

## Building Composite Centering Rings

Centering rings are a good candidate to take some weight out of the tail. A 7.5" -> 98mm Giant Leap ring weighs about 160g. There are four centering rings for this build.

1 - Aft ring - this has an Aeropac flange retainer and because it needs the screw insets I won't use composite for that. I will however put two layers of carbon on it because I can 😊

2 - The next two rings working forward are positioned on either side of the fin tab. These will be composite.

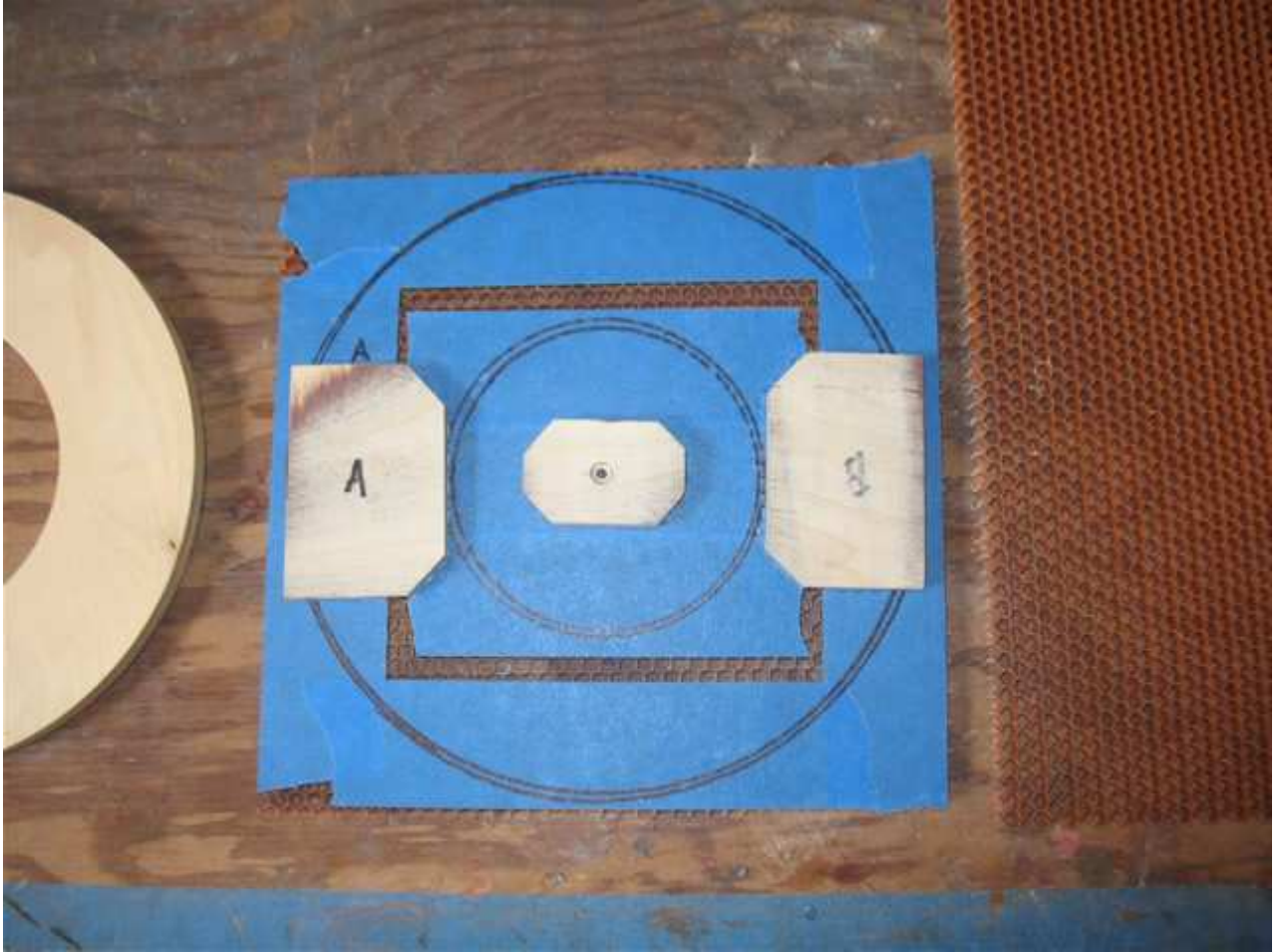
3 - The forward ring will also accommodate two U-bolts, one on either side of the ring and will be composite. But I will use birch-ply hardpoints inlaid where the U-bolts are positioned to add extra strength and make it more crush resistant. That way the U-bolt can be cinched down.

All these composite lay-ups will use 0.3" Aramid (Kevlar is made of this) honeycomb core with 8 layers of 5.9oz / 3K carbon twill. with 4 layers on each side. All are wetted down with Fiberglast system 2000 epoxy with peel-ply and breather on the outside for vacuum bagging. Then they are put into a bag and a 60cm vacuum is drawn. They are also pressed to assure they are perfectly flat. Simple - hu!

