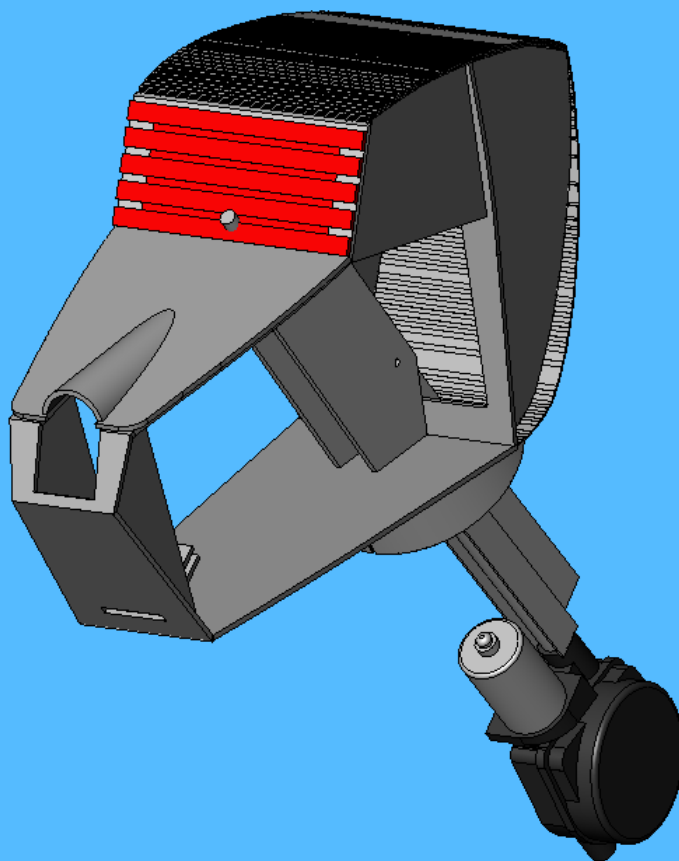
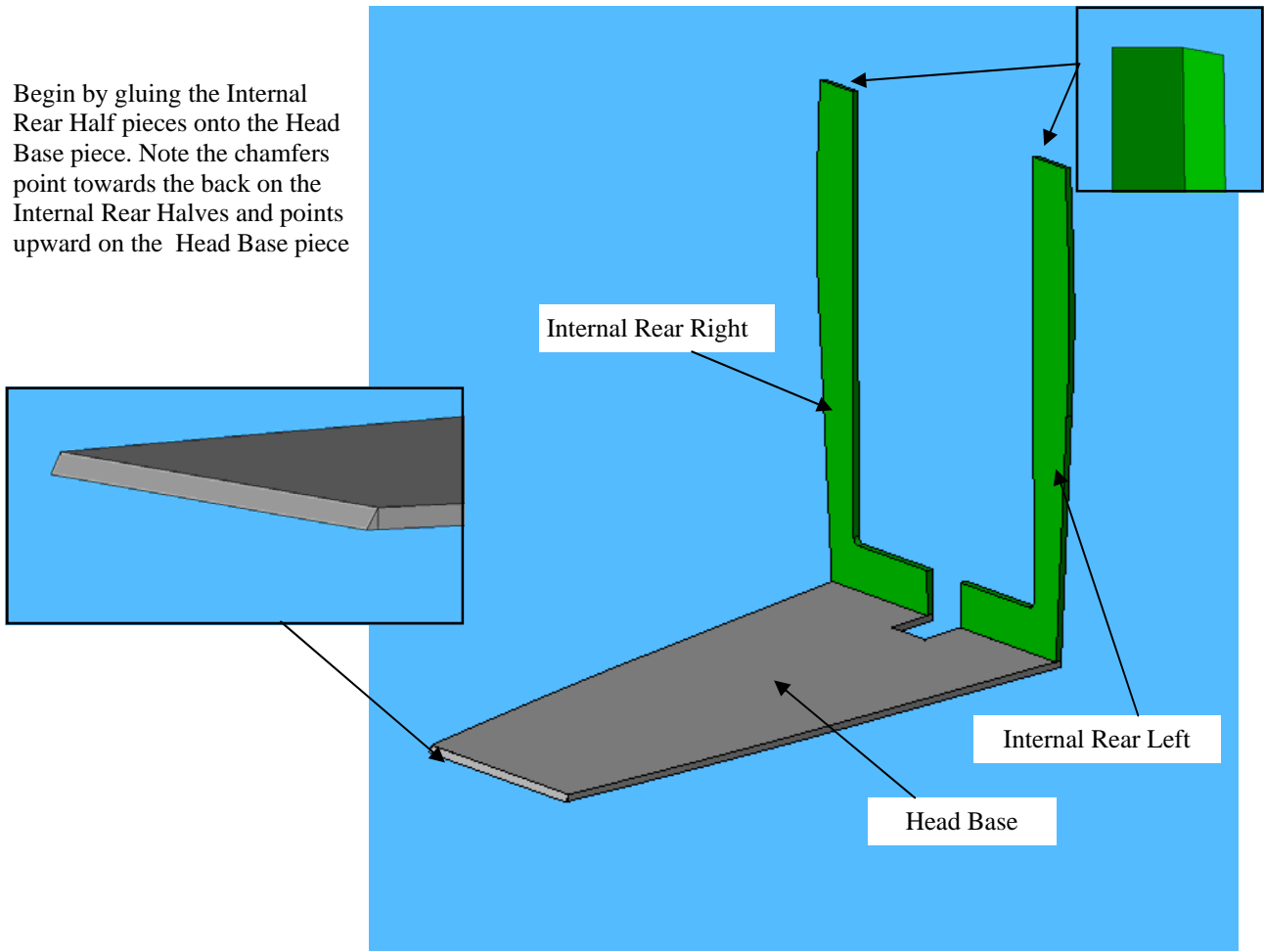


