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18-19 April 2013

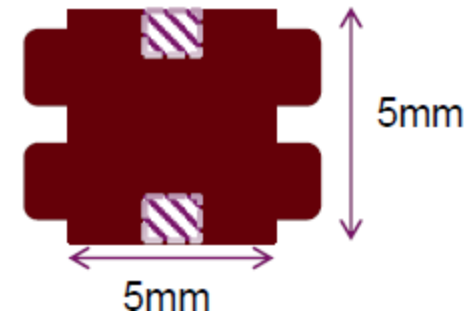
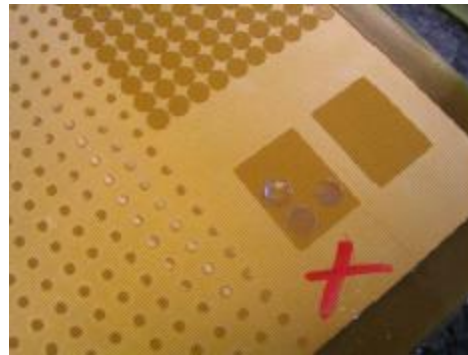
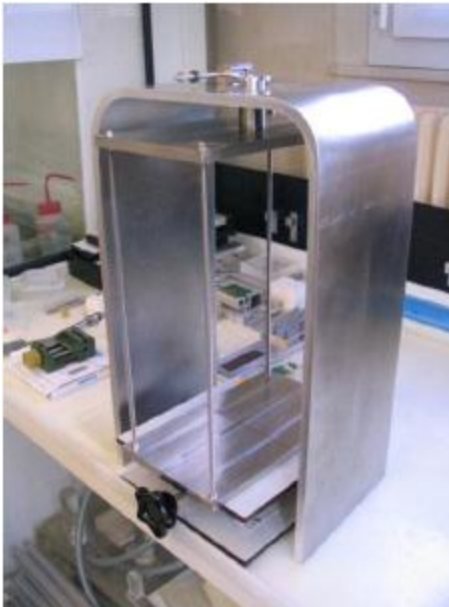
Saclay Mechanical Workshop

Outline

- What has already been done or is in progress
 1. Stress tests of drift pillars
 2. Honeycomb planarity measurements
 3. Participation to the fabrication of the 2 m × 1 m at CERN
 4. Glueing tests
- Preparations for future tests
 1. Measurements on deformation of a doublet
 2. Measurements on flexibility of proof composite materials
 3. Marble
 4. Optical head

