1919 AVRO 539b foam board model design by Alistair Potter ©2014

NOTE: design is for 5mm foam board. For other foam boards adjust slots, tabs etc. when cutting. Layout is for A1 sheet size. All sizes in mm.

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Payments through PAYPAL to alipotter@blueyonder.co.uk.

Wingspan - 840mm / 33 inches
Length (excluding prop) - 568mm / 22 1/3 inches
AUW - 960g / 33.7 ozs with a 1500mah LiPo
(Imperial sizes are approximate.)

An 11 inch prop is close to scale, though choice of prop will depend on your motor's rotation speed (Kv). The aeroplane shown is flying with an EMAX GF2215/20 1200Kv outrunner, which draws 20A with a 10 x 4.7 Slow-Fly prop. I fly with a 9x4.7 SF prop which gives plenty of get-up-and-go for the take-off. I'm guesstimating my max current draw from this 'under-propped' setup is somewhere around 15-16A. This setup gives me flight times of about 11 minutes with my 3S 1500mah battery.

The foam board used in my build is one of the heavier types. Built in lighter material, like Dollar Tree foam board, the plane should weigh much less. This will improve flight times and reduce flight speed for a more scale appearance in the air. On the plus side, a little more weight keeps the plane steadier in the wind, and even at this flying weight the plane can still fly quite slowly.

I increased the wing chord by about 10% to improve slow speed performance. Ailerons are on one wing only, which works well. I found the elevator very responsive and reduced my low-range throws to a full range of about 24mm - 12 up and 12 down. Low-range aileron throws are a little more, with a full range of about 30mm. Add about 2-3mm right rudder and right aileron for the maiden. About 2/3rds throttle will be plenty to get you flying, and you'll be pleasantly surprised how much you can back-off once it's steady in the air. For slow speed turns you'll need to use the rudder and keep the wings flatter or it'll lose height quite quickly, at higher speeds it flies bank-and-yank, though a little rudder always helps.

Most short-nose models need ballast weight and my version carries 60 grams of stick-on wheel balance weights on the nose, which could translate to extra battery weight and time in the air if you can get the CG correct with a larger capacity battery. Additional weight can be saved by using a modified Flite Test power pod (as shown). A short version will have less tail moment and require less nose weight to balance it.

