

DE LA RECHERCHE À L'INDUSTRIE

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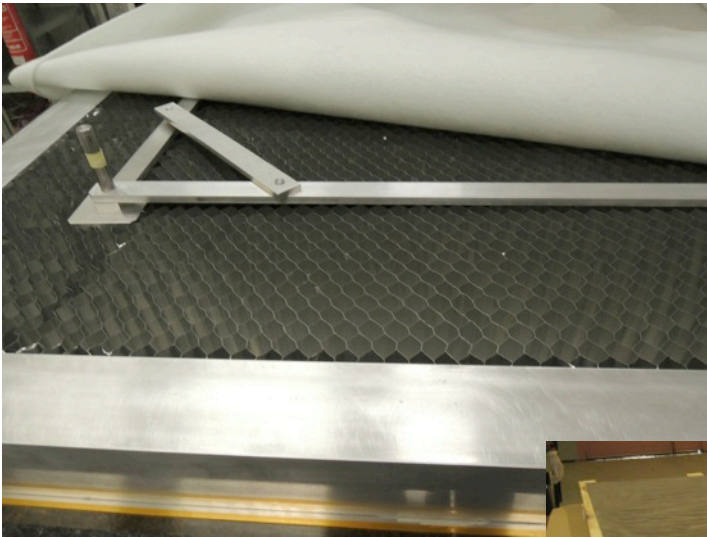
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NEWS FROM SACLAY

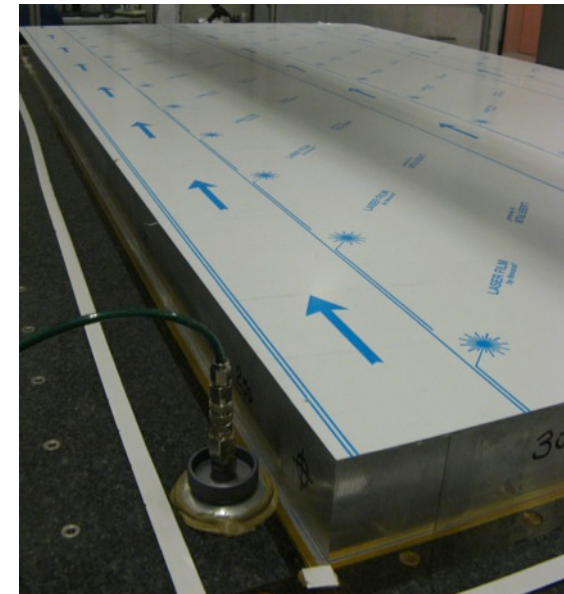
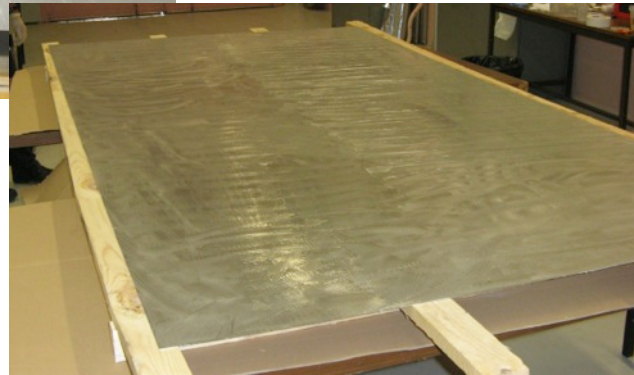
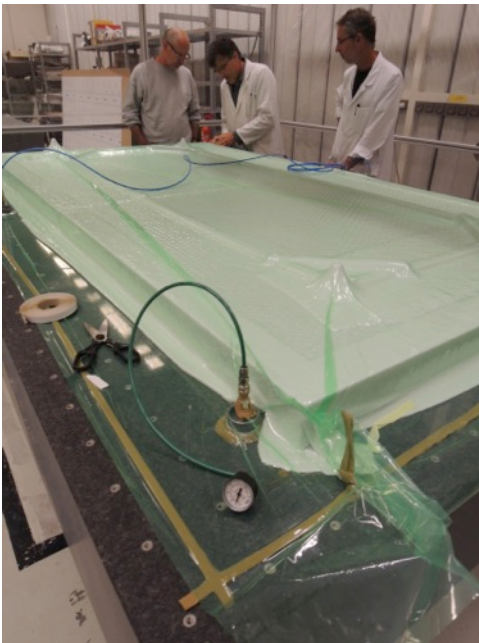
F. Bauer, M. Boyer, D. Desforges, E. Ferrer-Ribas, W. Gamache, A. Giganon, J. Giraud, P.-F. Giraud, P. Graffin, S. Herlant, S. Hervé, **F. Jeanneau**, H. Le Provost, O. Meunier, A. Peyaud, P. Ponsot, Ph. Schune

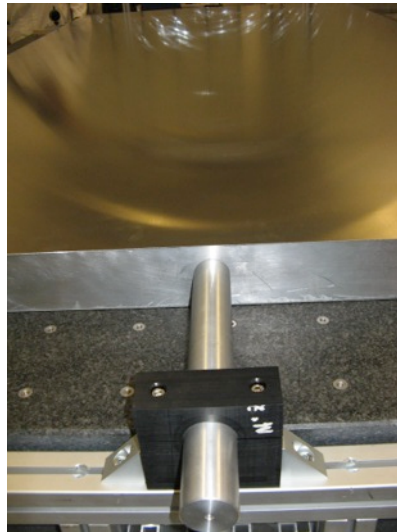
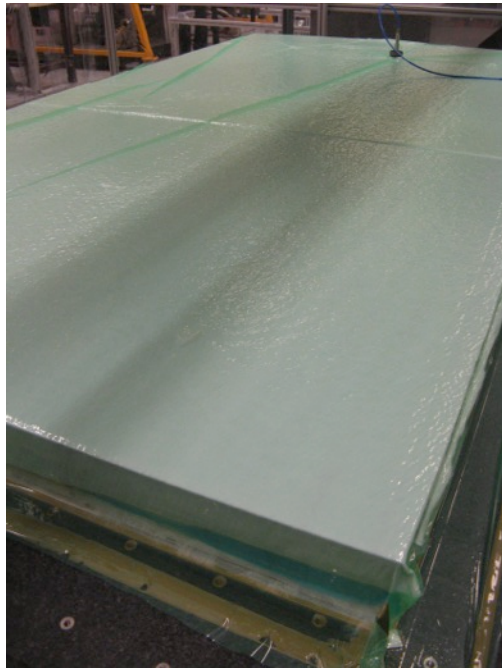
- Stiff-back : gluing and measurements
- Mechanical measurements: panel samples and 3 panels proto
- M4 tooling
- Functional prototype + mesh stretching

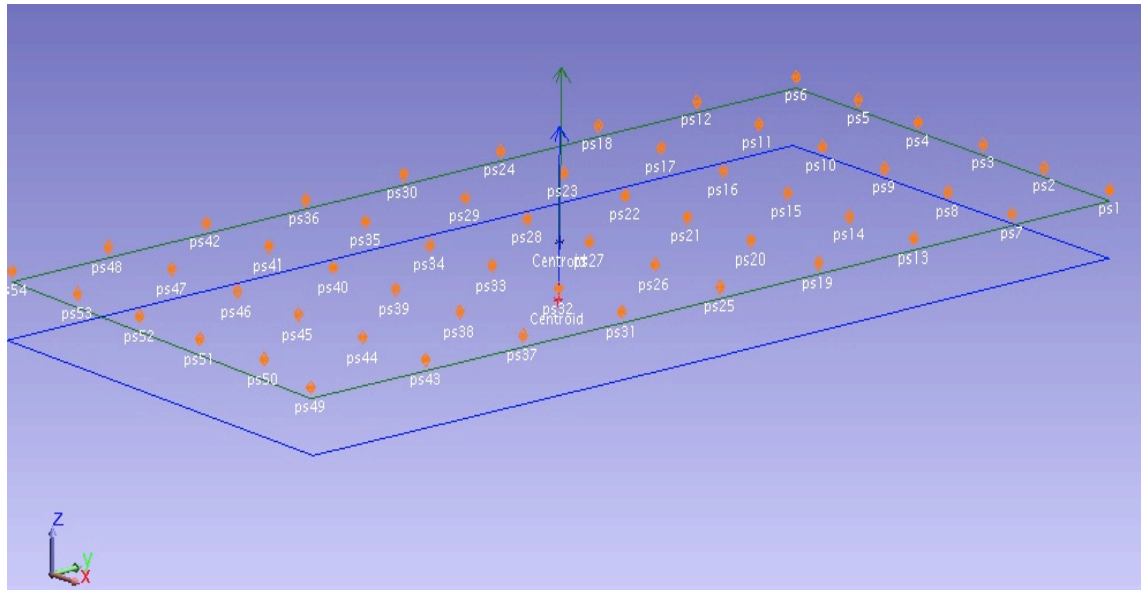
GLUEING OF THE STIFFBACK - I



- 2660 x 1410 mm²
- Al frame: 80 mm
- Al skins: 1 mm
- Al honeycomb: 80/10 mm
- Positioning tool