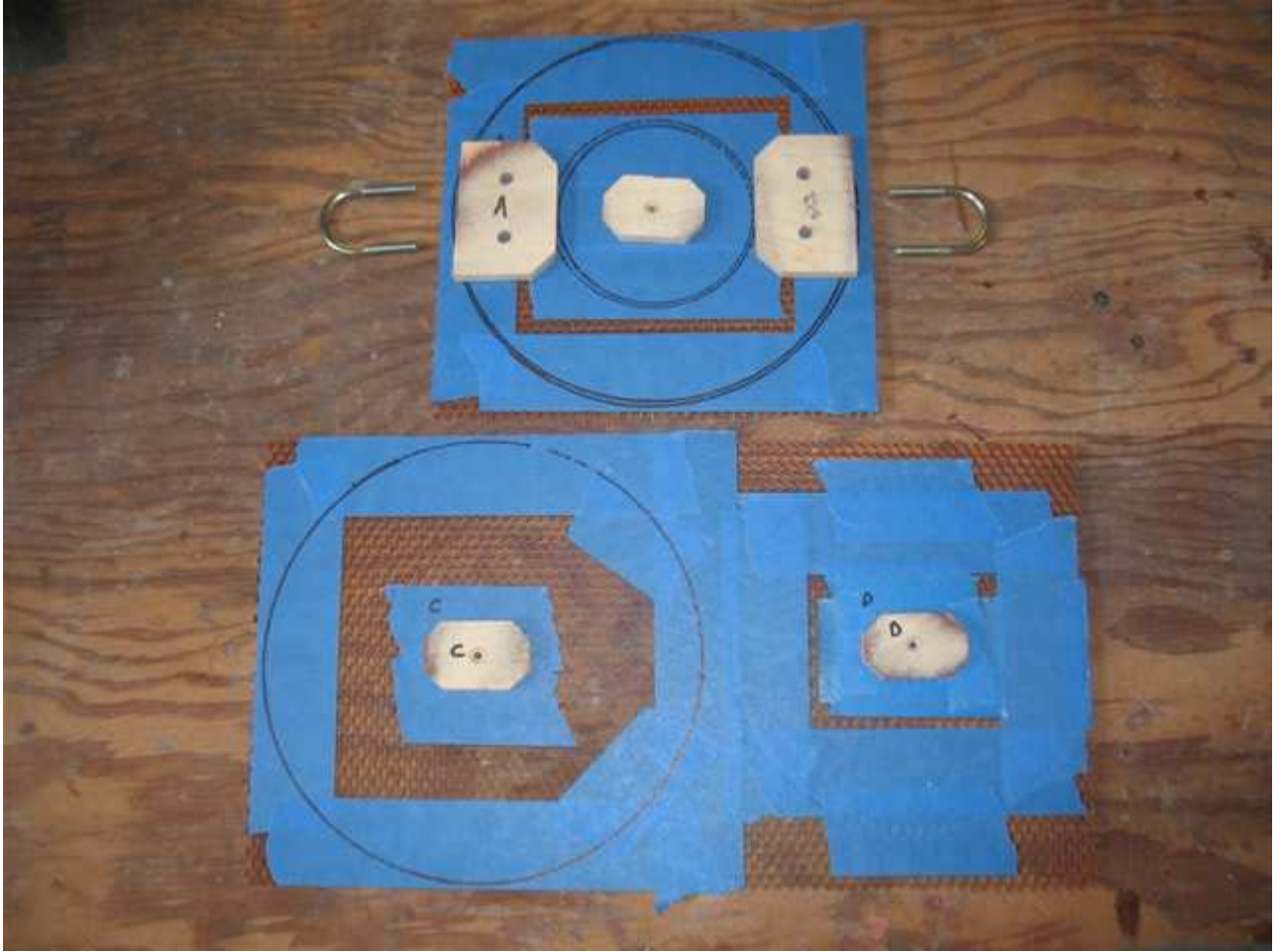
On to the pictorial...



This shows the original forward ring, the original honeycomb stock on the right, and a square of it in the center. The cut stock is taped where it's going to be trimmed, there is no way to mark on honeycomb in any way you can see so taping it works well. Also taping holds it more firm for cutting. Above this are the three hard points for the for ring. The two left and right are for the U-bolt connections. The middle is used only to reinforce the hole for the table router pivot pin.