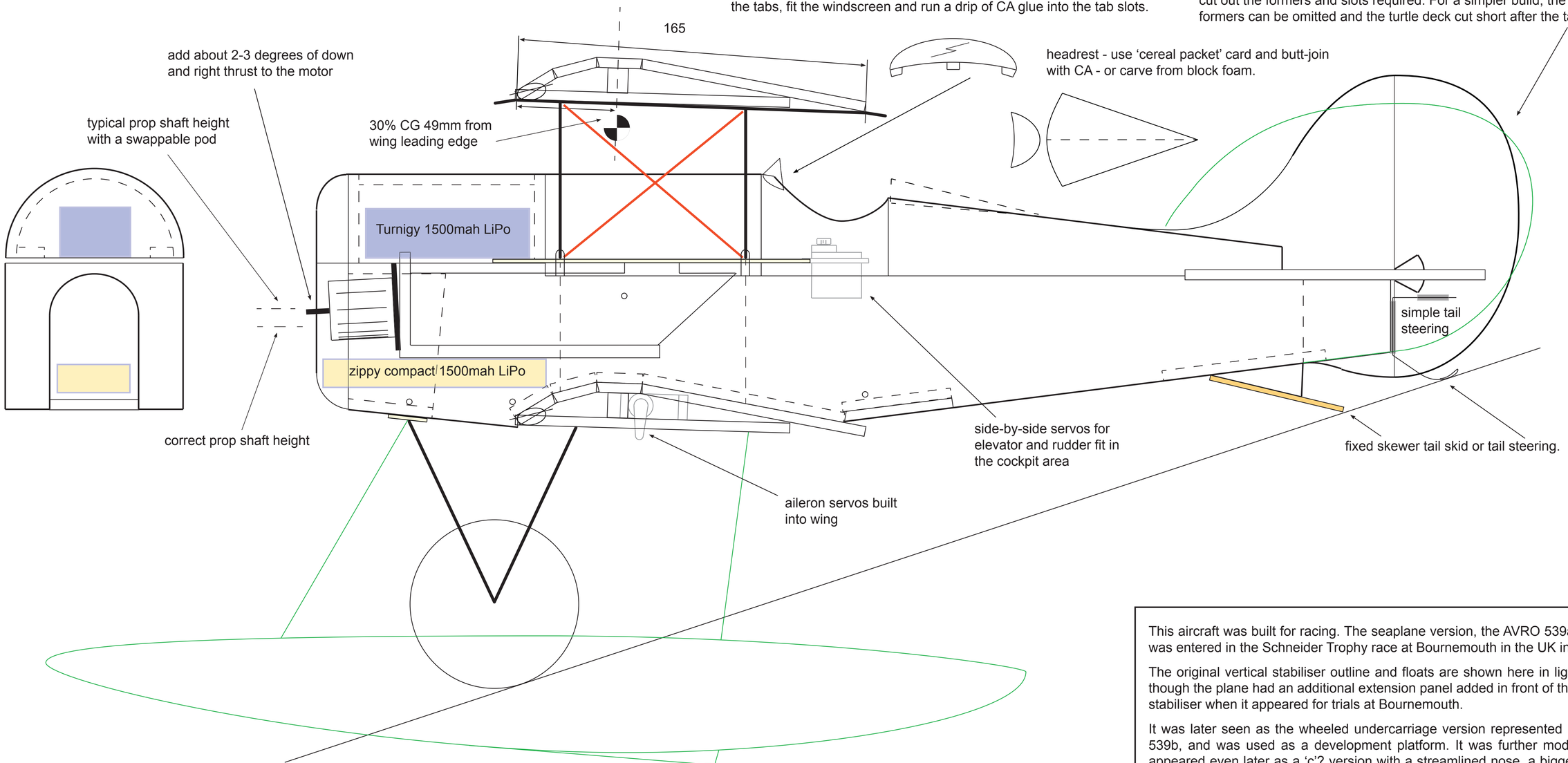
Battery space is tight! I fly with a Zippy Compact 1500mah, which is a very low profile battery, and which slips-in nicely through the nose and under the power pod. The easiest way to get more space for a fatter battery is to slim-down the power pod. On a build with similar space restrictions (Polikarpov U-2/Po-2) I made the pod shallower **and** hollow underneath. Another possibility is to make the nose section of turtle deck removable (I'd include the top of the radiator too) and fit the battery under the nose. I've shown a fatter 1500 mah Turnigy battery in the front compartment, but it should be possible to hollow out the next along turtle deck former and fit a longer battery.

If you do use this option, you could drop the power pod or motor to get the prop shaft in the correct scale position, though flying with a scale 11 inch prop and the correct prop shaft height will bring the prop very close to the ground; fine for tarmac or dirt, but no good in grass.

A scale wheel is 85mm. My wheel spokes are filled-in using foam board - see my technique on the Flite Test website: "Olde-Style Wheels for Olde-Style planes". My tail steering is a skid, but could easily be a wheel - see my design for both on the Flite Test website: "Simple Tail Steering". Or you can just fit the fixed skewer skid.

I've provided a flat panel to help finish the nose but you may wish to add more detail. My radiator is carved from a polystyrene block coated with dilute PVA glue to allow painting without it 'melting'.

Templates for 539a and 539b type tails are provided. These match with two different turtle deck formers marked a and b. These fit in different slots in the box fuselage, which are also marked a and b. Choose which tail you want and only cut out the formers and slots required. For a simpler build, the last pair of small formers can be omitted and the turtle deck cut short after the tail centring former.

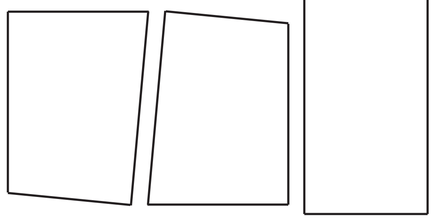


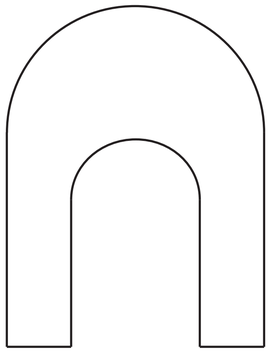
This aircraft was built for racing. The seaplane version, the AVRO 539a/Falcon, was entered in the Schneider Trophy race at Bournemouth in the UK in 1919.

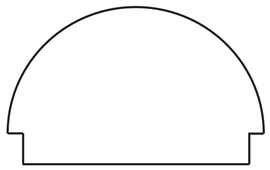
The original vertical stabiliser outline and floats are shown here in light green, though the plane had an additional extension panel added in front of the vertical stabiliser when it appeared for trials at Bournemouth.