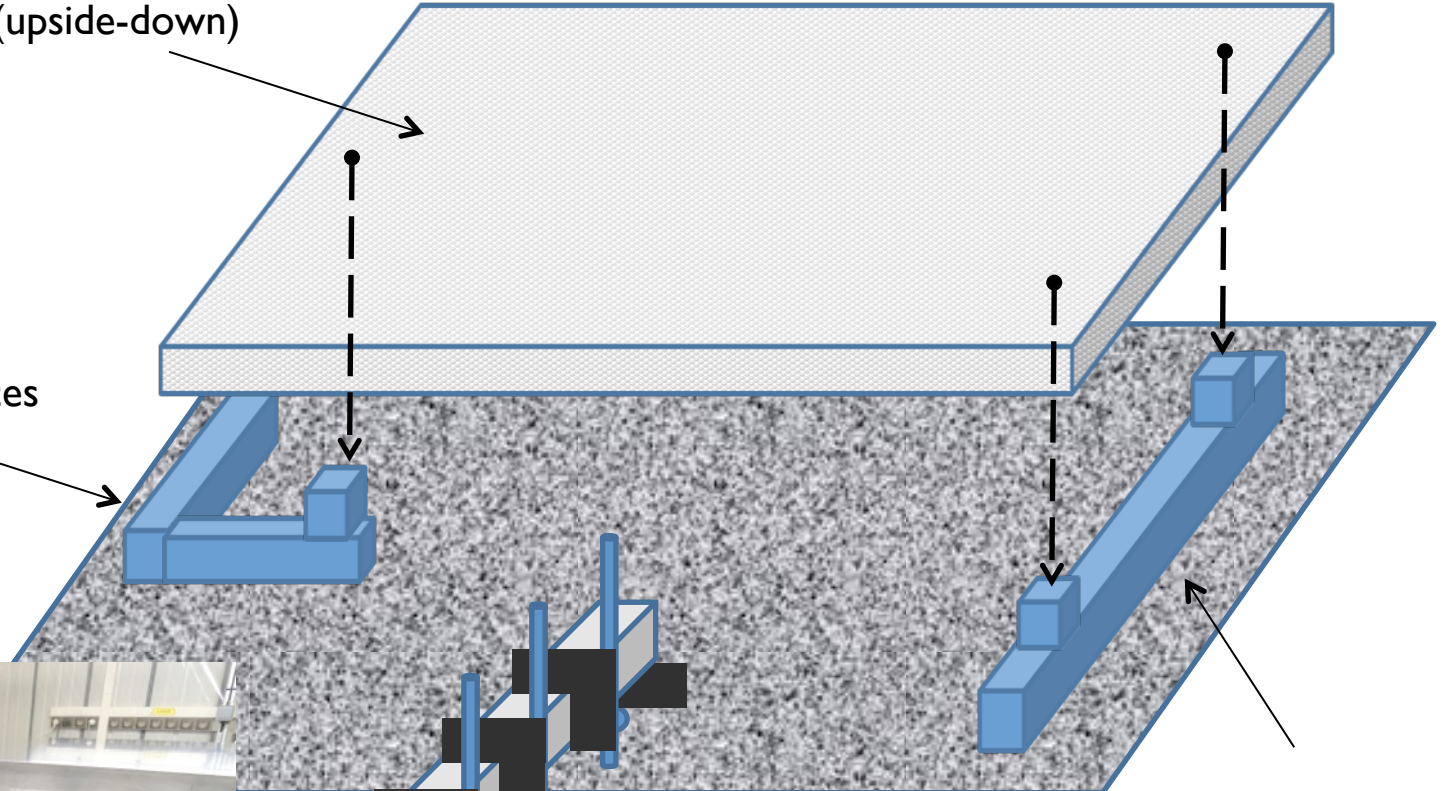


- Laser tracker method
- Accuracy +/- 50 μm
- Reference surface up
- Stiff-back on table

μm	On table	On 3 points
Min	-91	-115
Max	+138	+209
Rms from average	70	100

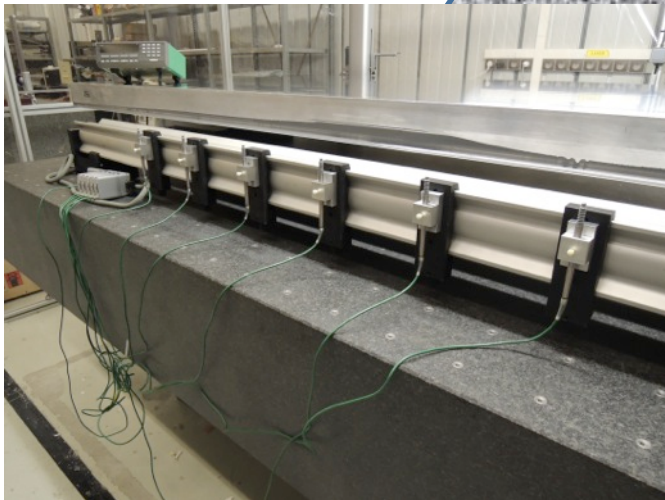
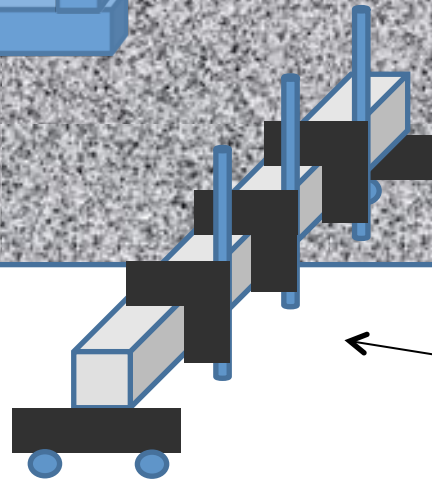
Stiff-back on 3 points
Working position (upside-down)

