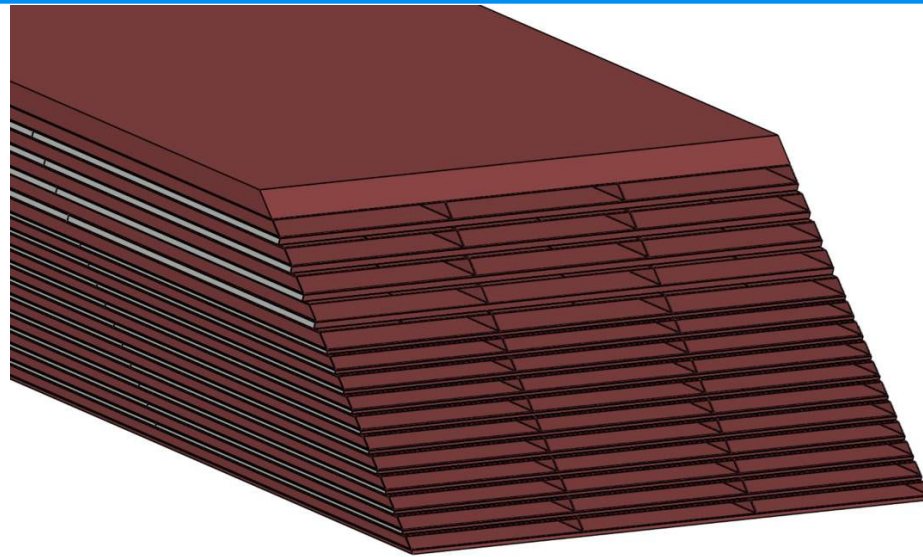


# *ECAL MACHANICAL R&D*

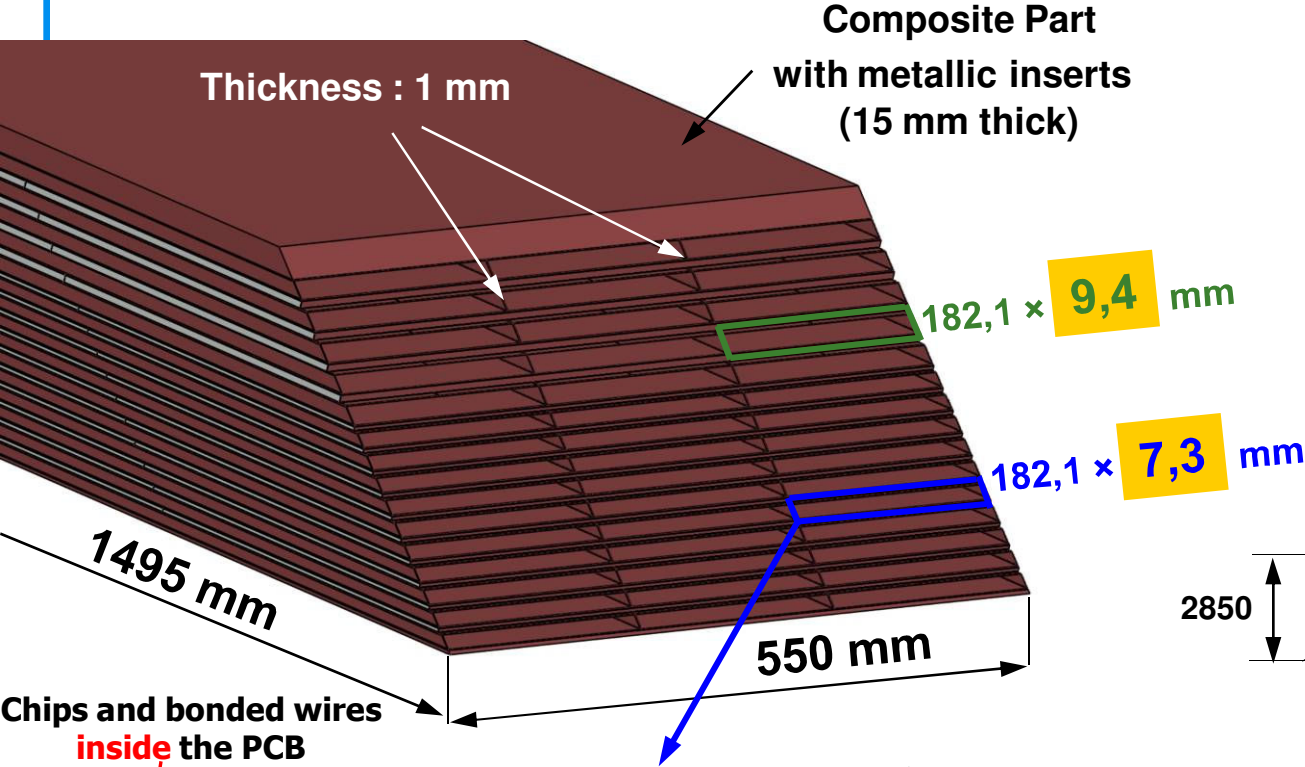


**ECAL meeting - PARIS**

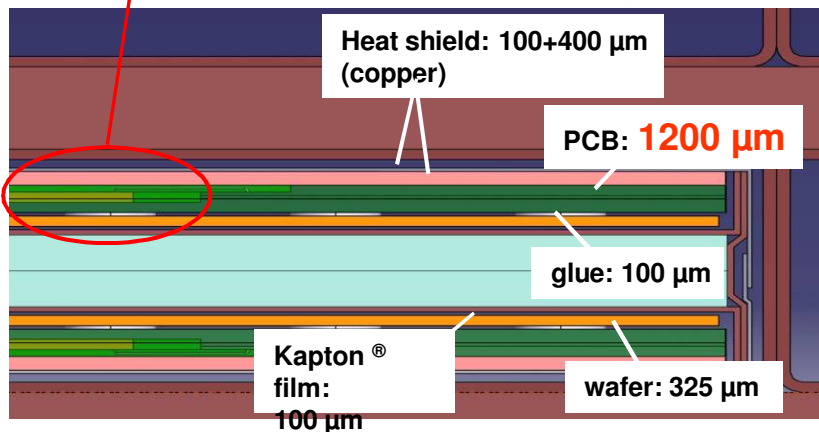
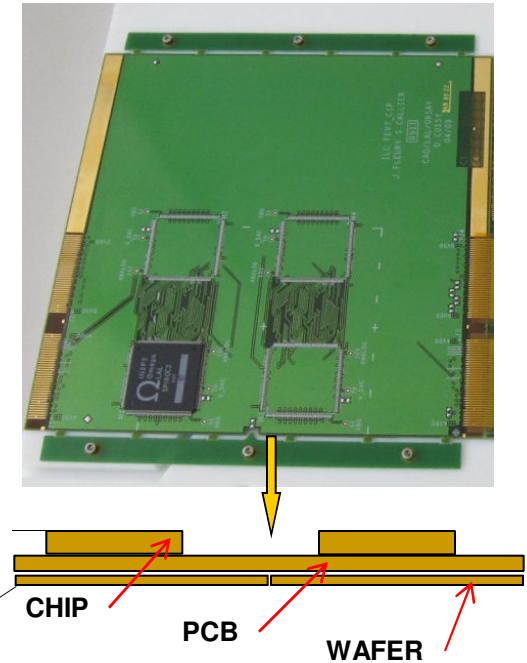


*LMR*

# EUDET design



FEV7 CIP at the present time