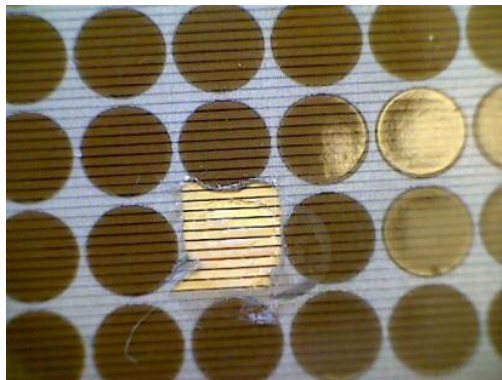
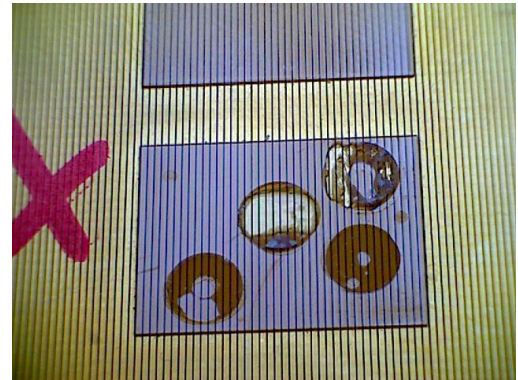
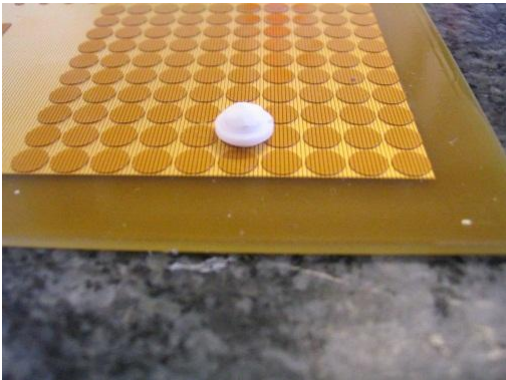
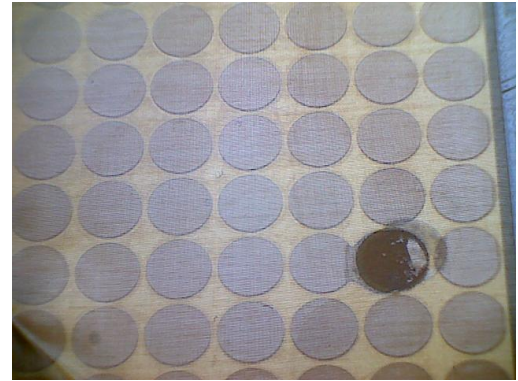
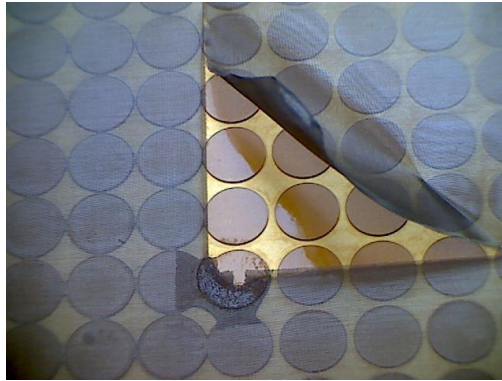
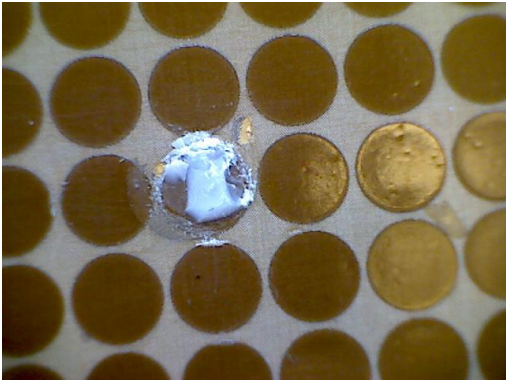
1. Stress test of drift pillars (1/3)

- In order to control the deformation of 4 PCBs inside a quadruplet with only one-in plane alignment system → glue drift pillars to distribute the deformation to all PCBs
- Set-up to measure the stress of these pillars (already presented by P. Ponsot on the Mechanical workshop at CERN in February)



- Pillars made out of ceramic or peek and either with a central “glue gap” or not
- Glue → Araldite 2011
- Tests performed with a bulked MESH or a standard MESH

1. Stress test of drift pillars (2/3)



1. Stress test of drift pillars (3/3)

	CERAMIC	PEEK	“Glue gap” CERAMIC
Copper	Tear off @ 9.6kg	Tear off @ 6.3kg	Tear off @ 8.4kg
Copper + Coverlay	Tear off @ 10.5kg	Tear off @ 6.3kg	Tear off @10.3kg
pillars + standard Mesh	Tear off @ 10.87kg		
Pillars + bulked Mesh	Broke off @ 11.08kg		