Marble rule + dices



Marble rule + dices

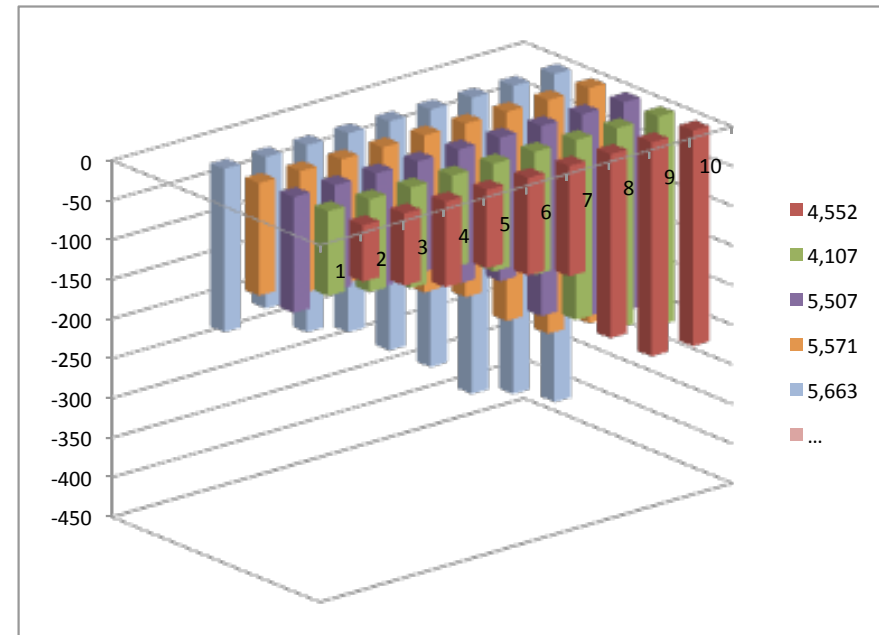
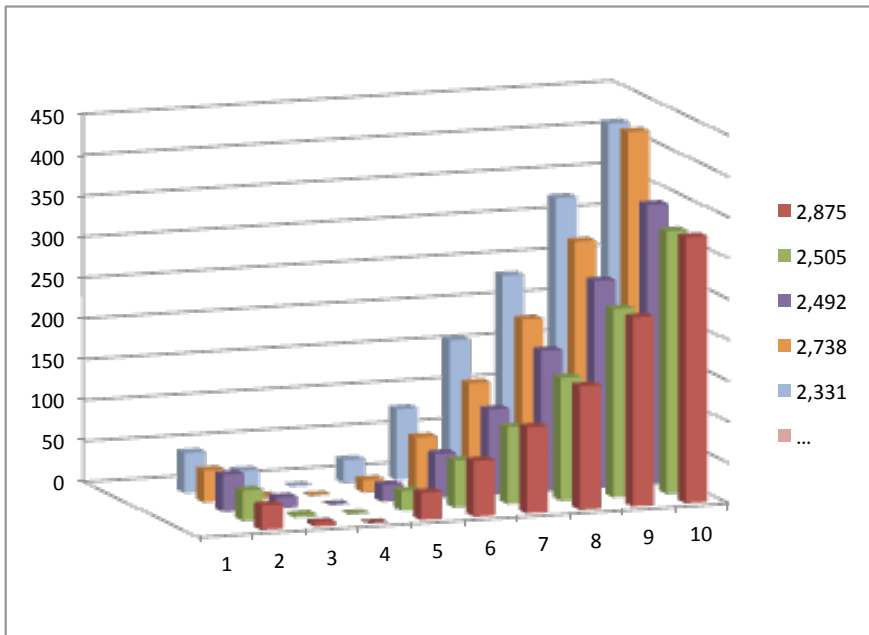
Rule with 6 probes



Stiff-back on the table face up

Stiff-back on 3 points face down

Planarity $\approx 70-100 \pm 15 \mu\text{m}$



Assess of Young modulus (reference: 17 Gpa)

- Dimensions:

$L = 110\text{mm}$; $W = 17\text{ mm}$; $h = 11\text{ mm}$

- Honeycomb: NOMEX and Al

Thick. = 0.05 mm; $h = 10\text{ mm}$; $d = 4.8\text{ mm}$

- Skins: FR4 thickness 0.5 mm

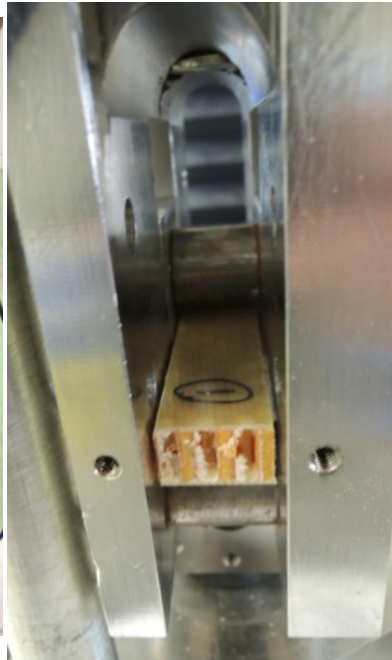
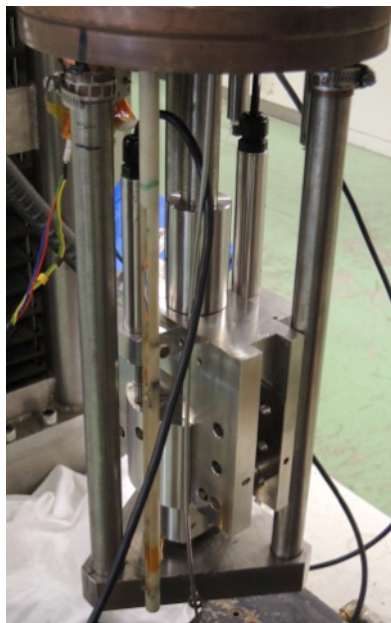
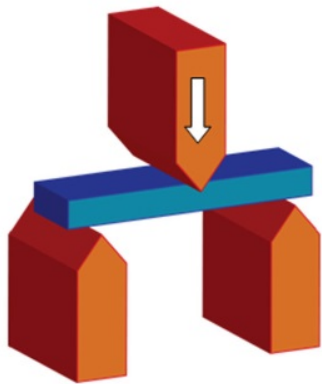
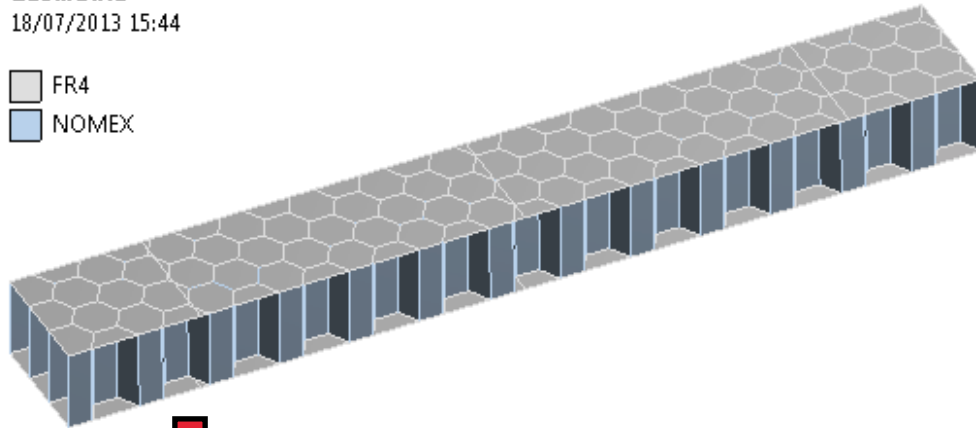
- Glue: Araldite 2011

Géométrie

18/07/2013 15:44

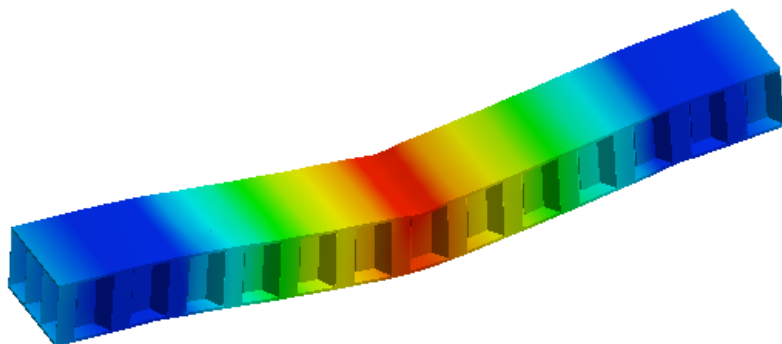
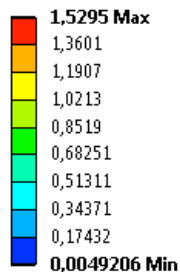
FR4