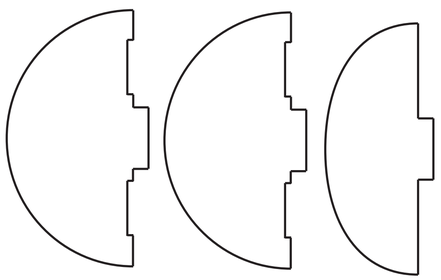
It was later seen as the wheeled undercarriage version represented here, the 539b, and was used as a development platform. It was further modified and appeared even later as a 'c'? version with a streamlined nose, a bigger engine and a modified cabane arrangement.

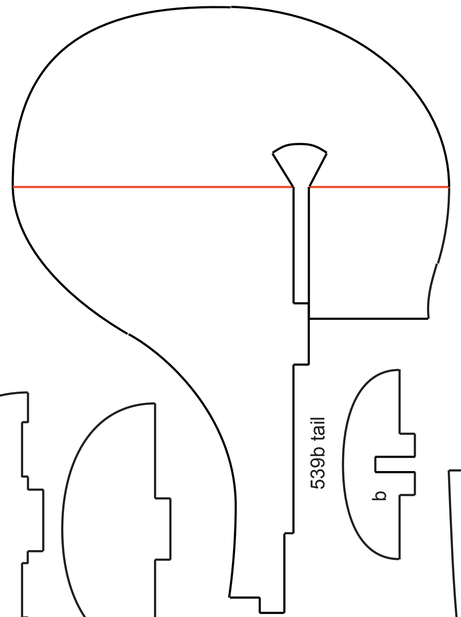
side cheeks and
bottom plate for front
undercarriage mount