→ We have a conclusive gluing process – CERAMIC wins

2. Honeycomb planarity measurements

Measurements done with a « palpeur », surface 500 cm × 500 cm

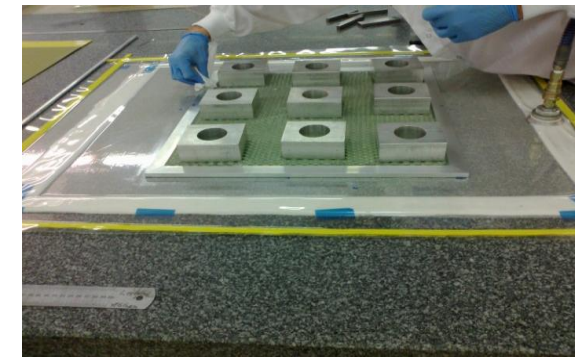
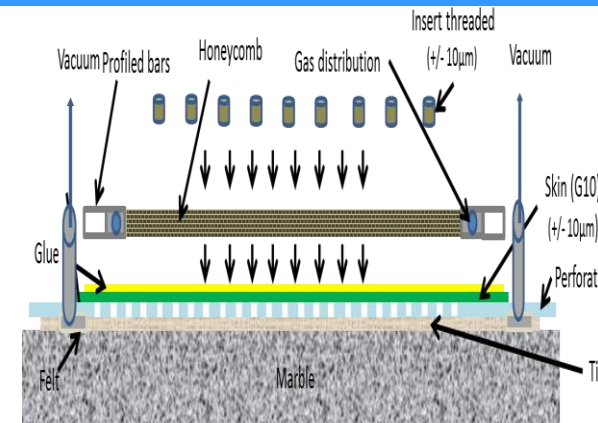
- Honeycomb Nomex alone: $\pm 30 \mu\text{m}$ (30 points)
- Glued FR4/Rohacell : $\pm 180 \mu\text{m}$ (25 points)
- Glued FR4/Honeycomb Nomex: $\pm 240 \mu\text{m}$ (25 points)

→After measuring the Nomex, a frame in G10 was fabricated with calibrated width. The idea is to adjust the frame to the honeycomb width to equilibrate the glue width in the two faces.

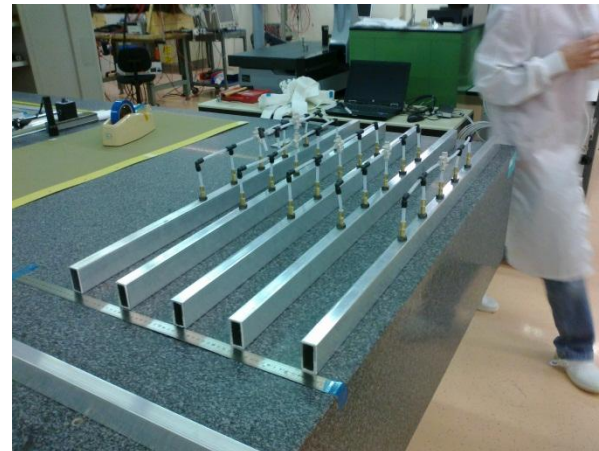
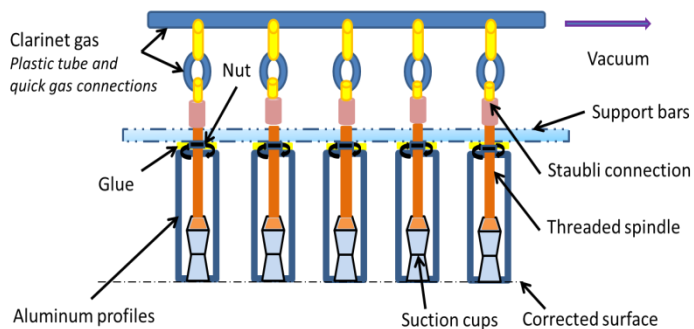


3. Participation to the fabrication of the 2 m × 1 m at CERN

- Participation of S. Herlant and D. Pierrepont (Antenne Saclay @CERN) to different glueing tests
- Fabrication of a sucking tool
- This sucking tool has been adapted for dimensions of 2 m
- Tests not completely conclusive (see Givi's talk)
- Work in progress