NOMEX



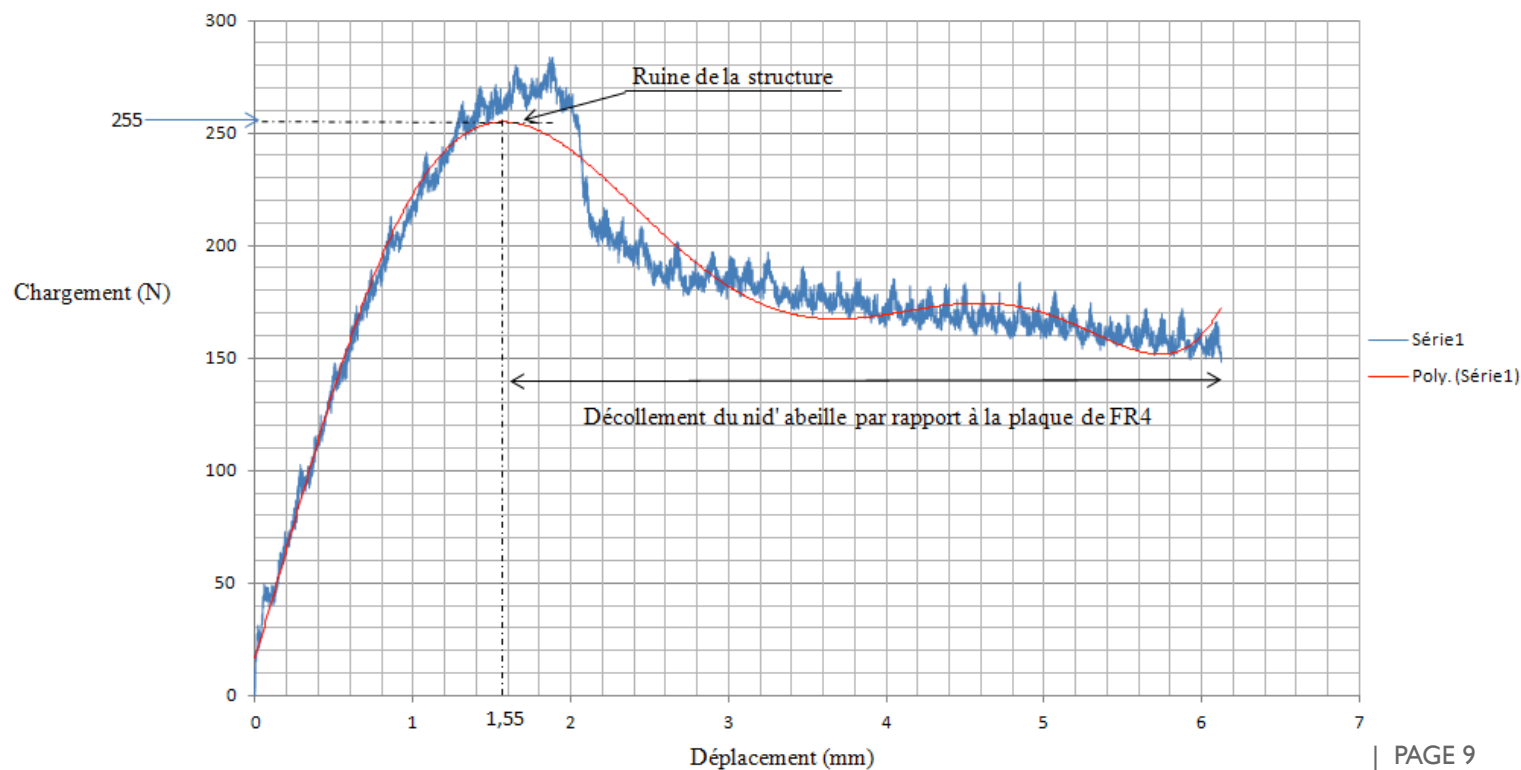
A: Structure statique

Déplacement total
Type: Déplacement total
Unité: mm
Temps: 1
18/07/2013 15:45



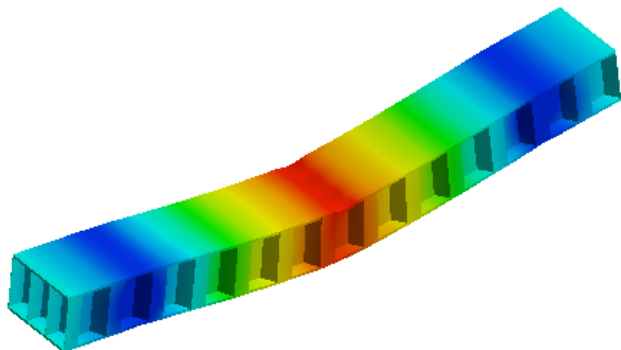
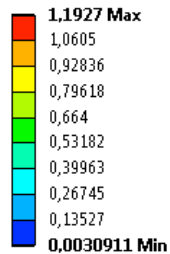
Young modulus: 8 GPa

Eprouvette n°1: NOMEX (110 x 17 x 11) + FR4 (0,5 mm)