K9 Head Construction

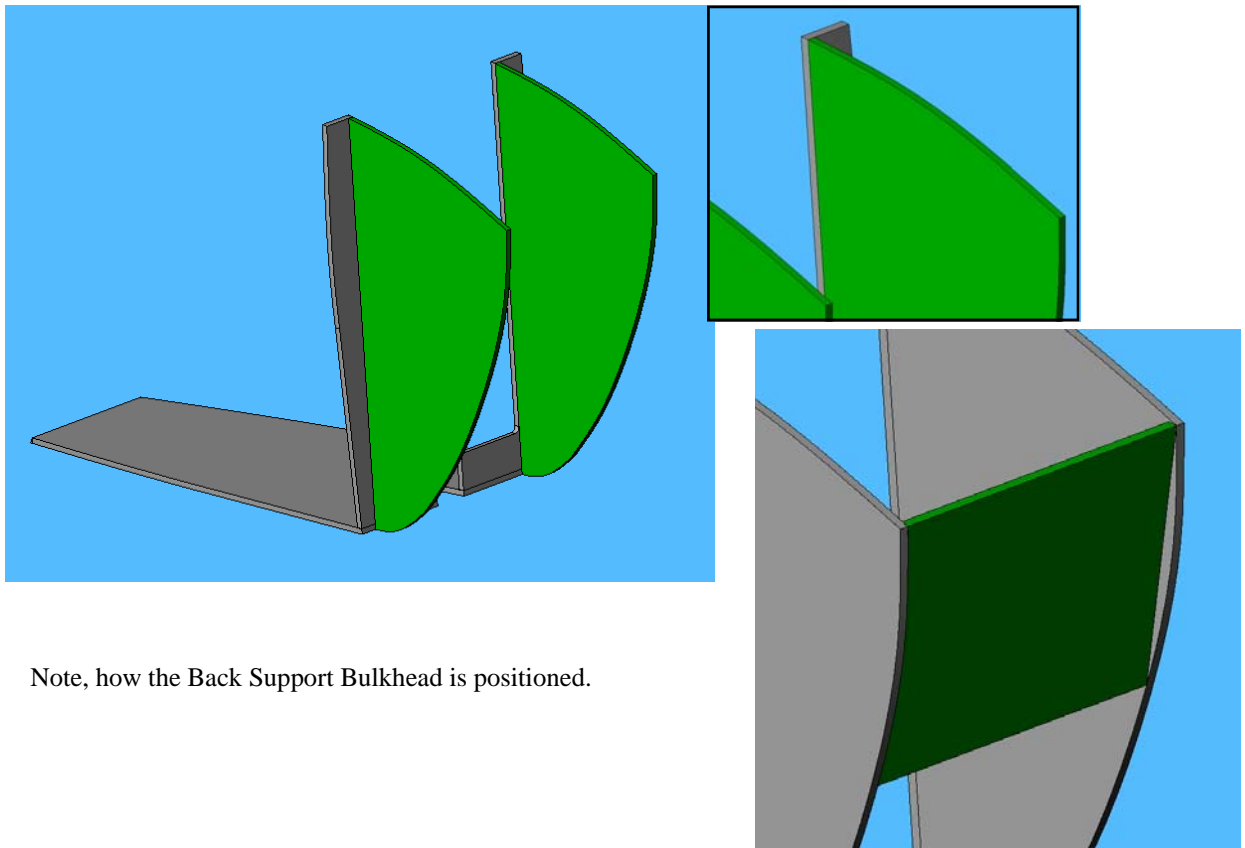


Dave Everett
Not for Commercial Use
2010

Begin by gluing the Internal Rear Half pieces onto the Head Base piece. Note the chamfers point towards the back on the Internal Rear Halves and points upward on the Head Base piece

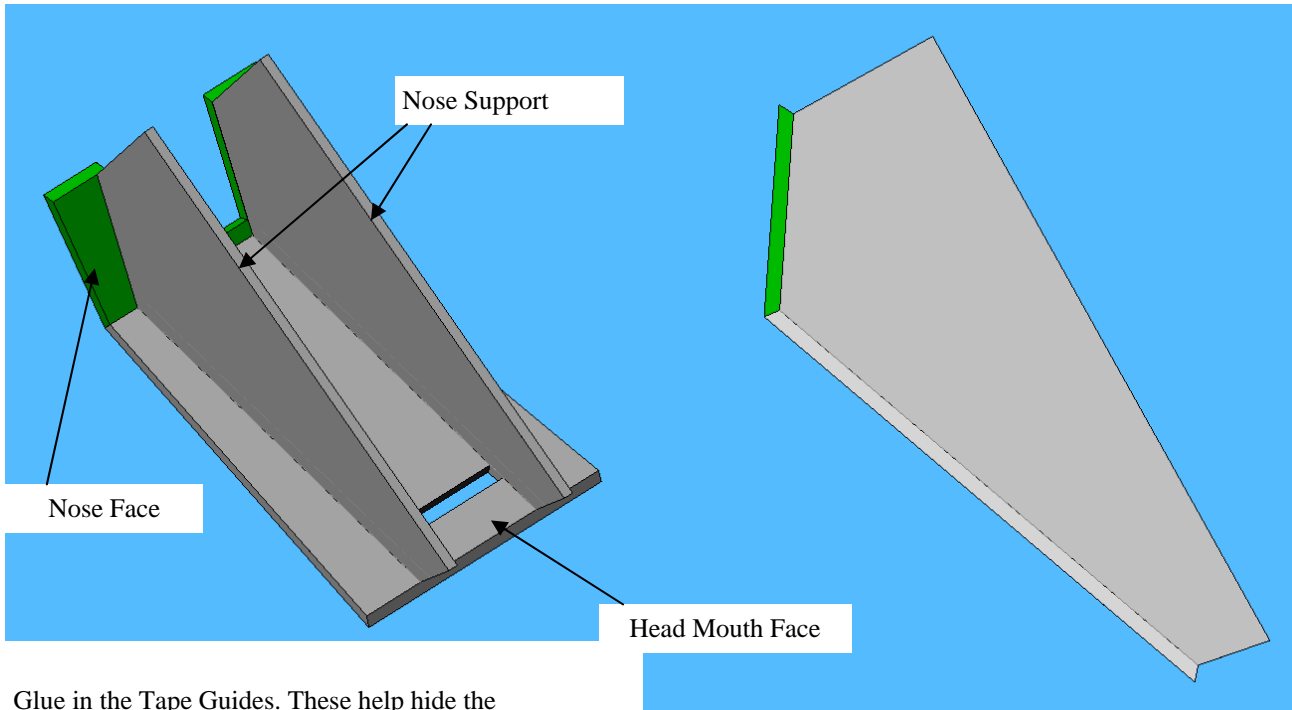


Now glue on the Rear Supports. They sit flush against the straight edge of the Internal Rear pieces. Then glue in the Back Support Bulkhead.

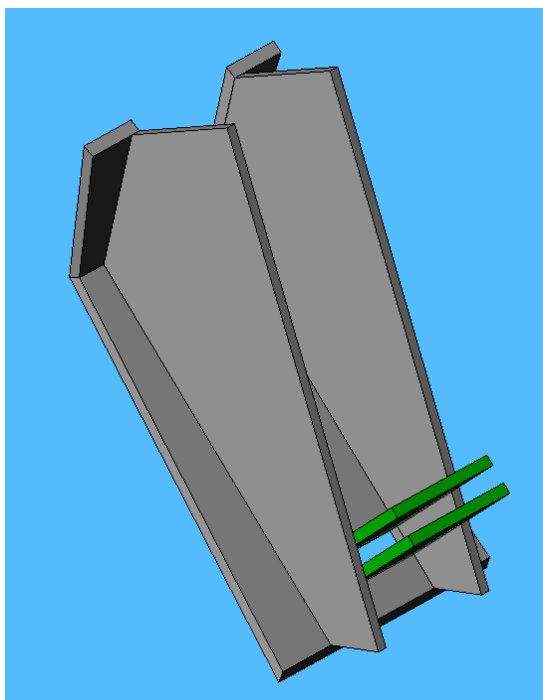


Note, how the Back Support Bulkhead is positioned.