Skin suction Tool



4. Glueing tests (1/4)

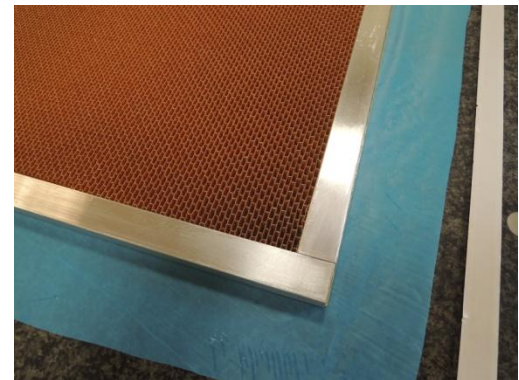
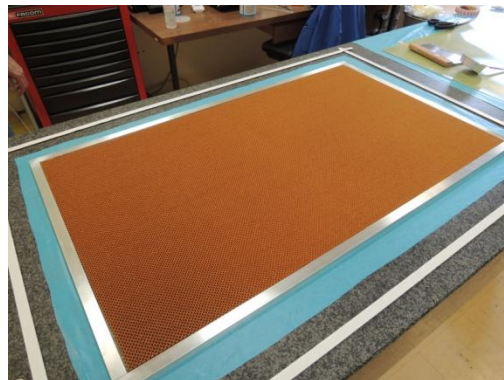
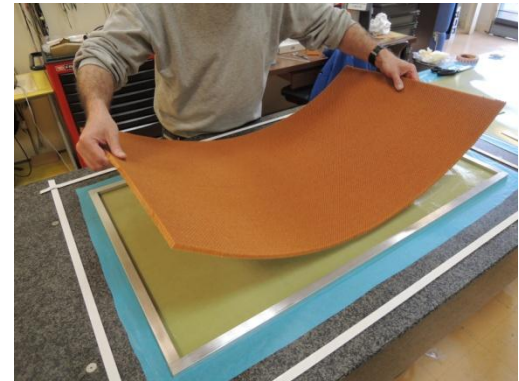
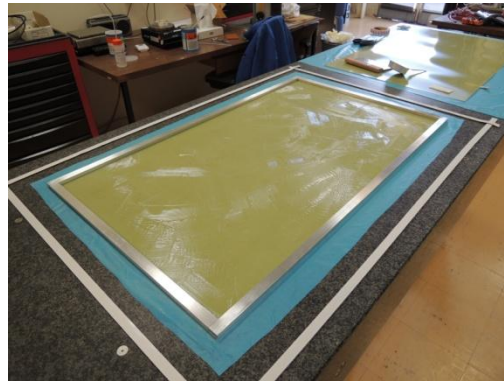
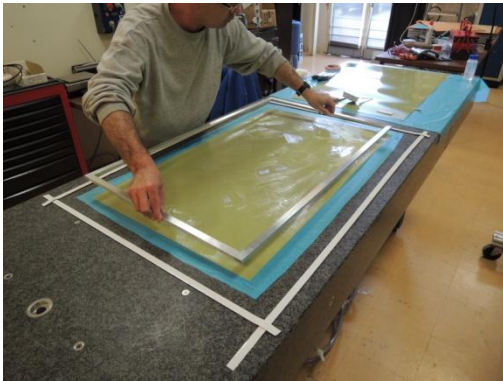
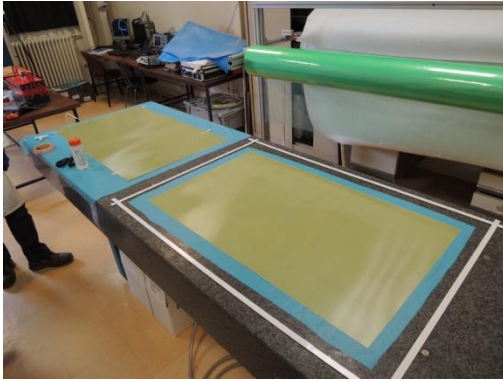
- New laboratory has been installed in Saclay
- Existing Marble (2.7 m × 0.9 m)
- Pump has been bought