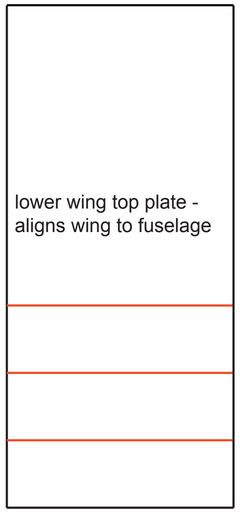




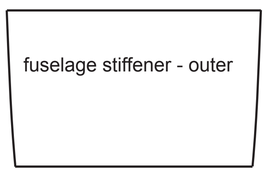
539b tail

b

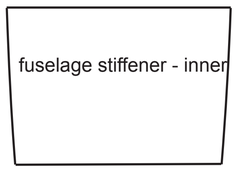
optional formers



lower wing top plate -
aligns wing to fuselage

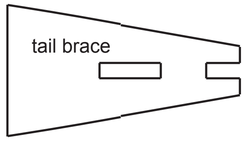


fuselage stiffener - outer



fuselage stiffener - inner

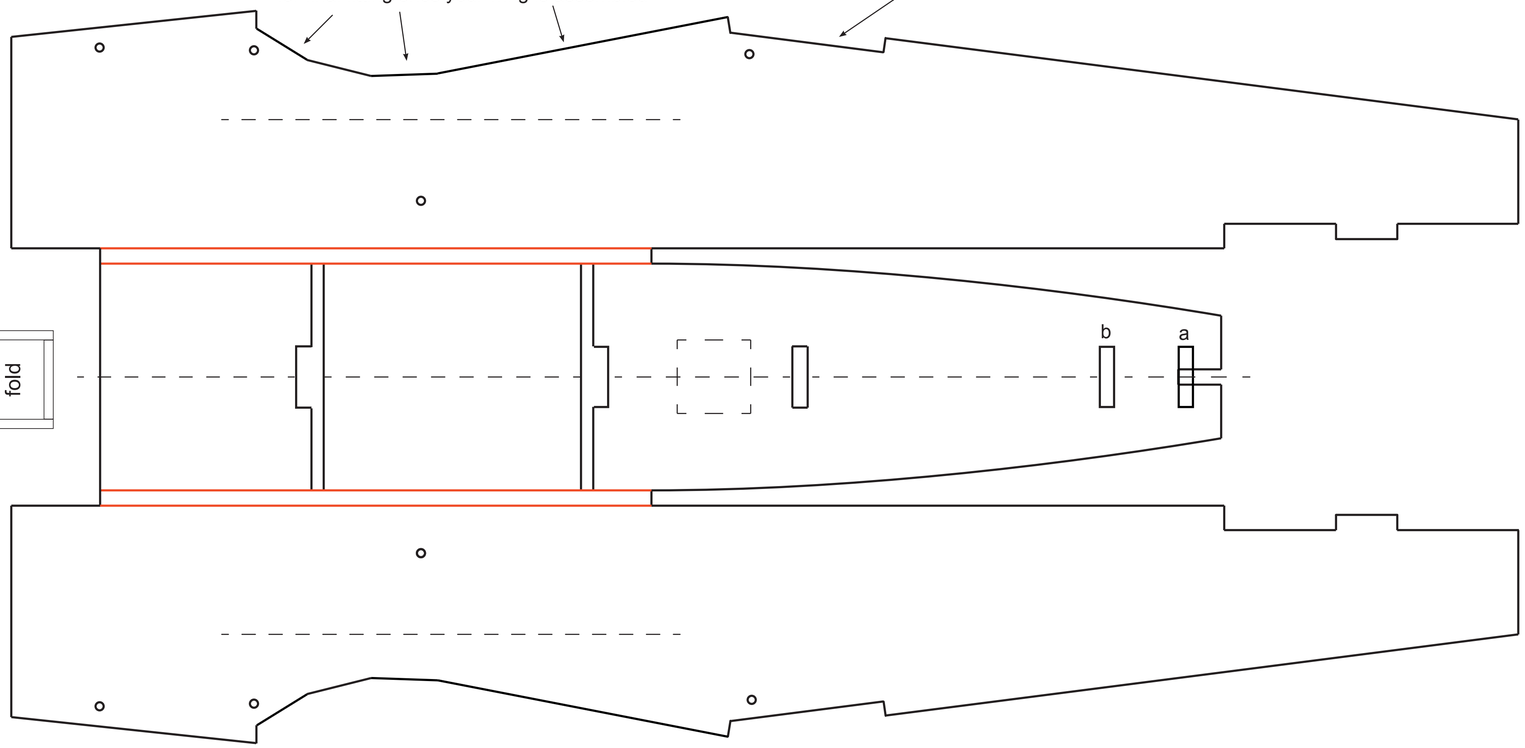
tail skid
(shown with skewer in place)

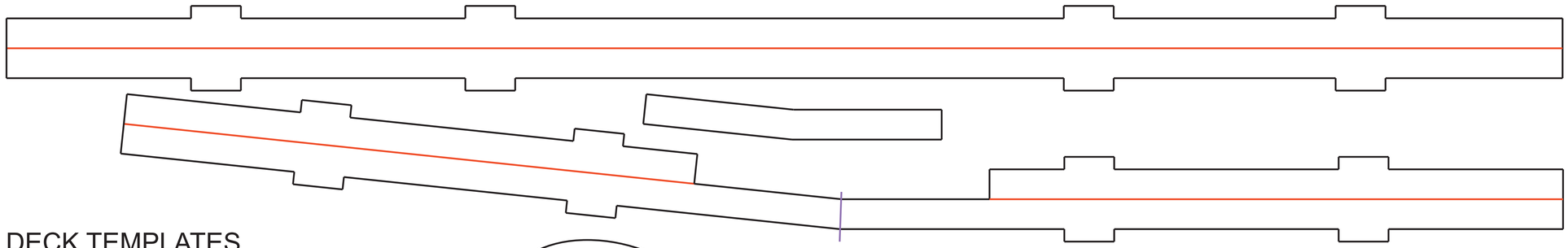


tail brace

wing profiles vary - leave a little spare material
for final fitting once your wing is assembled