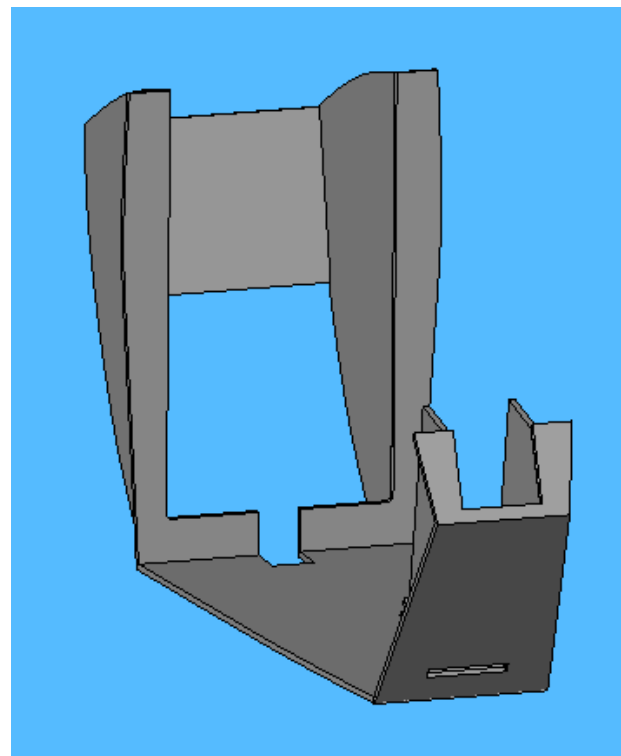
Now assemble the Front section of the Head frame. Glue the Nose Support pieces along the alignment marks on the Head Mouth Face. Pay attention to the chamfer alignment.



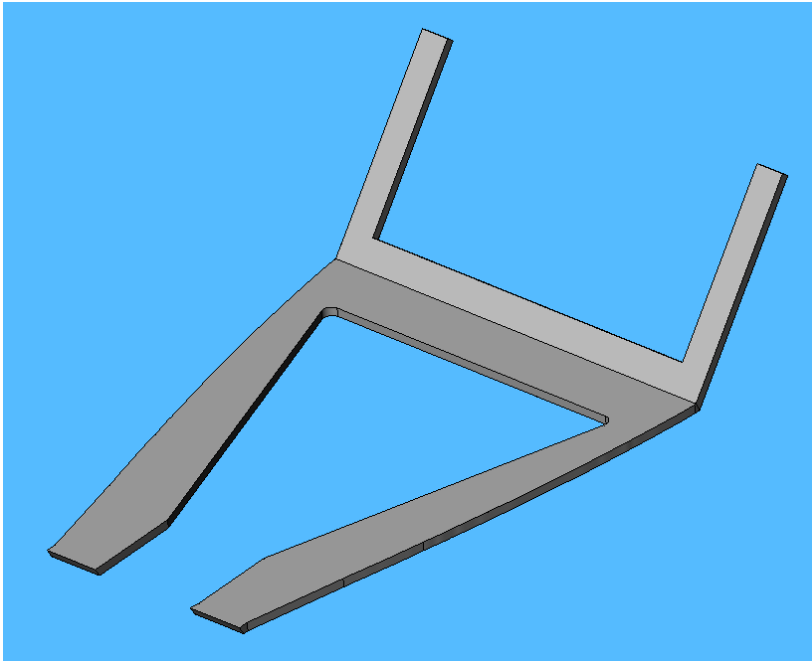
Glue in the Tape Guides. These help hide the insides and also guide the tickertape tongue if you decide to install one



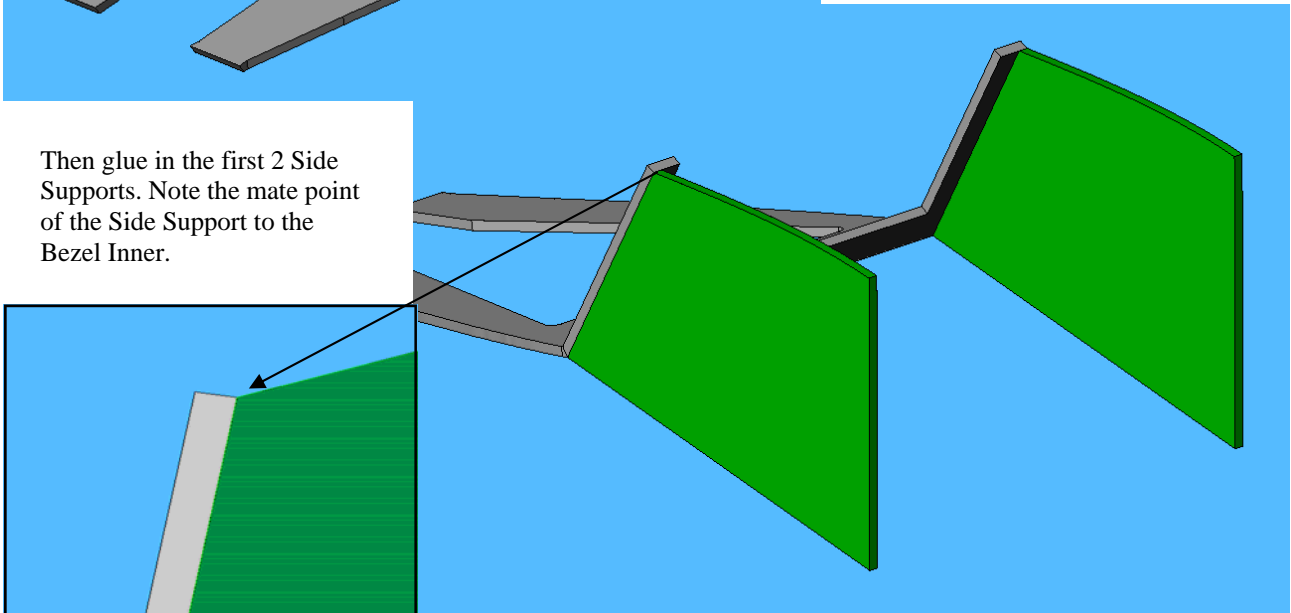
Glue this whole assembly onto the Base Plate



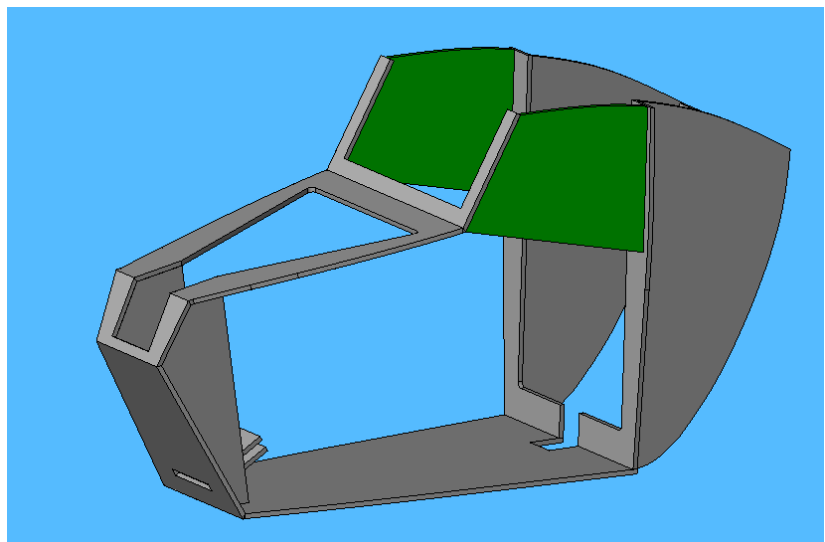
Glue together the Head Gun Inner Face and Bezel Inner.