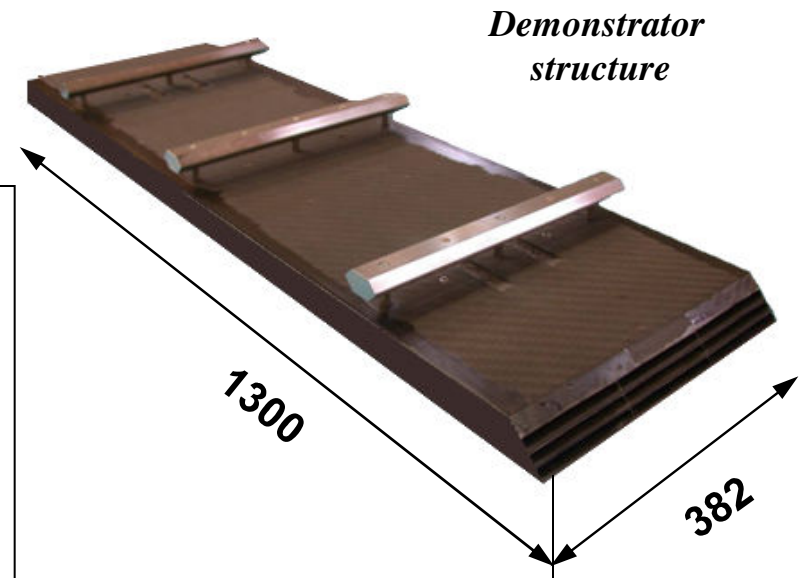


- ⇒ Clearance (slab integration) : 500 μm
- ⇒ Heat shield : 500 μm → Thermal demonstrator
- ⇒ PCB : 1200 μm → but 1100 μm used
- ⇒ Thickness of glue : 100 μm
- ⇒ Thickness of wafer : 325 μm
- ⇒ Kapton® film HV : 100 μm ? → tests
- ⇒ Thickness of W : 2100/4200 μm (± 80 μm)

