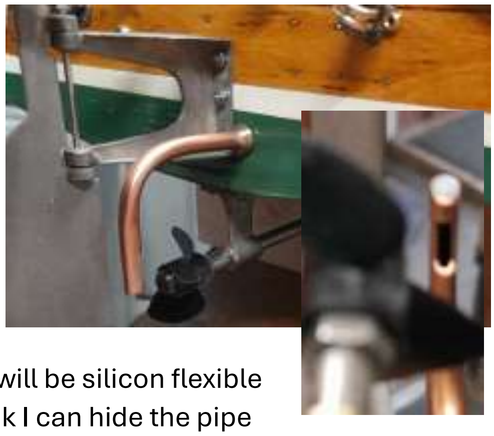
Miss Daytona build – 22

This document was written by Paul Naylor and is published here for FMES online viewing, and was written during 2026.

More bits and pieces, but this time reflecting on earlier comments about motors, batteries and electronic speed controllers (ESC). My searches latterly have been centred on the batteries and ESC, partly because I had not yet bought them, and partly to think about where they will fit in the hull. The batteries are now decided (see earlier article), at least in terms of location. The ESC however was more difficult. There is of course the size to think about, but also the current capacity and other aspects that affect the choice. I decided on a 60 amp capacity ESC to give some overhead above the motor maximum current draw – and if I needed to increase the size of the motor. The rub is that without a strong air flow (like maybe in an aeroplane), these may run too hot. ESCs sold for primary use in cars usually rely on heat sinks only for smaller capacities, and the same but with a miniature fan mounted on top for larger ones…. And this makes them a lot bigger and heavier. The implication is that if I want reasonable performance, I need to think about cooling, and 'marine-intended' ESCs are water cooled which not only is an efficient way to cool them, it is also compact and the ESC as a result is small and light. Whether the motor needs cooling or not is another moot point, and 'suck it and see' seems to be the ruling line in forums. I think however I can quite easily add a water-cooling jacket or coil to the motor which would take water after the ESC in the same circuit.

So, cooling it is and I need to add a means of getting the water on board (I have already provided the exit). In my youth, my IC boats had a simple scoop just after the propeller, and this was very tolerant of position and manufacture, always providing a good stream of water. I did look to see what was otherwise on offer, and these days you can buy water inlets that are nearly flush with the hull, relying on forward motion to force water round a bend and up a pipe. I expect that they work to some extent, and they would be unobtrusive on the hull, but if they did not suffice, I would end up with a large hole in the hull to mend, so my head is with the old-fashioned variety. The slight rub with this boat is that the propeller is aft of the transom and so, like the rudder, it will need to hang off the back for all to see (and, being a stepped hull, there is not much hull in water contact for a different type). Function beat form in this decision, and I made up a copper pipe shaped water scoop and positioned it on the hull. I know it will work (!?) but if I needed to remove it, I have a reasonably small hole to repair. I may paint it to hide it a bit, but I drew the line at using stainless steel to make it from. The result can be seen in the photos, with the somewhat blurry inset showing the hole facing the propeller. The internal pipework will be silicon flexible tube (5mm OD, 3mm ID is the recommended size), and I think I can hide the pipe runs OK. The photo also shows the small bush with a hole by the pulley for the rudder wire run.



The ESC water cooling comes built into the unit (ie water in/out pipes), but the motor needed some sort of jacket. There are two main types it seems you can buy to fit this motor size: one is just a jacket with O rings at the ends, using the cylindrical case of the motor as the inner jacket, and the other is a simple coil of copper tube around the motor. The former is reputed to be the most effective (although I remember coiling copper tube around the fins of an air-cooled IC engine to 'marinise' it for a boat), but I am nervous about relying on O rings (and unmatched mating surfaces) to keep the water in, after all, a leak will be a pretty good 'boat filler upper', if it didn't short out the battery on its way. The third way is 'my' way (!) and for this I bent up a bit of copper plate of about 18g thickness to spring closely around the motor, and 'persuaded' a piece of 4mm copper tube to snake around it and soft soldered that to the plate (it is bent at a tight radius and hammered flattish too) The result is not pretty and fairly heavy, but should work OK – see the photo, it is all hidden under the 'engine'. I can bend the tubes to suit the pipe runs later if required (or for that matter, turn it end for end on the motor with the pipe ends at the bottom).

Whilst waiting for my birthday (my son and daughter apparently are acquiring a receiver and electronic speed controller for me!) there are one or two small tasks left to complete. Other than installing the RC gear and battery, the main last activity is cabling up the rudder, but I am going to regard this as part of the RC installation then I can hopefully test it as I go.

I had not yet added a means to transmit the thrust from the propeller to the hull. This needs to be 'deliberate' rather than leave it up to the coupling and gearbox as the gearbox is mounted on rubber and might spring too much. I elected to add a PTFE spacer between the propeller and aft mounted 'skeg'. This was a simple job that should be OK, I *think* that the skeg is sufficiently securely mounted. If it is problematic, then I could change it for a collar just where the shaft leaves the propeller shaft tube behind the step.

I have also made some deck 'ornaments', namely a pair of fuel filler caps, two eyes to fasten ropes to for mooring, and another at the bow for towing:

The fuel filler caps were bits of mahogany with stainless steel and brass inserts glued to the deck with a bit of wire through the deck to make sure they stay there. The photo shows them a little unfinished (more rubbing down of the varnish).

The pair of mooring eyes were made from stainless steel with an included pin glued through the deck, with a finishing piece of thin stainless steel as a surround (per prototype) glued and pinned around them. Piercing the stainless with a 7 x 1.5mm slot was somewhat fiddly and involved drilling holes at the ends, a cold chisel made from an old jigsaw blade to remove the slot middle and then a ground down old needle file to finish to size.

The bow towing eye is also stainless steel with pins included glued into the bow stem. There is potentially a secondary purpose for this that I have yet to make: as the photo shows, the bow is a very sharp point that just one meeting with a pondside (or anything else) would spoil, so I am considering how to make a temporary rubber fender at the bow, probably secured through the hole for 'in case' when in operation. My thoughts here include covering the bow with cling film or similar and moulding silicon rubber (bathroom sealant!) round it, but that is still under consideration.

I took the plunge and ordered a battery and associated 'support' bits. Mindful of the potential risk of mistreating these things, I got the recommended package from Overlander Batteries and it includes a charger, a battery condition meter, and a bag for safely charging them in. Reading the instructions, it is a bit more than 'plug it in and go' though. Another aspect I had not appreciated is that drawing too much from the battery is also very bad for it: that is, drawing current from it after its voltage per cell drops to 3.0 volts. I understand that the ESC has a monitor in it that prevents the battery voltage going below this, although it is recommended not to allow it to get to this level. Since the motor could use the available energy quite quickly, I will need to watch this. The battery I got is a two cell LIPO (ie 7.4 volts output nominally) with a capacity of 22.2Watt hours (3000mAHr) and a 'C' factor of 50, meaning it can provide up to 150 amps continuously until discharged, more than enough for this motor. I chose this because it is the largest capacity I could find in a compact form to fit in the space available. When I have it all linked up and working, I will try it in the bath (restrained!) and monitor the current draw to see just how long it takes to discharge it.