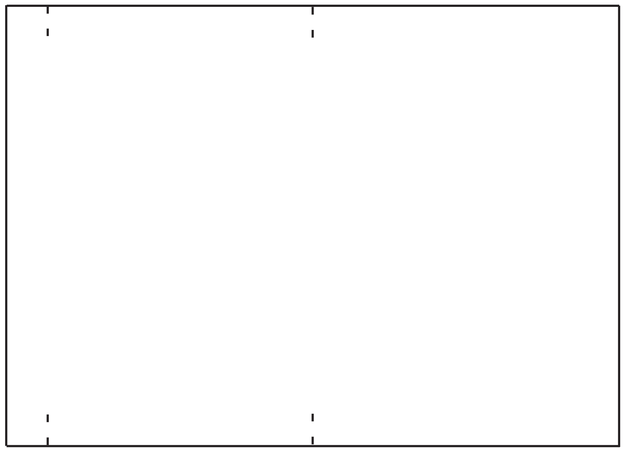
fuselage stiffeners go here

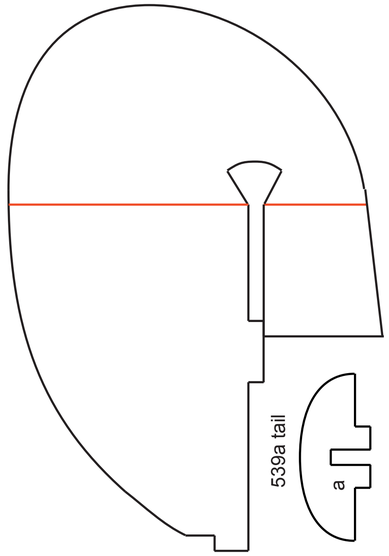


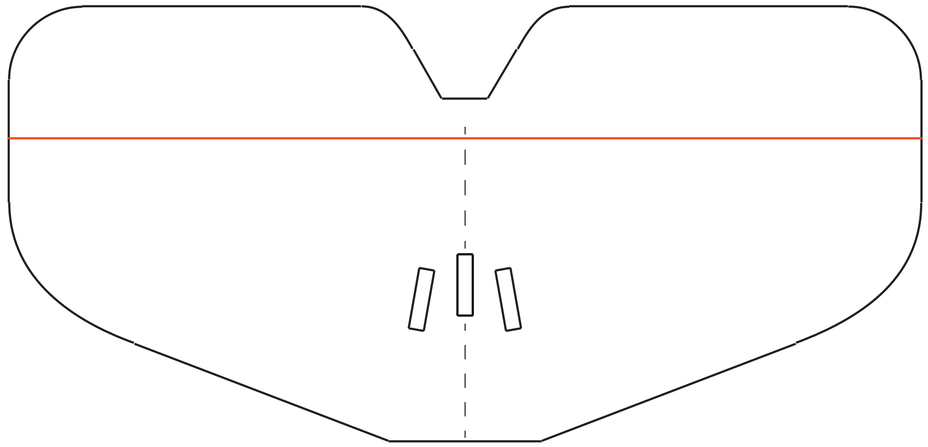


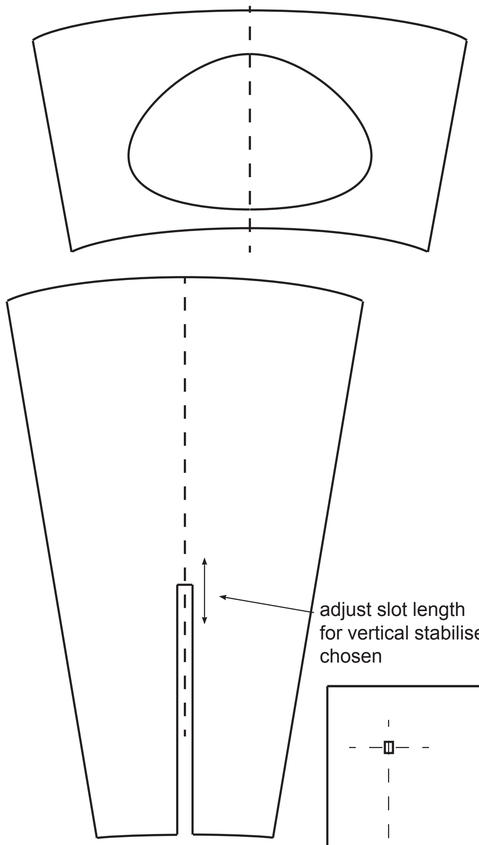
TURTLE DECK TEMPLATES

(oversize - will need trimming as they are fitted)

