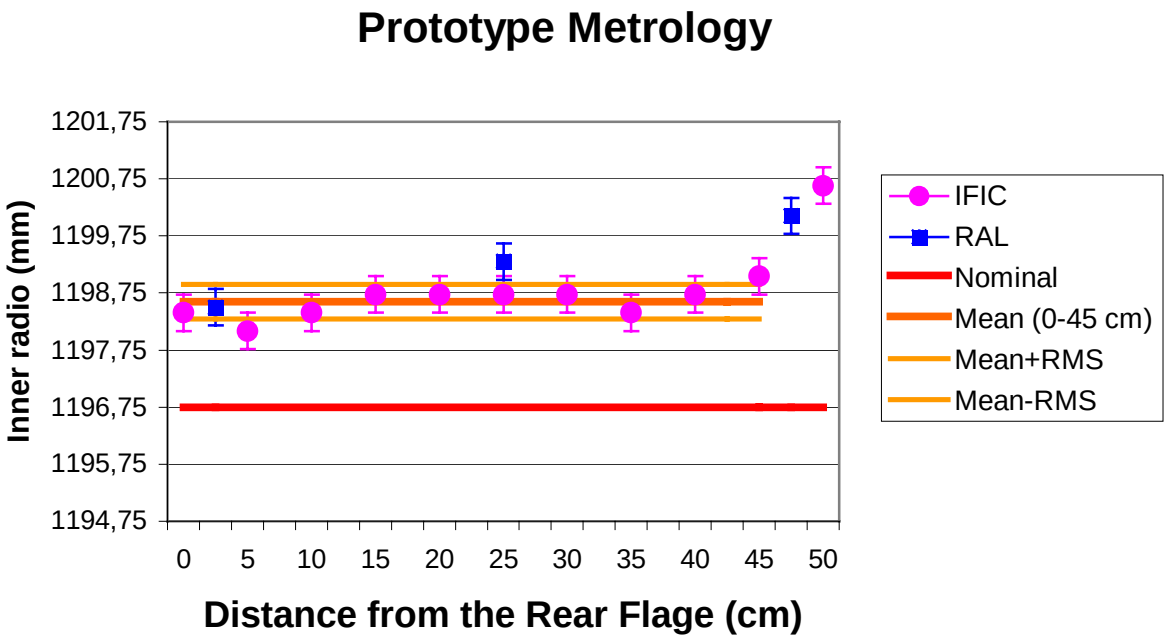
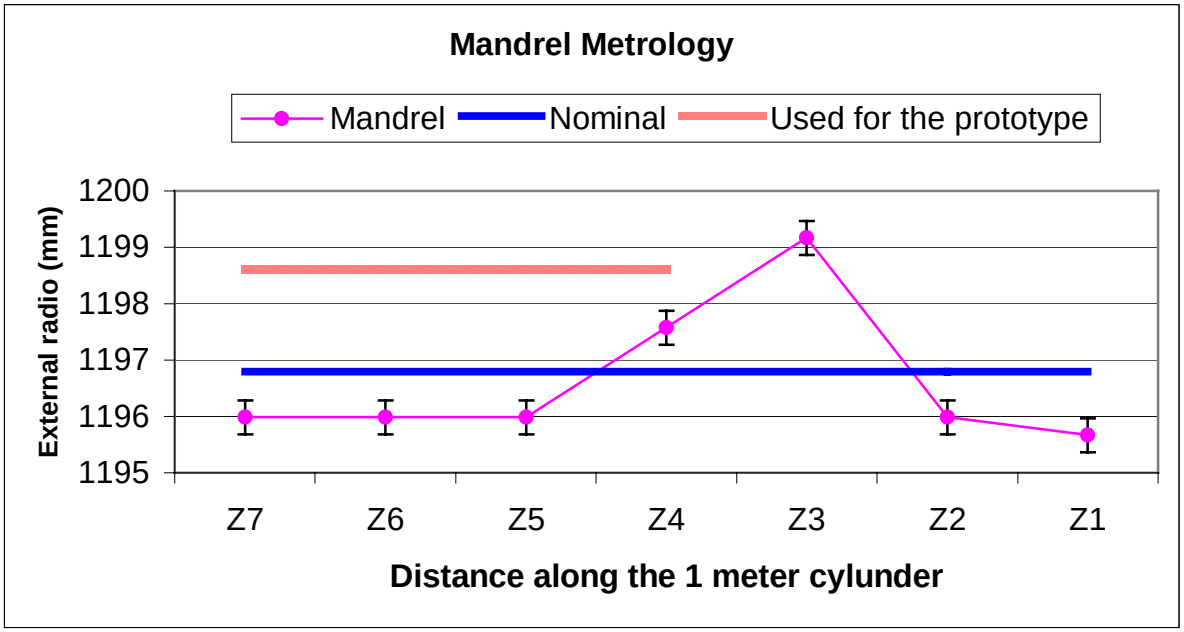
Progress on the manufacture of the SCT Endcap OTE