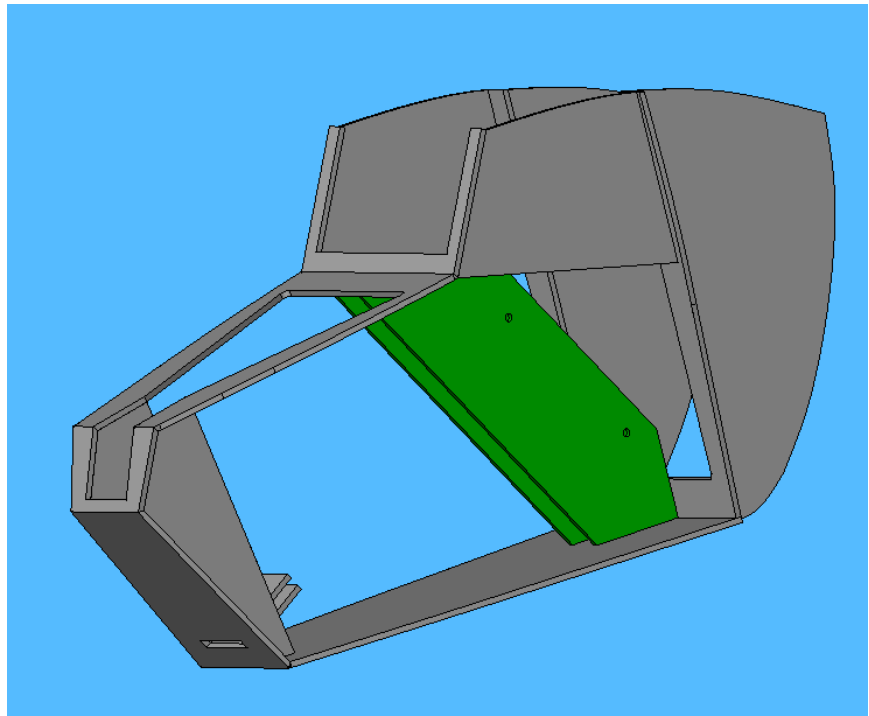
Then glue in the first 2 Side Supports. Note the mate point of the Side Support to the Bezel Inner.



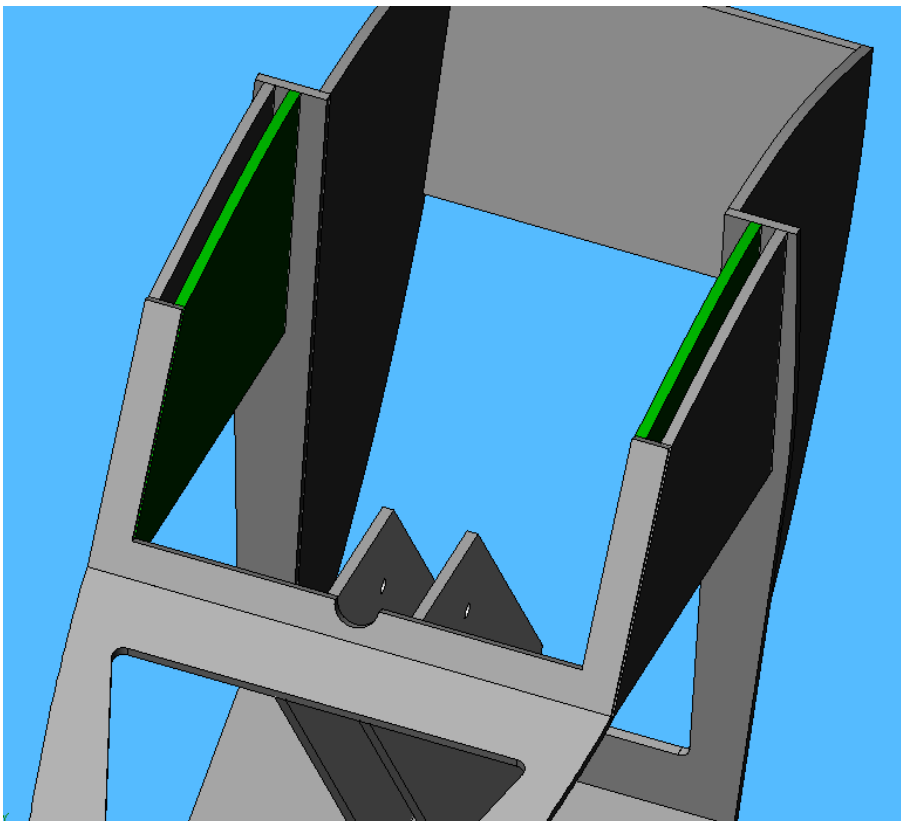
Glue This section to the lower section.

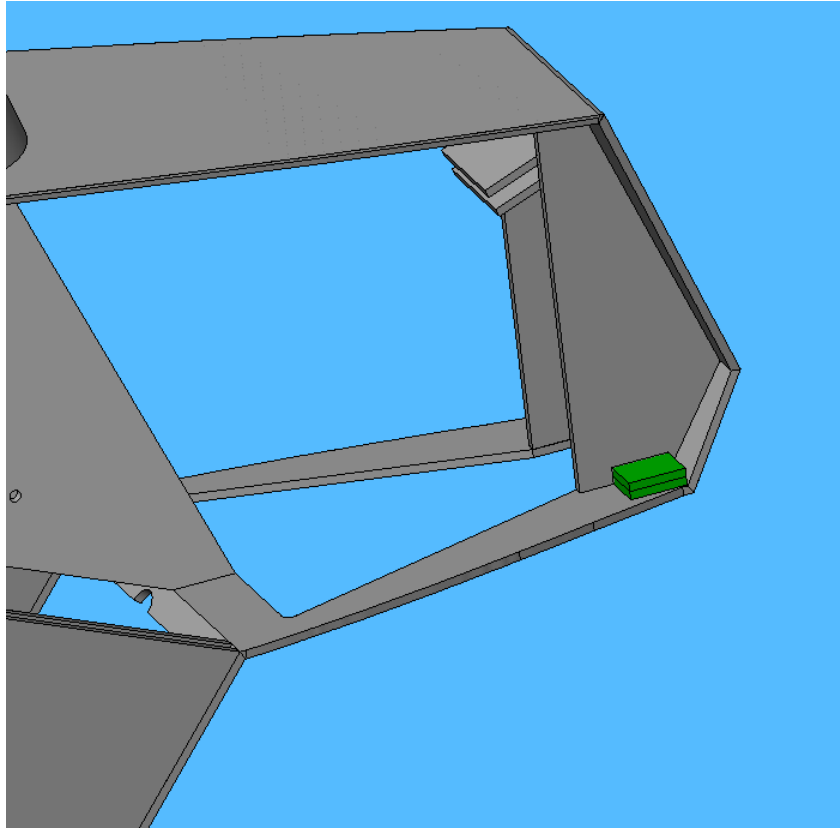


Now install the Antenna Support pieces. These should align with the cutout in the base plate and with the alignment marks on the Head Gun Inner Face