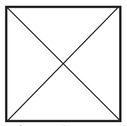




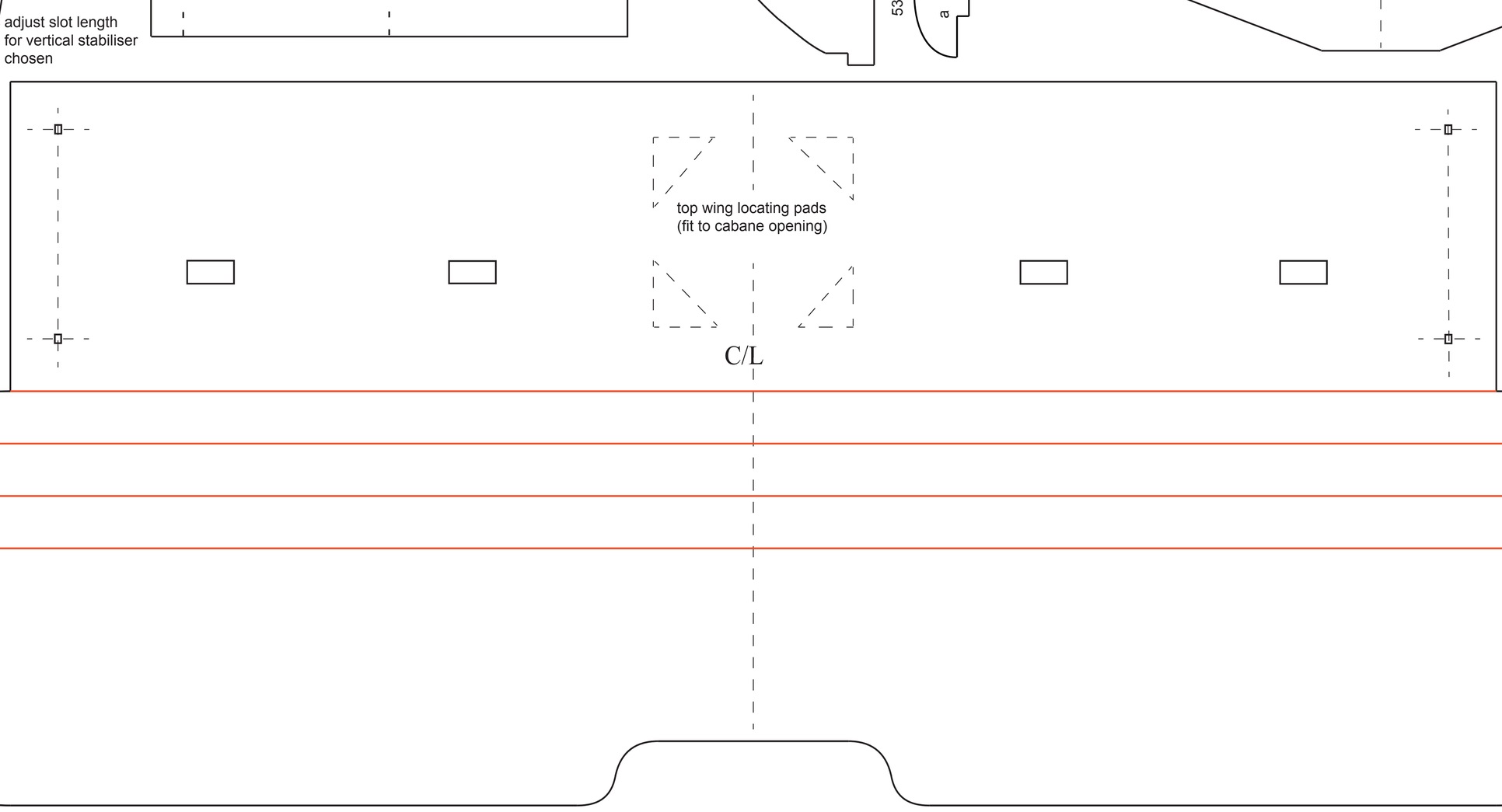




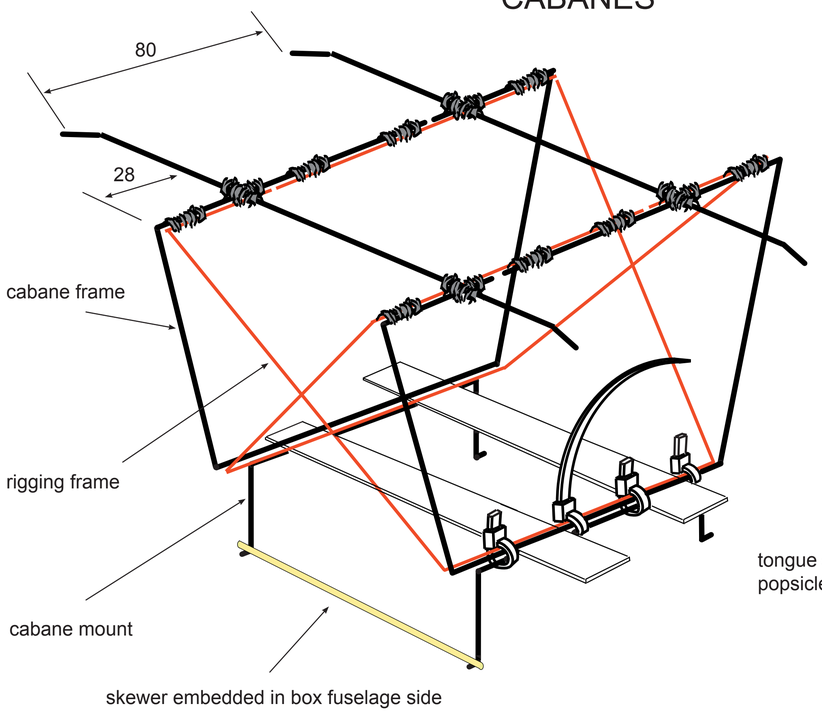
adjust slot length
for vertical stabiliser
chosen