We will go through the main point raised on the September review:

1. The prototype has a diameter around 2 mm larger than nominal and with a sort of "conic shape" :-
   It was known at Valencia that the diameter of the prototype was larger than nominal and therefore, the mandrel diameter need to be reduced. We measure the prototype every 5 cm from the Rear Flange, the result are shown in the next plot, with the measurement done at RAL. We confirmed the RAL measurements; we observed that the diameter of the prototype only rise in the last 5 centimetres and it is very uniform in the rest of the cylinder.



The effect on the lager diameter on the last 5 centimetres is due to the mandrel defects. Next plot show the external diameter of the mandrel cylinder. The full cylinder is 1 meter long, however due to de large deformation in the central-left region we only used the area marks in red. Notes that the cylinder diameter was fixed by mistake to 1196 (nominal-tape). In the plot Z7 corresponds to the Rear Flange and Z4 to the edge of the prototype.
We still have to understand some local deformation observed between Z7 and Z6 not shown in the prototype



2. New mandrel 2 meter long:-
We need a new mandrel 2 meters long for the manufacture of the final OTE, with that we must correct the OTE diameter and the defects found in the prototype, mainly to get a uniform diameter along the full cylinder. The company that roll the Aluminium sheet promised to solve previous defect but when we received the new sheet it had the same problem in a different location. Then, we move to another company and to Stainless Steel of 3 mm, all that introduce some delay but the results look very promising

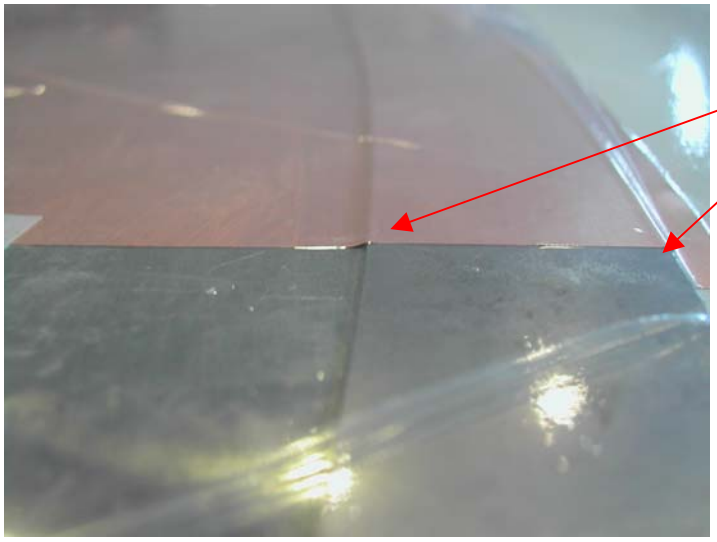
Next picture shown the mandrel with the Stainless Steel sheet:

We have also change the design of the ribs to improve the cylinder sphericity. We are now fixing the Steel sheet to the ribs, only preliminary measurements has been done in the location of two of the ribs and the diameter is as expected. To work with the Stainless Steel so far has made the fitting of the jig much more easy.