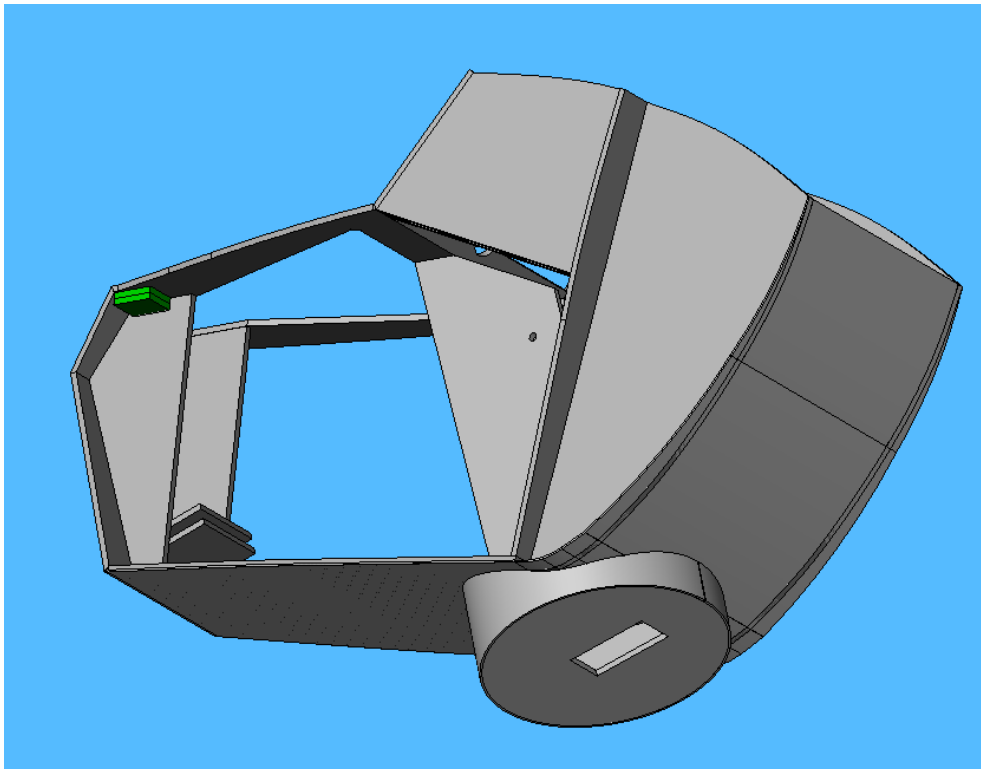
Glue in the remaining 2 Side Support pieces so they are flush against the cutout in the Inner Bezel.





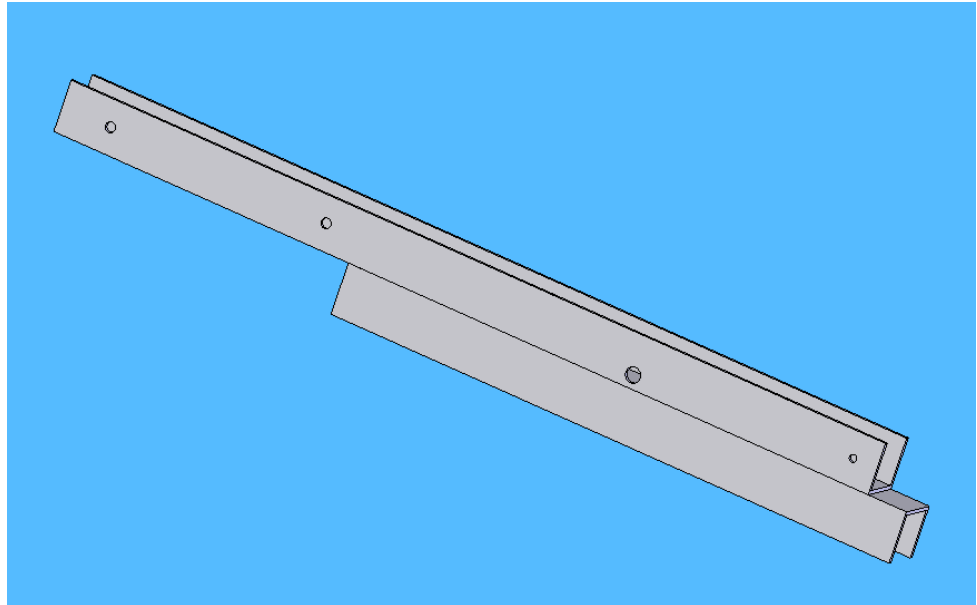
Cut 4 pieces of 3mm styrene from scrap, each piece should be about 15mm x 30mm

Glue 2 together to form 2 6mm thicknesses, then turn the head frame over and glue the 2 assemblies into place up under the Head Gun Inner Face. These will be tapped later on to screw down the top part of the head.

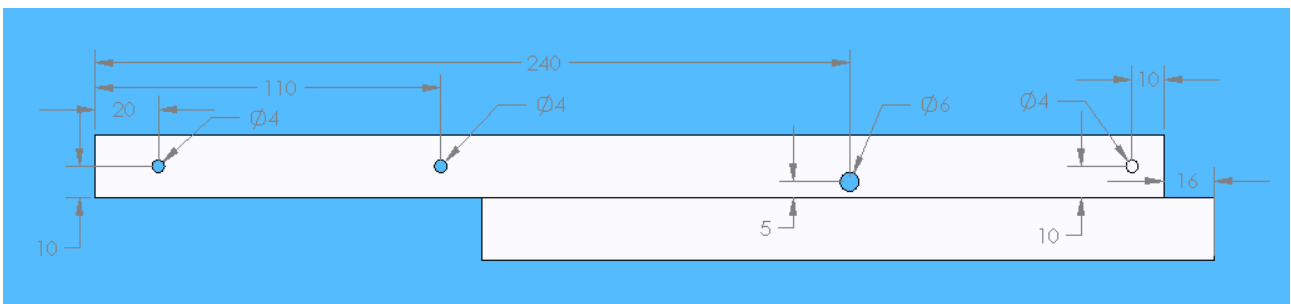


Now you need to assemble the Aluminium channel pieces which form the neck mechanism and hold the antenna for the sensor.

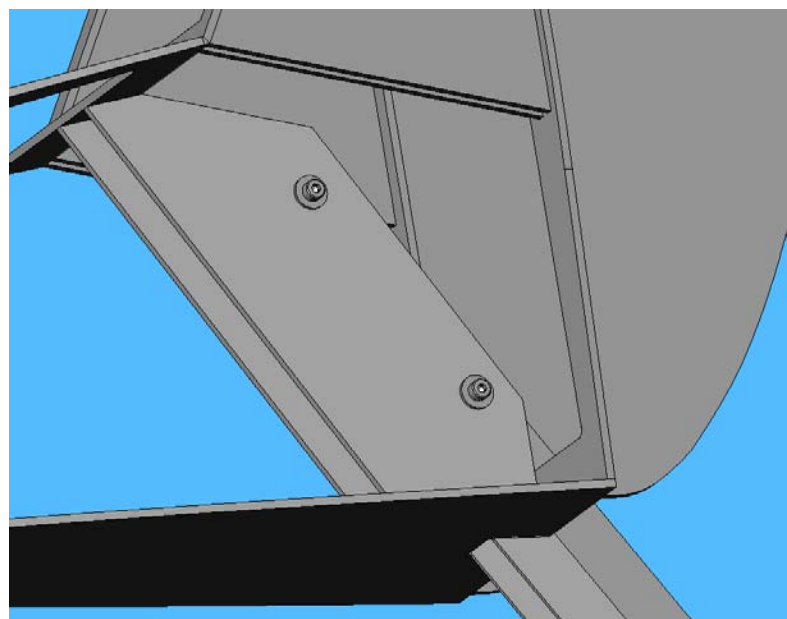
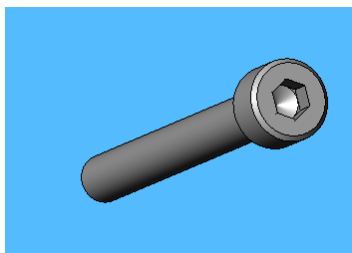
You'll need 2 pieces of aluminium channel. The dimensions of the channel are 20x20x1.5mm. One piece should be 233mm long, the other 340mm long. The two pieces are screwed together back to back and the shorter piece should be set 16mm away from the end of the long one. Make sure you use countersunk screws. The countersink should be in the short piece so the screws do not interfere with the antenna when we install it. I think 3 screws are sufficient.