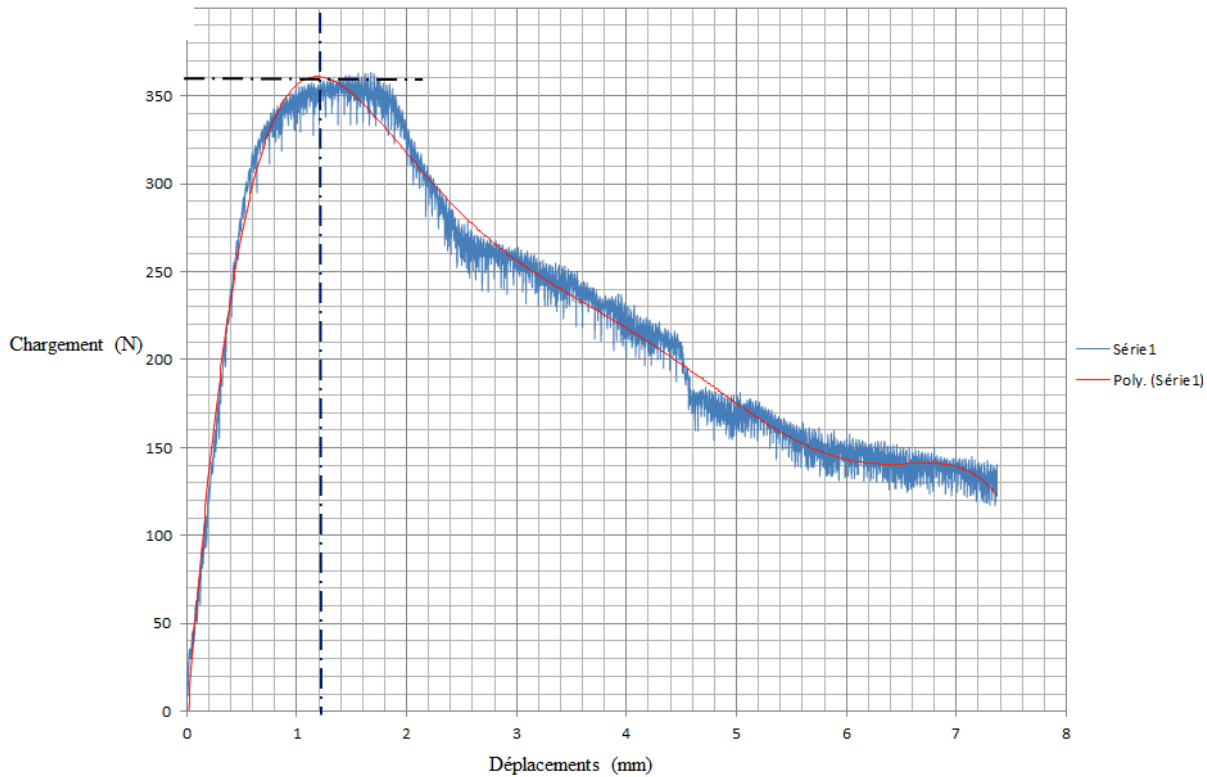
B: Copie de Structure statique

Déplacement total
Type: Déplacement total
Unité: mm
Temps: 1
11/10/2013 15:13

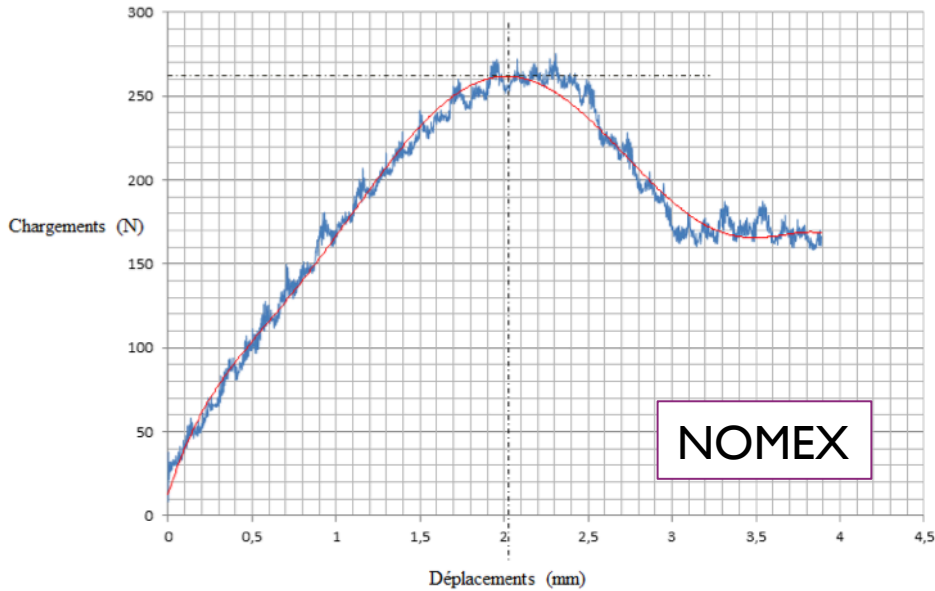


Young modulus: 24 GPa

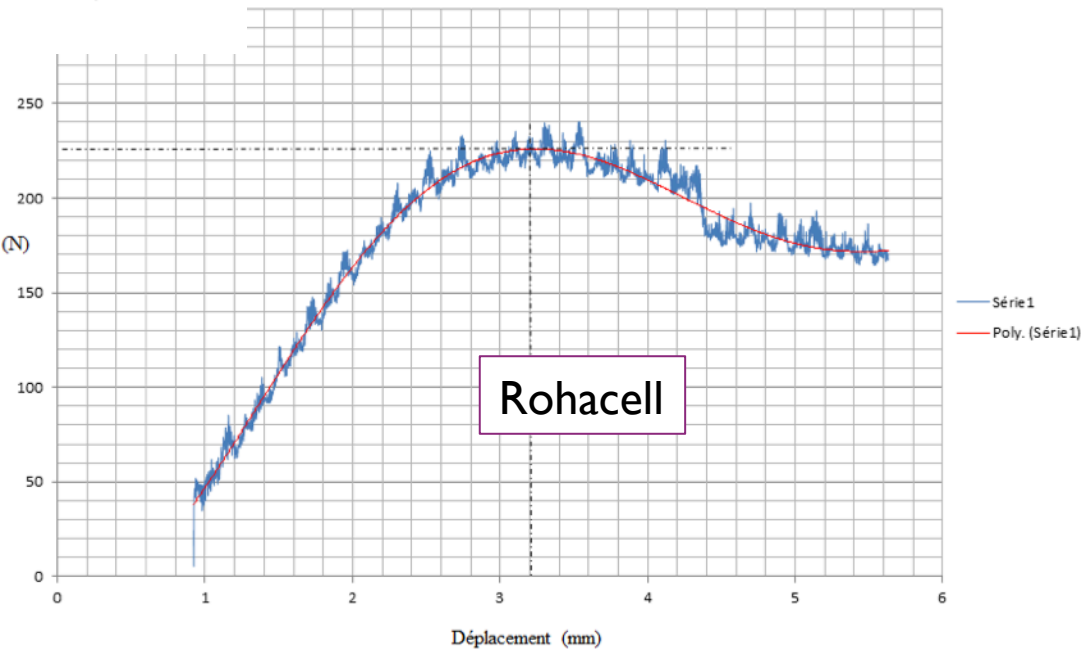
Eprouvette (110 x 17 x 11) : Aluminium + FR4 (0,5 mm)



NOMEX VS ROHACELL (h=6mm)



200 N	Nomex	Rohacell
Displacement (mm)	1.25	2.4

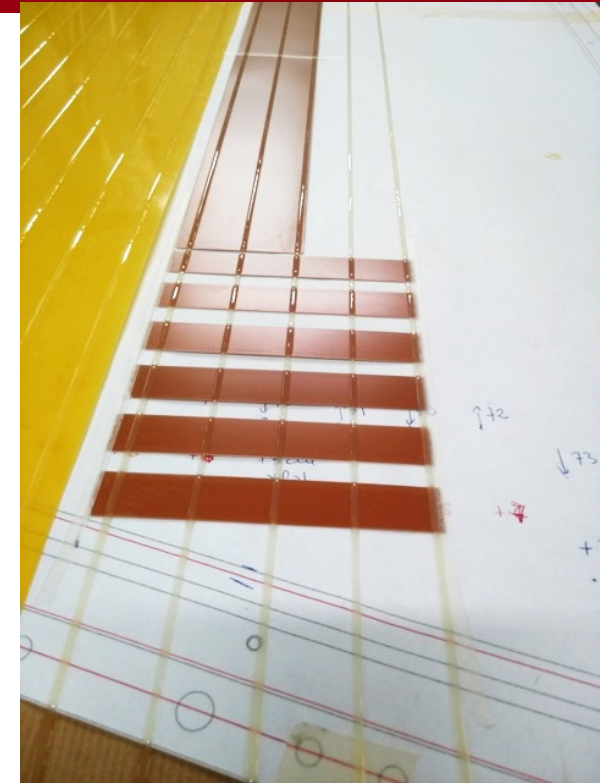
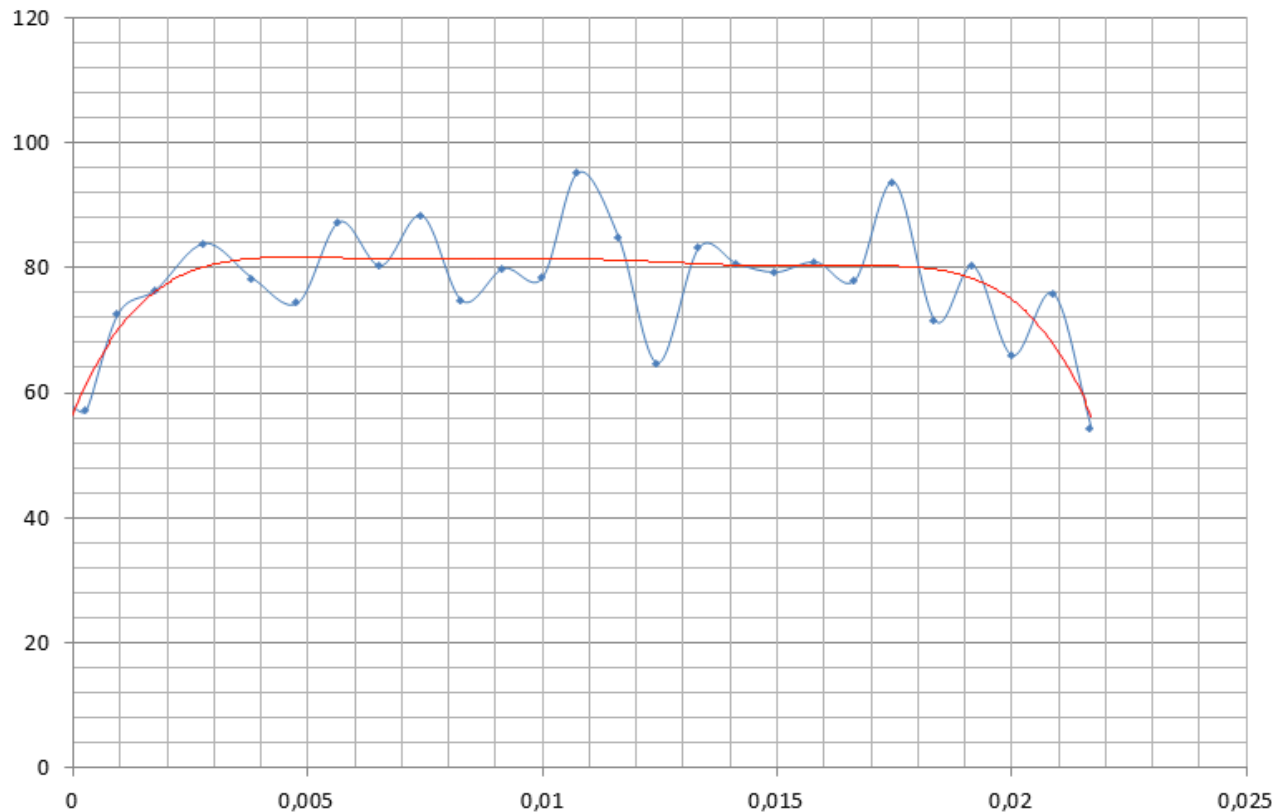