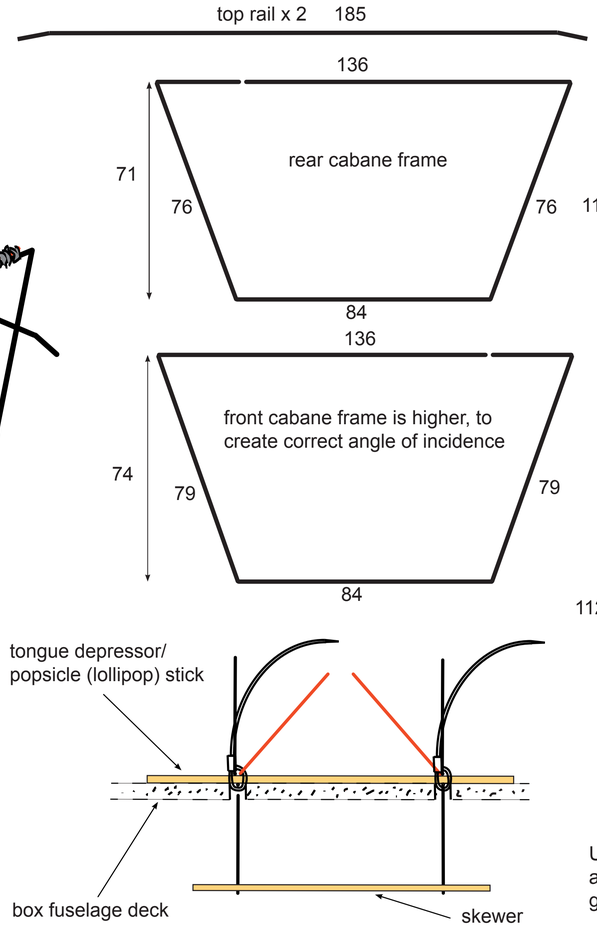


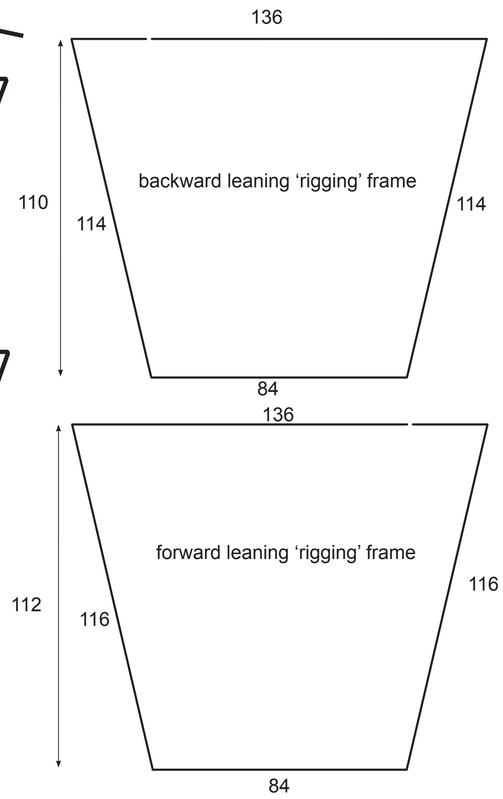
top wing locating pads - cut in 4
and fit to cabane opening when
wing is correctly aligned