The dimensional positions for the holes in the long piece are shown below, also the size of the holes is marked. All holes drill all the way through the channel section. Get them accurate or this piece will not bolt into the head properly.

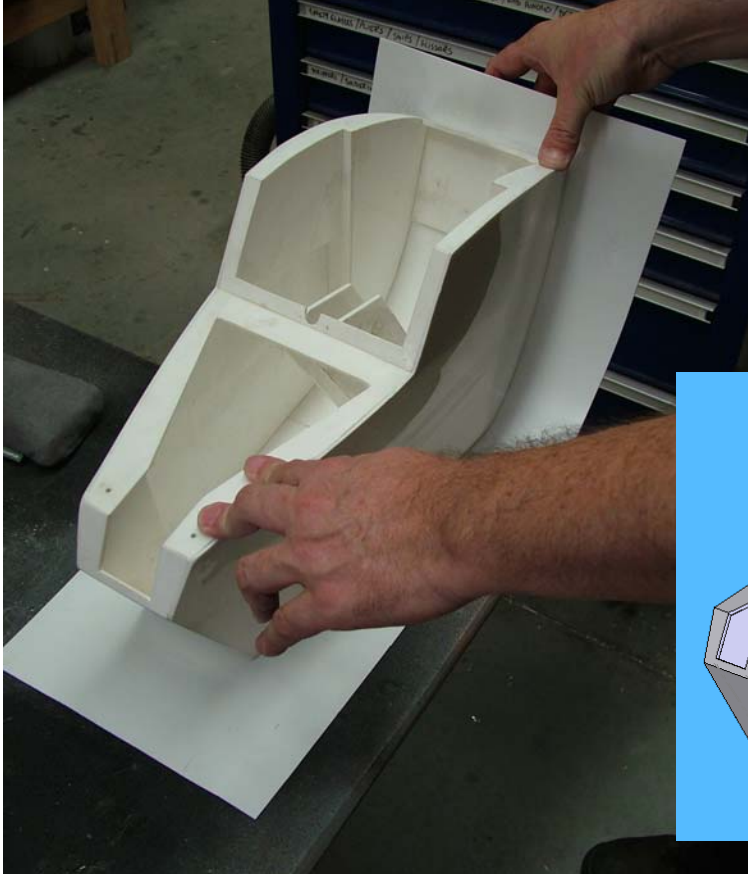


The aluminium neck assembly is attached to the head using 2 M4 socket cap screws of 35mm length. Make sure you use washers on both the head and nut sides to protect the styrene from damage. Test fit the pieces together at this stage.



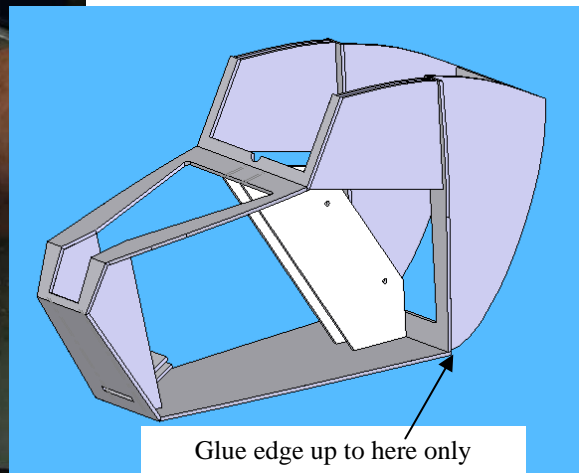
Now it's time to skin the main section of the head. There are no drawings for this as it's a matter of gluing 1mm sheets on and trimming them to the exact size of the skeleton you have made. The only tricky bit is the piece that goes around the back side of the head, you will need to take your time on that piece.

So let's start with it as it is. The photos that follow show the process using my already skinned head. I could not take photos while I did it as I had no one available to take the shots. The following pics were taken during one of our Wednesday night builds at the club workshop.



Start by cutting a piece of 1mm styrene large enough to cover the bottom and the back of the head frame.

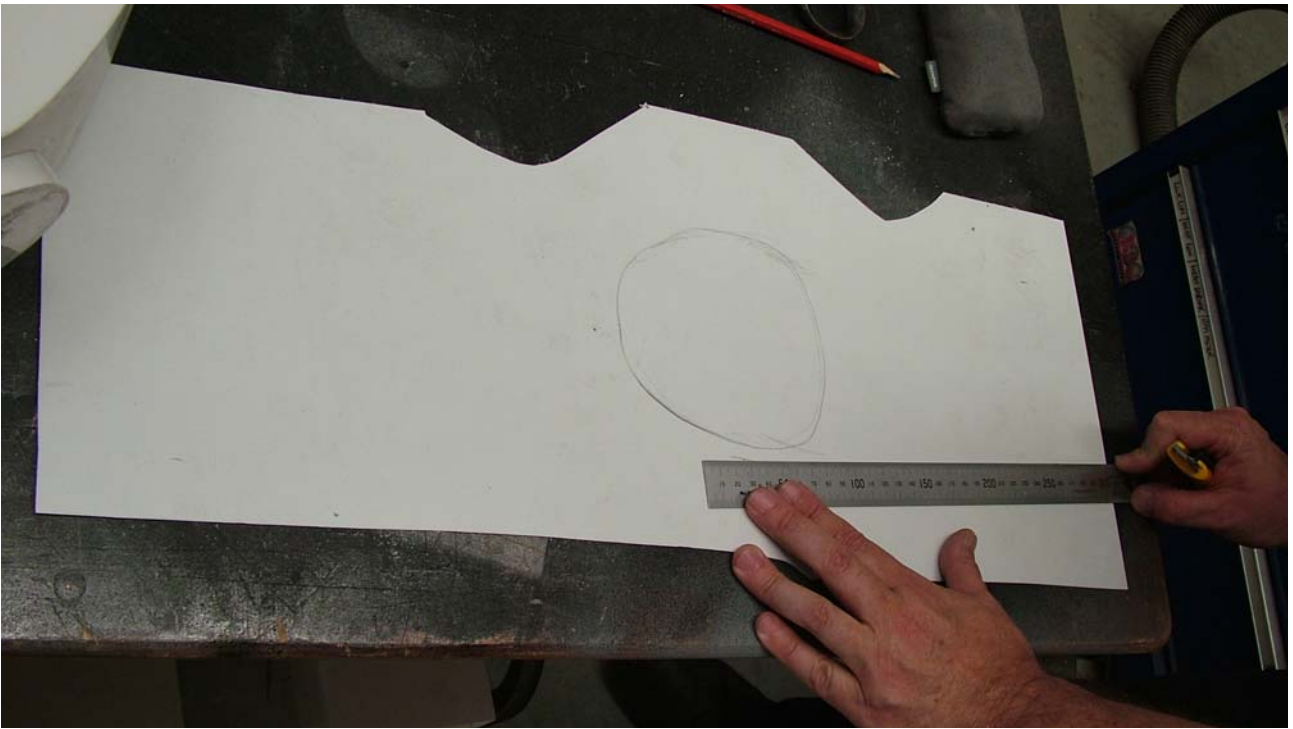
Glue the bottom plate of the head frame to the 1mm styrene piece. Let this set up before you move on to the next step. You should run glue along the edges of this section as well. Only glue up to where the Internal Rear Upright ends