3. We have contact a company to made the survey of the mandrel using a laser tracker as suggested in the review. The survey will be done next week.

4. Vacuum Bagging technique for Cu-Kapton to Airex bond and Rear Flange bond.-

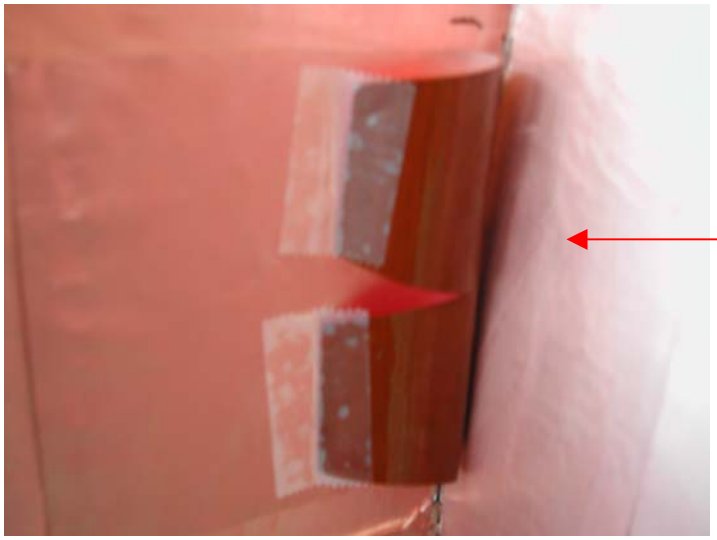
   We have all the consumables with the exception of the vacuum connectors to the film that will arrive next week. Meanwhile we have been doing some test using the connector we had in the laboratory, with reasonable results. We know how to do the bagging and we still have to learn how to get a fitting on all the steps of the Rear Flange.



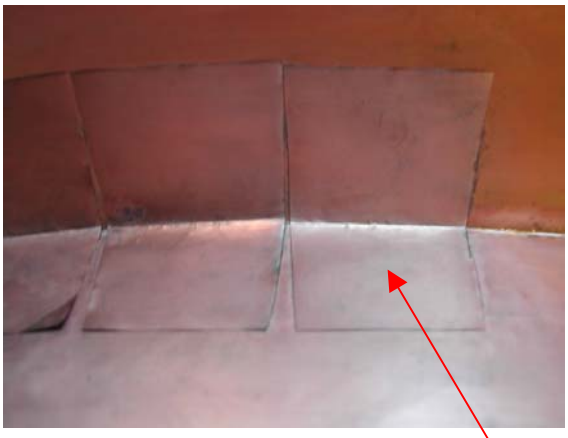
This picture was taken without the breather cloth to be able to see how the Cu-Kapton fit. We use enough film to allow a good fitting

5.- Rear Flange:-

We found the pins to precise locate the CF pieces to the jig out of position and they are now being modified. The way the Rear Flange will be connect to the cylinder is still under investigation, several approach are consider but the soldering is still difficult and very laborious.



Leaving some flaps (grounding taps) in the Flange with out glue and bond later:
Easy for soldering but difficult when the Flange is assemble



Bonding flaps after the assembly: we have try with different dimension and the last ones (3x5x2 cm) fit very will but the soldering in the Flange look very difficult. More work will be done in this area.

5.- W have manufacture two plastic gauge disk, one to check the inner diameter (already in the lab and with metrology done) and one for the outer diameter (to be deliver next week).
6- A jig to cut at 30^{o} angle the Airex has been manufactured and testes.
7- An aluminium template to cut the Airex for the Rear Flange is also available.