- Aim :
 - Honeycomb and glue compensation for parallelism of the 2 PCBs
 - Learn how to do planar assemblies
 - Be ready for the Multi layer operational Saclay prototype (MLO) → Alan's talk

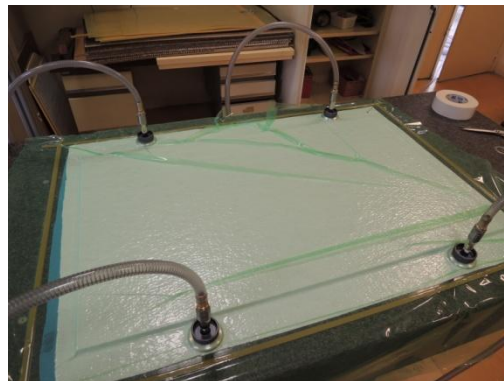
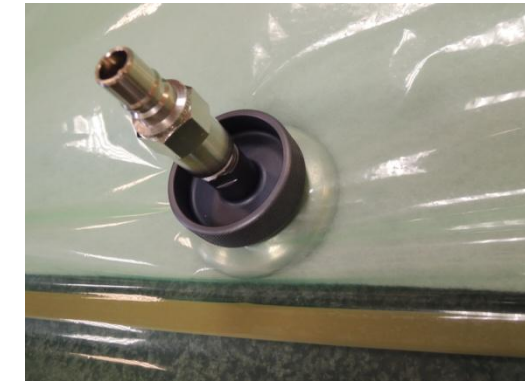
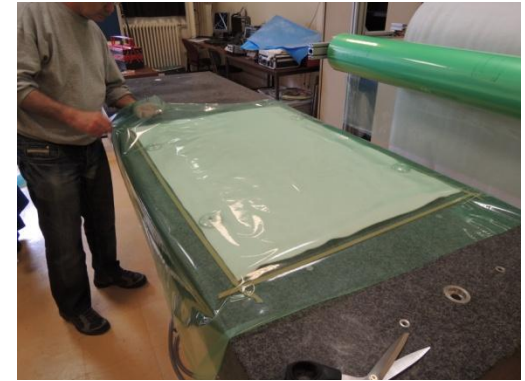
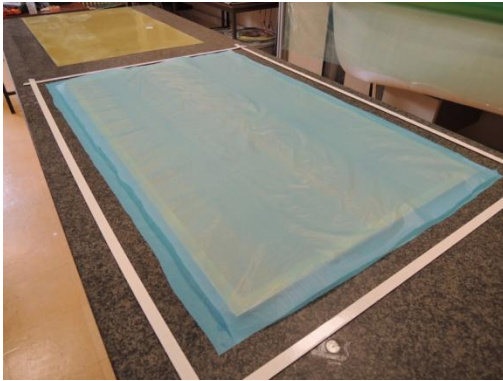
- First glueing test on Tuesday the 16th of April
 - Pcb + Nomex Honeycomb



4. Glueing tests (2/4)



4. Glueing tests (3/4)



4. Glueing tests (4/4)

- New laboratory has been installed
- Pump has been bought
- Aim :
 - Honeycomb and glue compensation for parallelism of the 2 PCBs
 - Learn how to do planar assemblies
 - Be ready for the Multi Layer Operational prototype (MLO) → Alan's talk
- First glueing test on Tuesday the 16th of April
- NEXT steps
 - Measurements of the planarity
 - Improve the procedure, see limitations
 - Try different honeycombs (aluminium micro hole)
 - Establish procedures



Preparation for future tests

- Measurements on deformation of a doublet
 - Heat on one side and measure deformation on the other side /comparison with simulations
- Measurements on flexibility of proof composite materials
 - Try to bend an assembly and see at which force it breaks
- Marble (3 m × 2 m) for the mechanical prototype
 - Has been ordered this week (delay due to logistic problems)
 - Will be installed in DATCHA laboratory
- Optical head has been ordered → should allow optical alignment of the Saclay MLO (see Alan's talk) in CMM L=1000 mm; W= 800 mm; H= 600 mm