Mark where this join point is on both sides of the head, then wrap the 1mm around the back and pull it tight and mark where the head frame ends again on both sides of the head





Let the styrene rest back on the table and draw a line between the points you marked. Wrap it around the head again and check the lines before cutting. Now let the piece lay flat on the table again and cut along the lines.

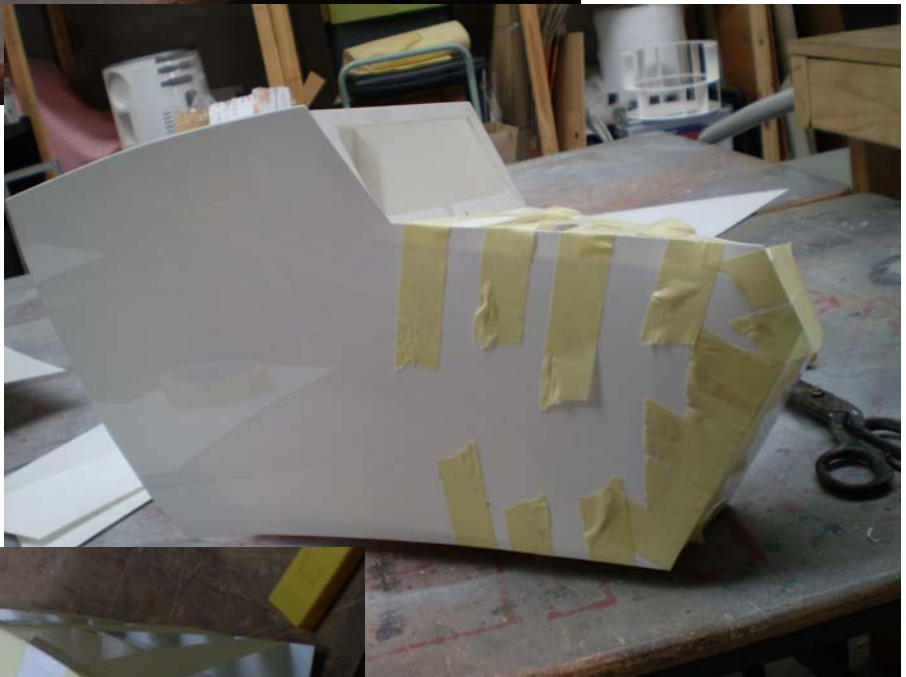
Ignore the fact the head is missing in this shot, this is as I explained because my head is finished.

(I have only cut one side in the photo, but this is just to show the process)



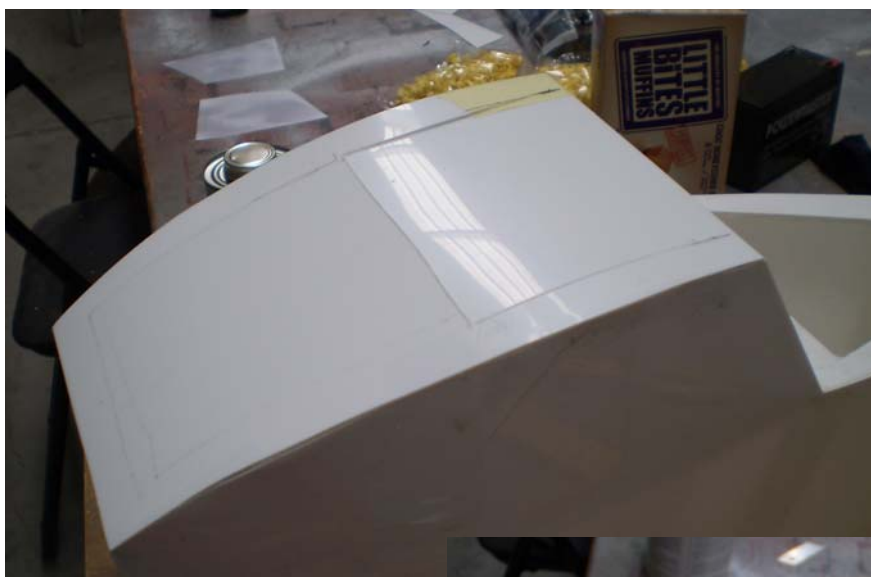
Glue the piece along the edges. I brushed the 1mm piece with styrene glue using a paint brush, then rolled the head on a flat table to get the 1mm piece tight around the rear curve of the head. Let it set, then trim the top edge against the Back Support Bulkhead. Give this an hour to set up properly.

Time to start the sides of the head. Lay the head frame on a sheet of 1mm styrene and roughly cutout the shape of the head, leave plenty of edge on the piece. Left about an inch all around. Work your way from front to back, gluing a little and taping to hold while it sets up. Take your time here and keep an eye on the piece. You are now forming a very complex surface and if it's not done right you will end up with gaps near the end that cannot be formed into the correct shape



Once the side is set, trim it up. Be careful around the top as there is nothing to trim against yet. Take your time because this will affect how the finished head will look.

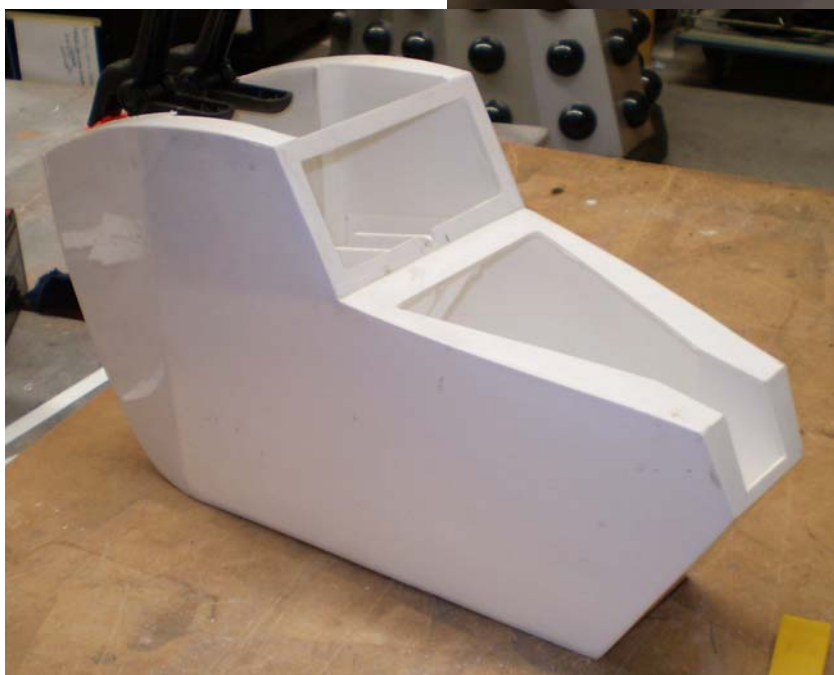
Once you are happy with the trim, cut a piece to glue over the top. This piece will hold the loose side edges at the top and close in the frame structure, make it strong and give you a small lip for the removable portion of the head to lock in to.