Rohacell 2 times less stiff than NOMEX
(Y.M. \approx 4 Gpa)

Glue strips perpendicular to length of the sample (every 25 mm)

Impossible to determine the Young modulus (too small)

Ungluing for only a displacement of 30 micron under 60-80 N

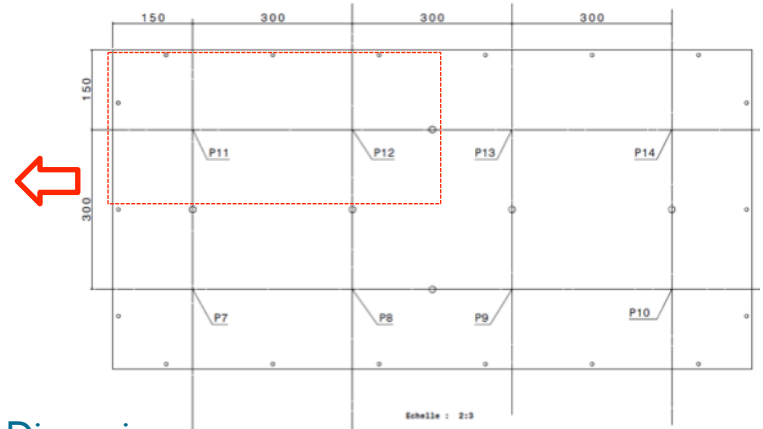
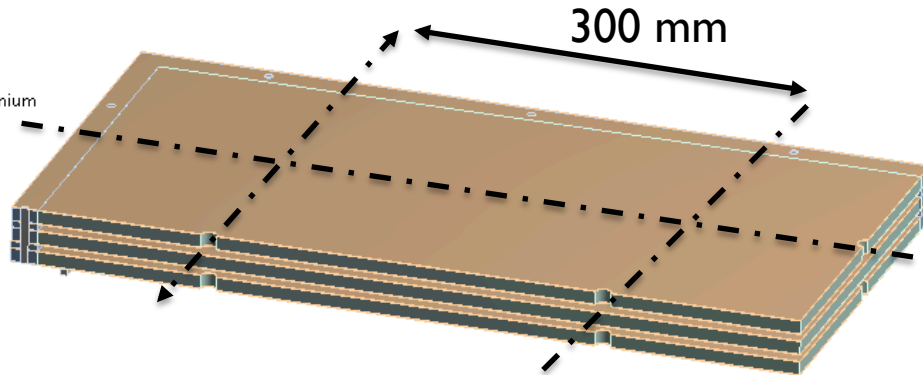


— Série1
— Poly. (Série1)

Géométrie

25/10/2013 16:25

- Acier standard
- Alliage d'aluminium
- Céramique
- FR4
- Nida



Aim: assess the possibility to transfer the deformation to inner layers by using drift pillars

- **Dimensions:**
 $L = 1200 \text{ mm}$; $W = 600 \text{ mm}$; $h = 43 \text{ mm}$

- **Honeycomb:** NOMEX (10/4.8/0.05 mm)

- **Al frame** (10 x 20 mm)

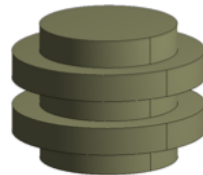
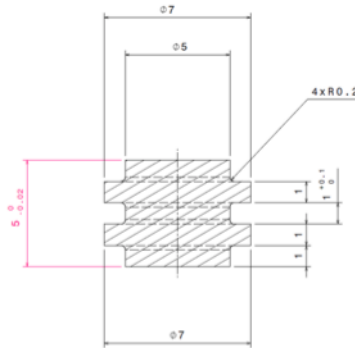
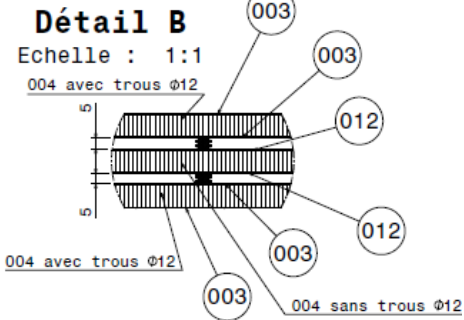
- **Pillars:** 5 mm, Macor

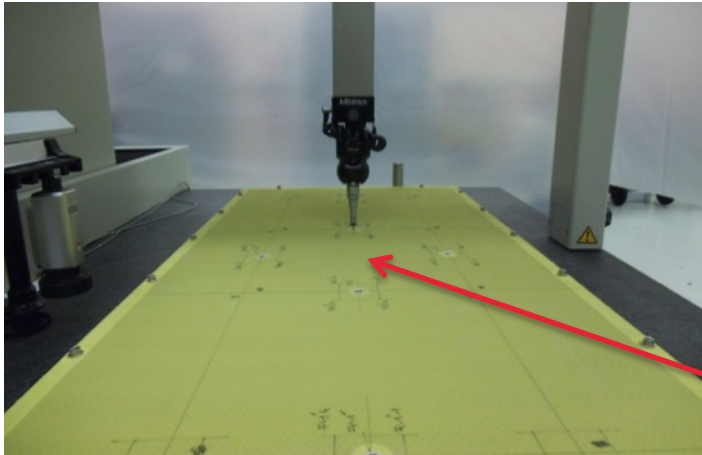
- **Skins:** FR4 thickness 0.5 mm

- **Glue:** Araldite 201 I

- **Pillars** glued on one side (sliding possible)

- **Panels** first screwed then glued → deformation measurement at each steps

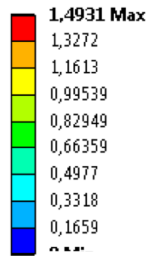




mm	P1	P2	P5
Top layer	-0.108	-1.020	-1.075
Inner layer	-0.109	-0.694	-0.602
Diff.	0.001	0.326	0.473

Loading: 220 N (2 lead bricks)

B: Copie de Structure statique
Déplacement total 2
Type: Déplacement total
Unité: mm
Temps: 1
25/10/2013 16:28