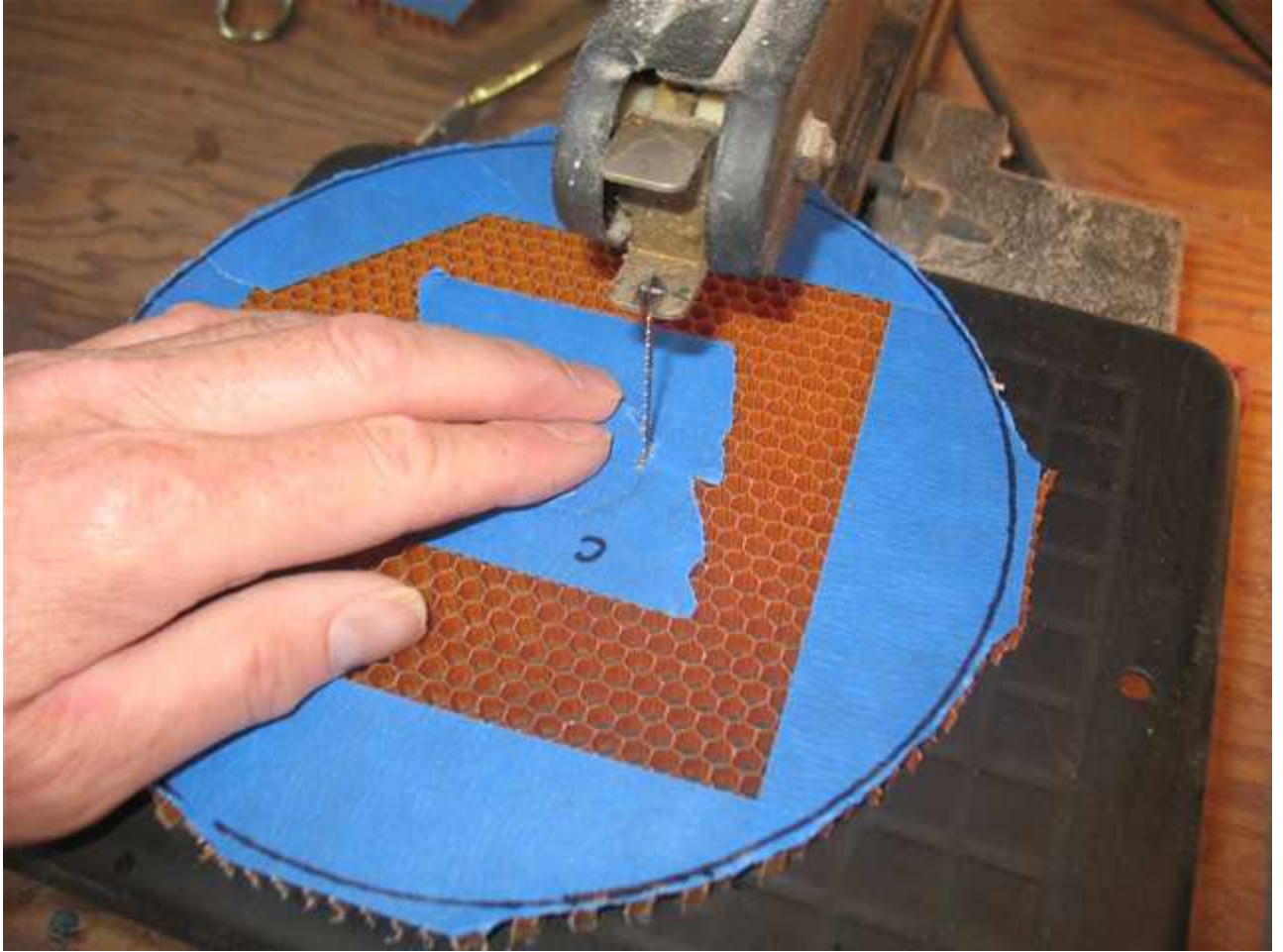


The position of the hard points is marked.