CABANES

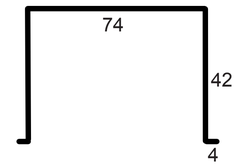






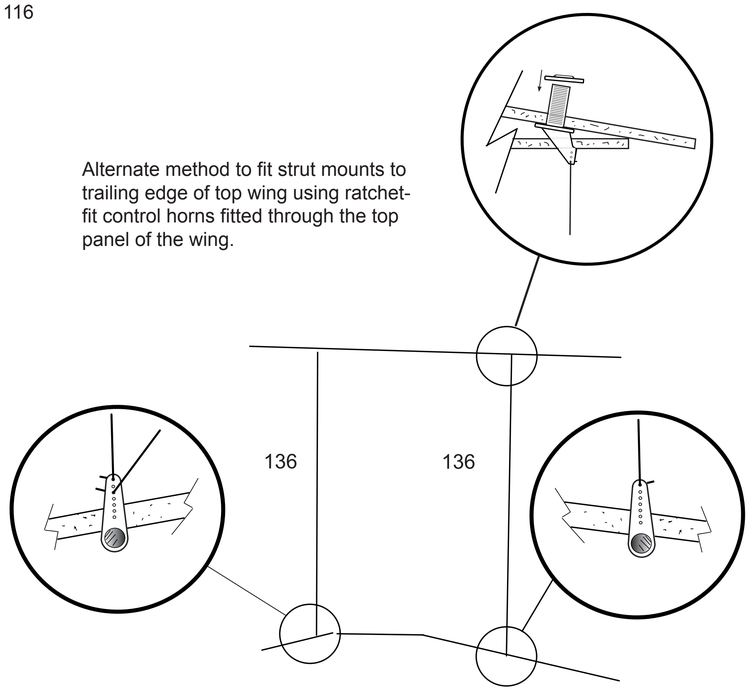
Use 2.3mm wire for the main cabane frames, and about 1.5mm for the 'rigging' frames. Put all the gaps in the frames about 40mm from the corners.

CABANE MOUNTS



cabane mount x 2
(sizes given for guidance, but fit to fuselage width and skewer position)

INTERPLANE STRUTS



Alternate method to fit strut mounts to trailing edge of top wing using ratchet-fit control horns fitted through the top panel of the wing.

These wires maintain the wing spacing, but will also share load between the wings. You could fit a third wire to create triangulation, which would help stabilise the wing geometry, but because the wings sit directly one above the other I found they are stable enough with just the two wires. You can 'bulk-up' the wires by folding PVC tape over them to create the impression of timber struts.

Use fine piano wire, around 1mm, for the struts and spare servo arms with a short length of BBQ skewer through the mounting hole as attachment points.

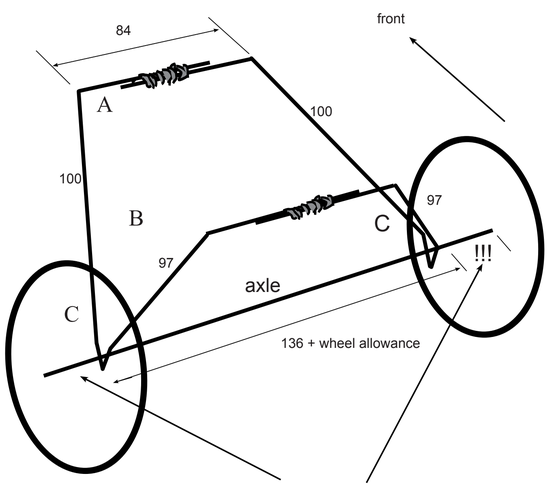
As you fit the mounts on the bottom wing tilt both servo arms slightly towards the centre of the wing. When the wing is folded-up these will then point straight up.

On the top wing point the servo arm mounts straight down.

Sizes shown are very approximate and will depend on the fittings in the wings. Just the same as fitting control rods, you have to make them up to size. Make them in pairs left and right. Do not make them a 'tight' fit as this will distort the wings, bending the top wing down and the bottom wing up.

For ease of assembly/dissasembly, use a modified z-bend at one end and a right-angle bend and a swing-in keeper at the other end.

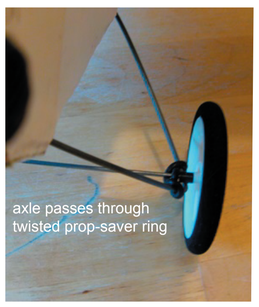
UNDERCARRIAGE



Use a 2mm wire for the undercarriage. Depending on the width of wheel used, allow extra at each end of the axle for the wheel and a collet or glue blob. An 85mm wheel is scale. The axle is held in place by a twisted O-ring (prop-saver ring), which also provides a little suspension.

Kink the last 15mm of the undercarriage wire at the sharp corner 'C' to make it vertical and stop the 'pointy bit' catching in any wheel spokes.

The frame can be assembled from two 'sides' as shown, or if you have a long-enough wire, from a single piece with only one join. You'll need about 650mm in length for this.



Tongue depressors protect the foam board from the pressure of the wire. Skewers provide for attachment using elastics at the front and cable ties through the wing at the back. However, I just loop the wing elastic around the back and rely on the front elastic to hold the frame in the right place. A little give in the undercarriage is no bad thing if your landings are a bit heavy.