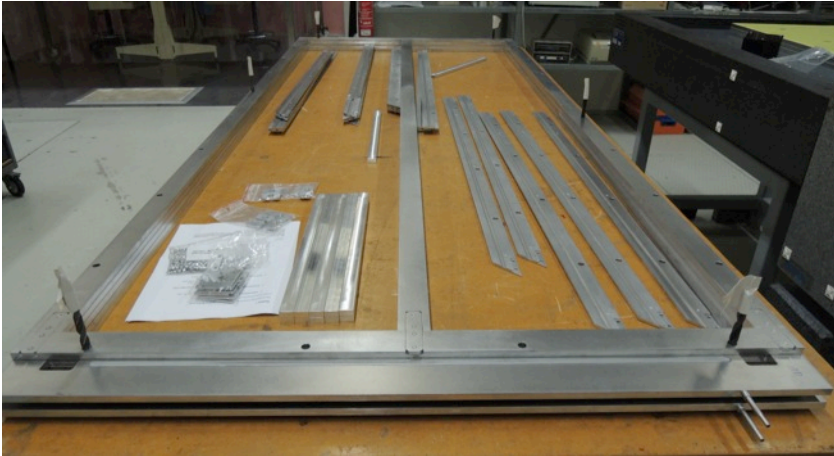
0.125 mm
P1 = 0.123 mm

Simulation

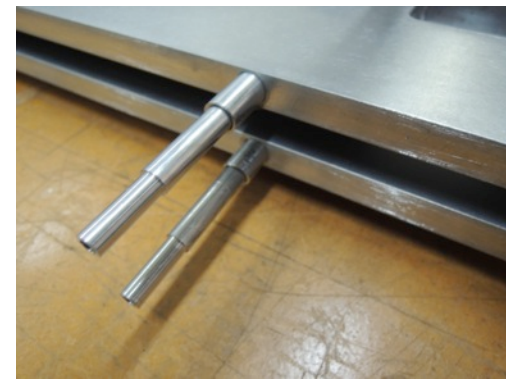
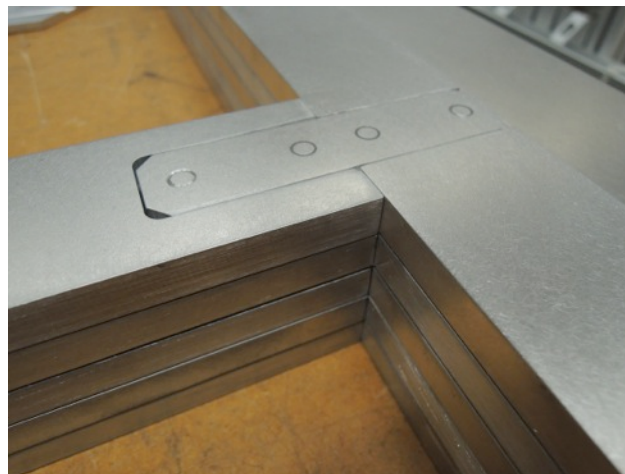
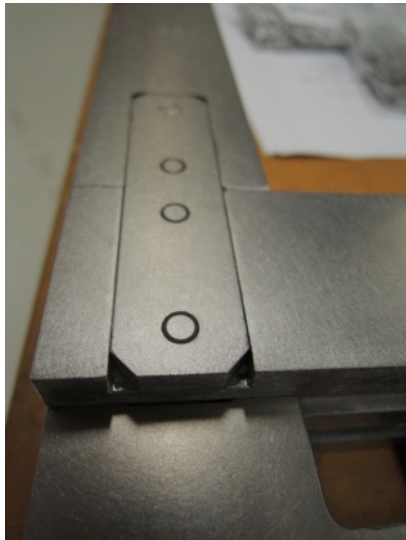
0.960 mm
P2 = 0.606 mm

PRELIMINARY...

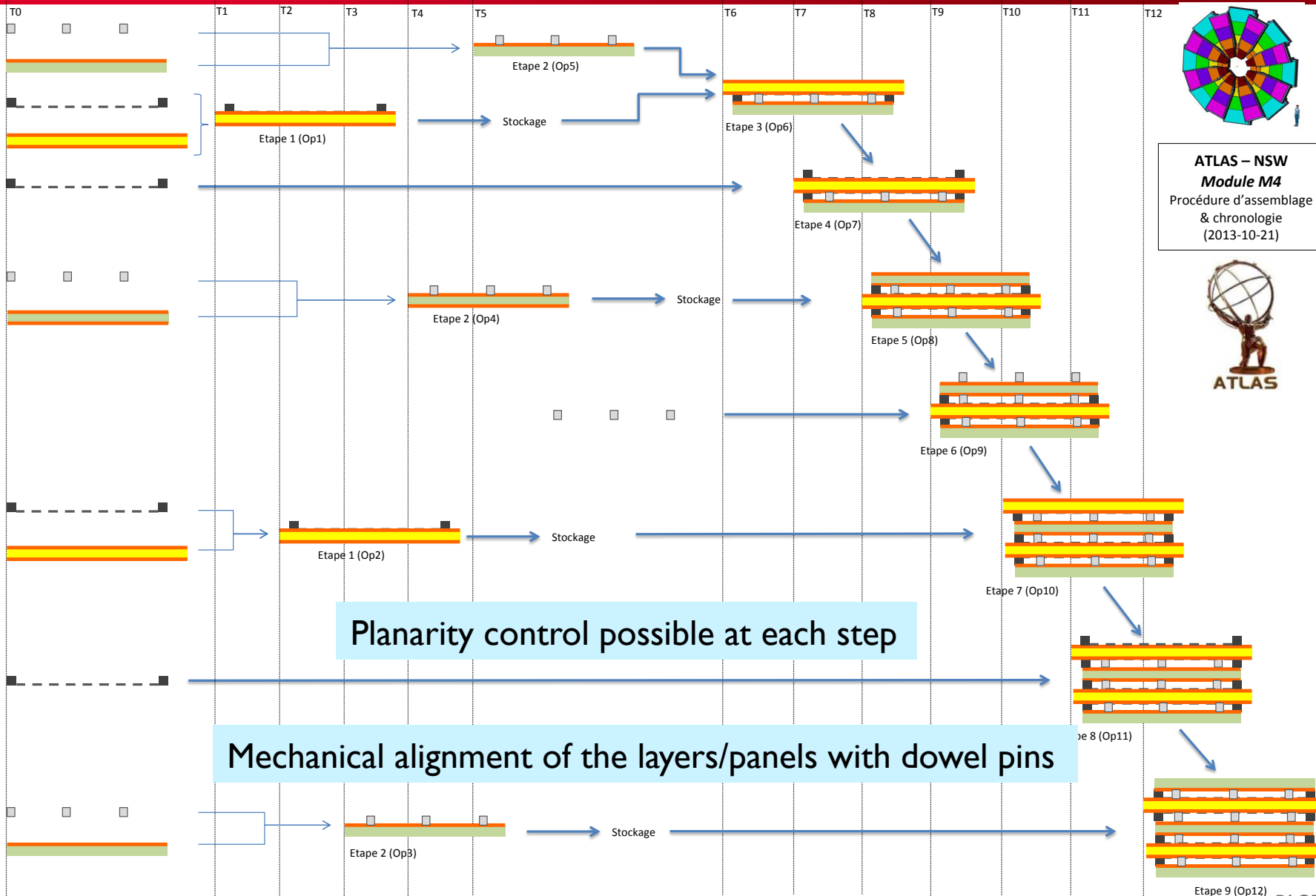
0.997 mm
P5 = 0.597 mm



- Mesh stretching by Marabu company
- Transfer frame larger than the final frame
- Gluing with Araldite 2011 at home
- Panels gluing tests before assembly of M4