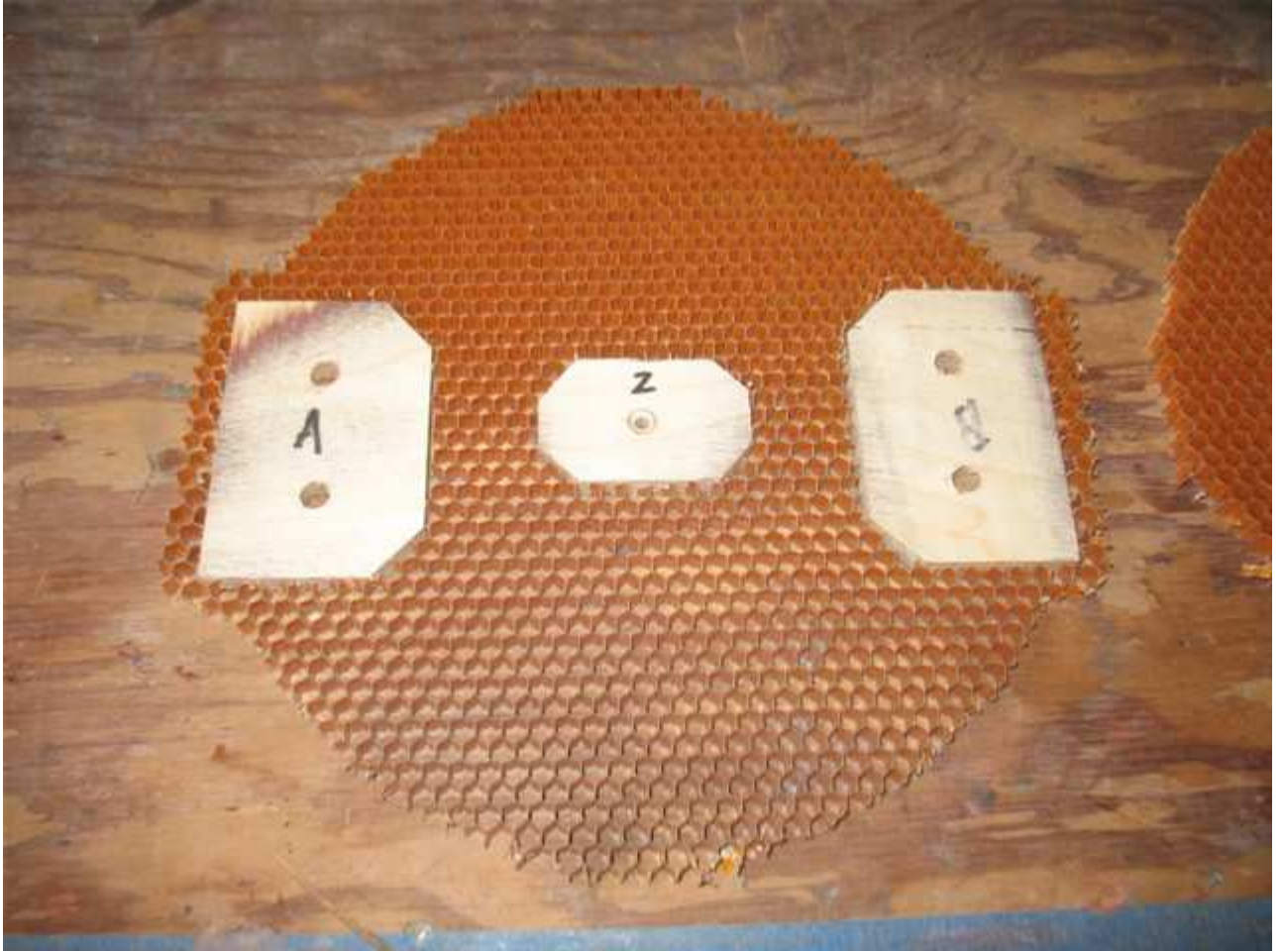


The other two rings are cut, tapes and marked. The lower two are the rings that flank the fin tabs. Note where the u-bolts will go.





The stock is now cut. The outer edge is rough cut to assure it stays larger than the final ring size. The hard-point areas are cut out. The rings will be final trimmed on a router table using a carbide bit.



The hardpoints are in-set into the honeycomb.



This shows the middle rings that flank the fin tab. Note the right one is smaller to accommodate the boat tail.





This shows all rings for to aft plus the AeroPac retainer. Now to vacuum bag! Be sure to remove all the tape.





Here is the lay-up in the bag. Sorry, no pics or cutting, I forgot...



Times up, the layup is pulled from the bag, looking good. Humm - not looking very ring like.

continued...

## Building Composite Centering Rings - Continued



Now the peel-ply comes up. Ain't they a beauty! These are rough-cut using a Dremel carbide cutting wheel. Don't even bother cutting Carbon without carbide, you won't get far. The aft ring is shown at the top.



Here is where the center hard point comes in. The center hole is drilled out and acts as a pivot for my table router. I made a simple jig that holds a 1/8" pin that drops into the hole. I set the size, clamp the overhead piece, and cut away the flashing.





Next I take the cut disk and trim the honeycomb on the edge. To finish the edge I mix up some 20min System 2000 epoxy with micro-balloons and lay it into the edges. I then tape over the edged to keep it in place while it sets. I thought about using my Aeropoxy light – but it is so light and airy that it's not as strong as this mix.



To add further amusement I used a balloon for apply pressure to the inside epoxy and force it into the edge. This looks like a model or an exploding star picture I saw from the Hubble.



Here is the final front ring ready to go! It weighs just 86g, 50% less than the original.

Overall I think I will save about 9 oz by replacing birch rings with composite. But it is a lot of work! But hey, keeps me out'a trouble.

There strong to. I put a ring between two blocks and stood on it - minimal flexing. And let's just say I weigh more than I would like to, we'll leave it at that.

Next up - AV-bay construction and composite end caps.