Trim this piece up against the edges and begin to cut out the middle section. You want to trim right up to the Side Support pieces and the Back Support pieces in the head frame, and all the way back to within 10mm of the back.

Leave 10mm of material here

Piece of 3mm glued underneath



Trim up the piece so its flush against the sides and glue on 2 more side pieces laminating them to the first ones by brushing glue onto the first side sheets.

Be careful with this stage as the glue is aggressive, Once you stick the sheet on, it will not want to peel off if you have not positioned it correctly. Trim everything up and leave it to set for a few hours.

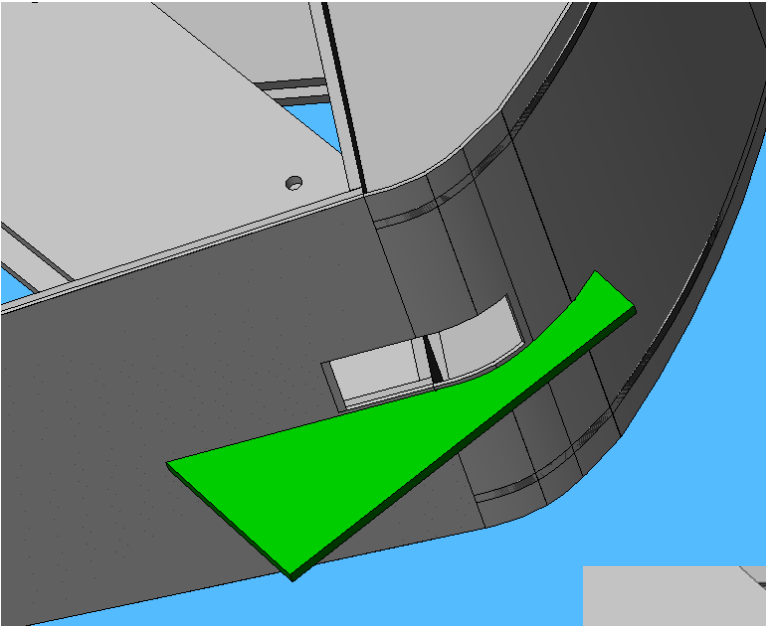
You now have a head with 2 layers of 1mm on the sides. It should be looking good.

Lastly take a piece of 3mm and cut it and glue it up underneath the 10mm lip you created before.

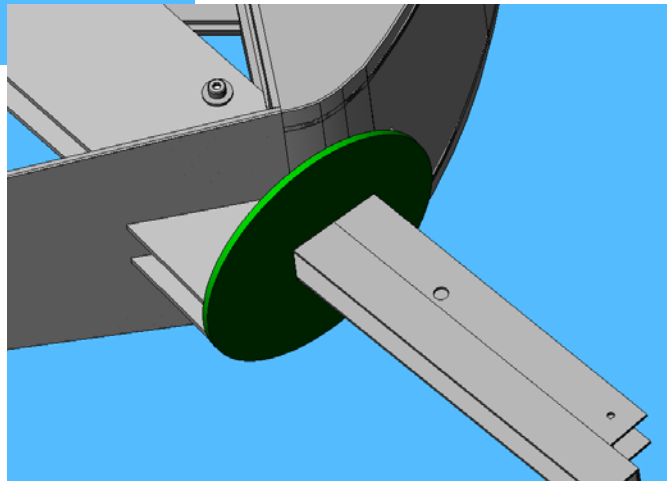
Making the neck Flange

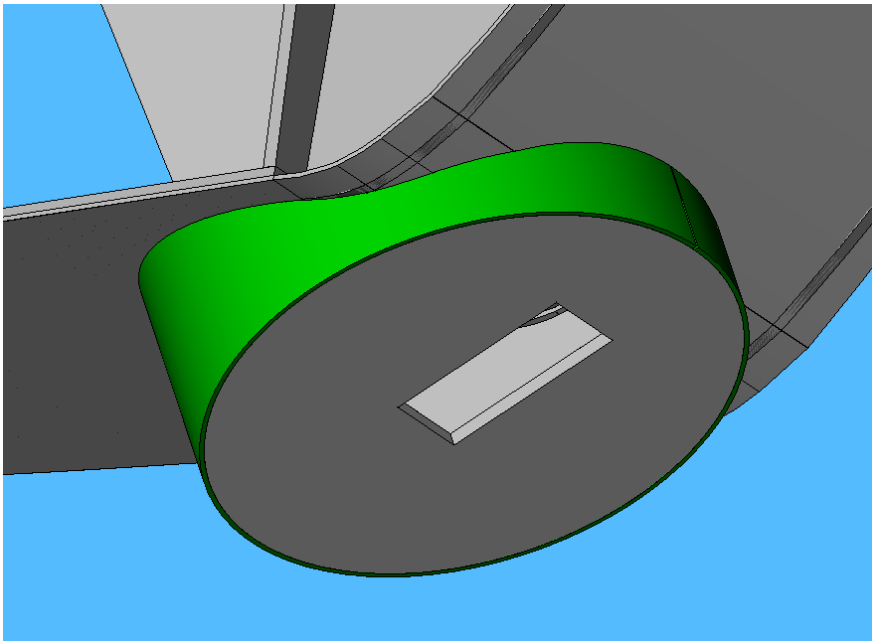
The neck flange will make attaching the rubber neck easier. It also helps hide the internals if the neck rubber does not fit perfectly all around.

Begin by gluing on the New Neck Rib pieces. They sit flush against the slot the antenna assembly slides through. Only one is shown below so you can see the slot.



Once they are both glued on, install the aluminium assembly you made earlier. This will help you align the Neck Ring.





Glue on the Head To Neck Wrap 1. Note that the join is at the rear of the neck.

You may need to trim this piece as you glue it on. I tend to cut the straight edge (the edge that ends up flush with the neck ring) about 5mm wider, then I can trim it off flush with the neck ring later. This allows you to push the curved edge into the head skin better and get a nicer finish.

Repeat for the wraps 2 and 3. Note that wrap 2 has the join at the front and wrap 3 at the rear. This creates an overlap which means you have a good surface to glue the join ends of wraps 2 and 3 to.



Last job before you paint this part of the head. Cutout the top of the Inner Bezel support. This piece kept the head stable while we skinned it, now it needs to come out or it will interfere with the top part of the head. You can see I have also filed a round clearance in the Inner Bezel Support where the antenna (sensor probe) will rest.



For K9 I have used a dark grey metallic auto paint. It bonds well to styrene and looks the part. This completes the lower head section. Still to come is the upper section that can be removed, it will contain the eye light box, ears, gun and tickertape tongue mechanisms.



The first coat of paint goes on the head