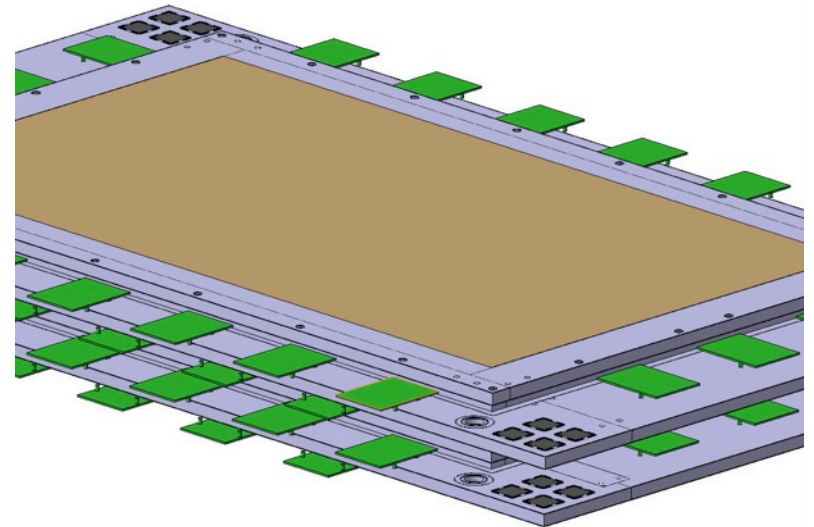
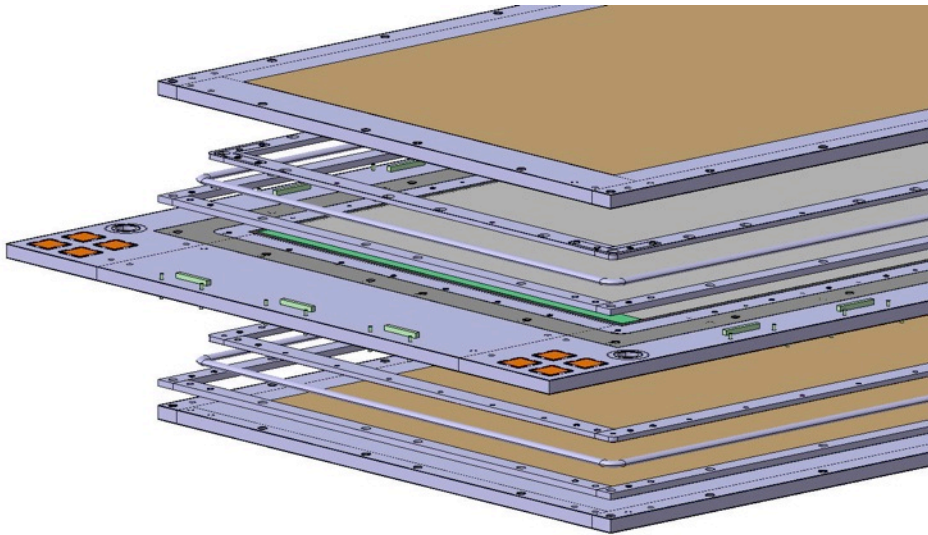
M4 ASSEMBLY PROCEDURE



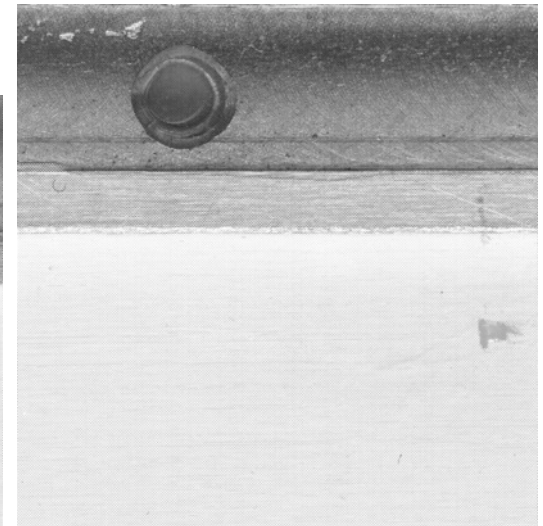
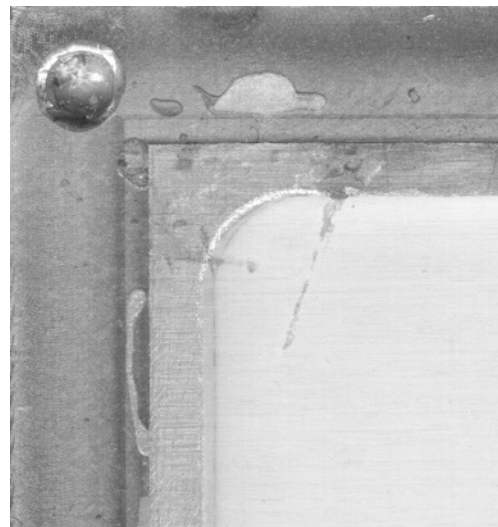
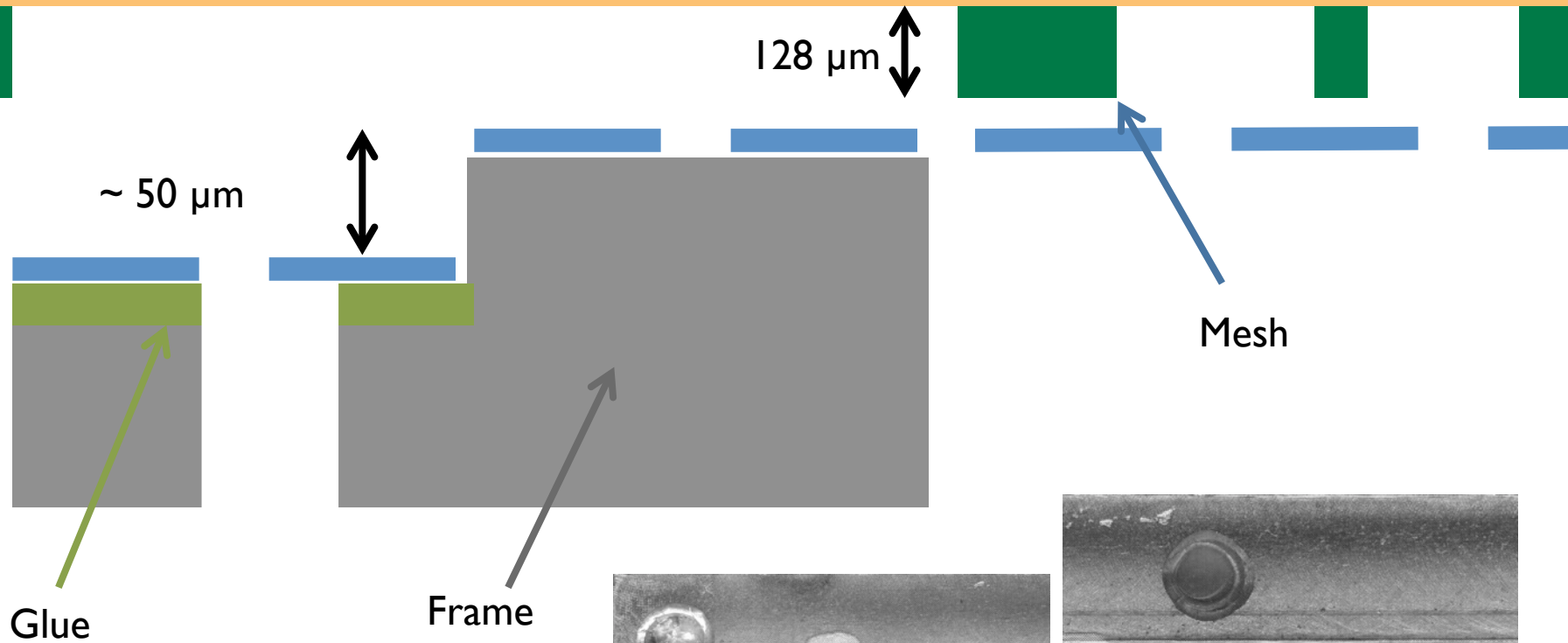
ATLAS – NSW
Module M4
Procédure d'assemblage
& chronologie
(2013-10-21)



- 2 independent doublets
- X/Y resistive readout
- Test of mechanical and optical alignment
- Dimensions: 600 x 1000 mm²
- Mesh stretched on independent frame screwed on the readout plane
- Electronic readout APV/SRS
- Symmetrical design
- Layout finished







- Study for a cleaning room is in progress
- Stiff-back has been glued → planarity preliminary measurements (70 to 100 μm)
- Young modulus of panel samples have been measured
 - Better case for Al honeycomb
 - Poor mechanical behavior with strips gluing
- Assembly and first measurement of deformation transmission with the 3 planes prototype
 - Pillars glued on one side → deformation transmission less than 70%
 - Next steps: pillars glued on two sides
- M4:
 - all parts have been delivered
 - still working for the mesh stretching
 - Gluing tests and defining procedure before doing the assembly
- Functional prototype: layout finished