# Demonstrator design

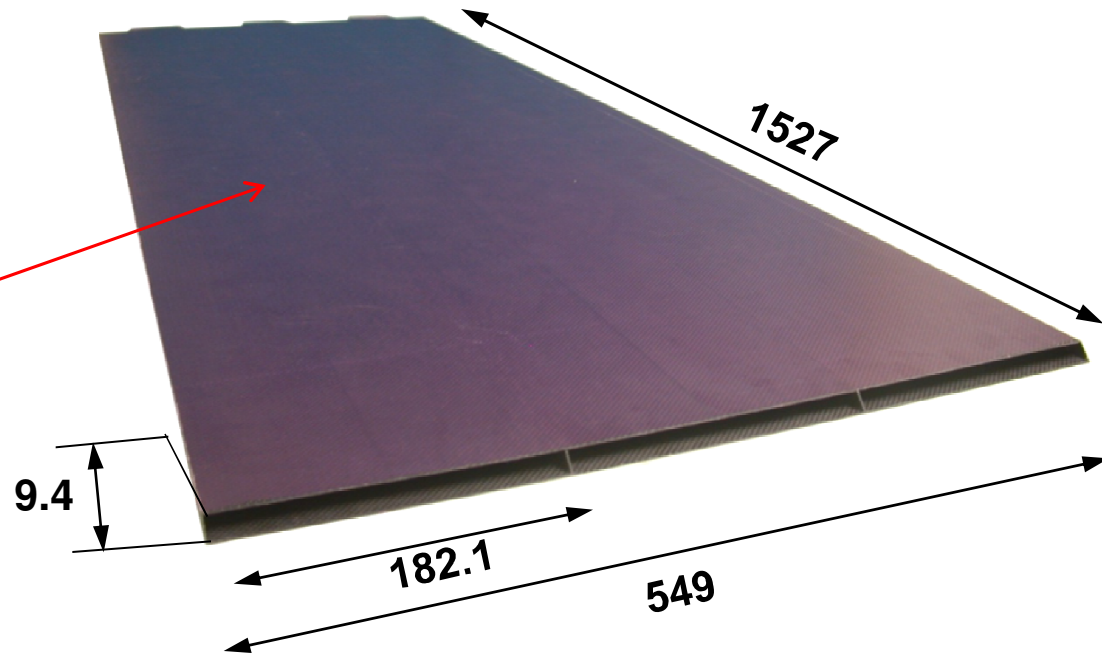
- Built a first demonstrator to understand all manufacturing processes
- Width is based on physics prototype (124 mm)
- Good precision (width, dead zone, cells thickness) (global tolerance +/- 0.01mm).
- Used for thermal PCB studies and cooling system analysis
- Used for the First test of slab integration (gluing, interconnection ...)

- It's consisted of
  - 3 alveolar layers + 2 Tungsten layers
  - 3 columns of cells : representative cells in the middle of the structure
- Used for **Thermal studies** support
- Width of cells : **126 mm**
- Identical global length : **1.3m** and shape (trapezoidal)
- Fastening system ECAL/HCAL
- weight : ~ **60 Kg**



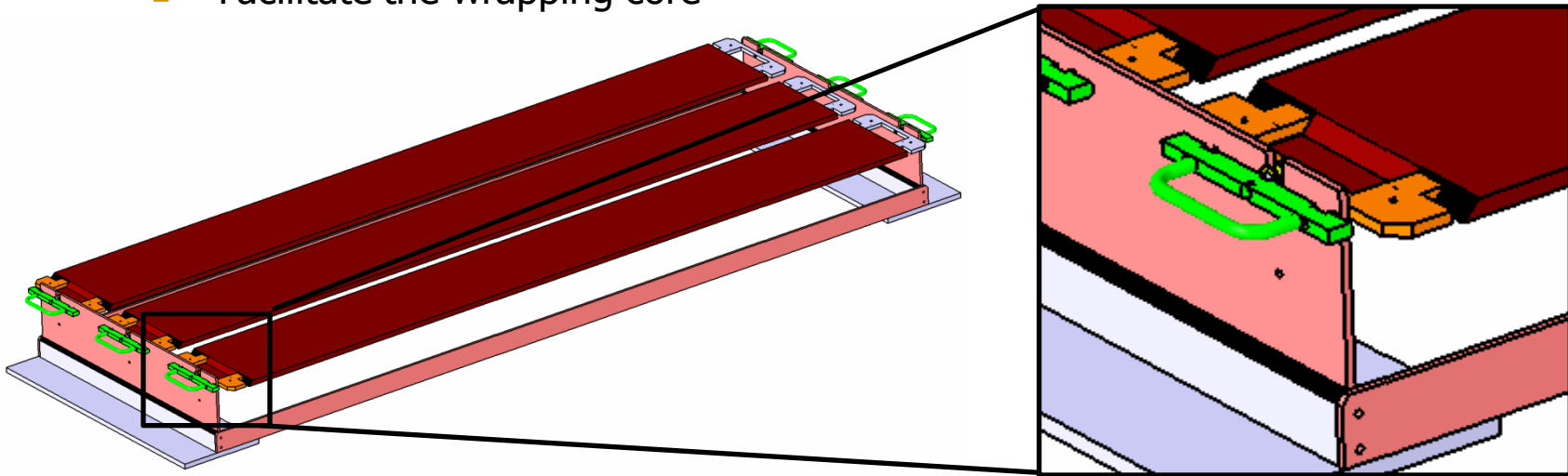
- New built layer for the EUDET Module
- Cells width is based on 182.1 mm
- Used for BEAMTESTS.

*First EUDET layer alveolar structure*

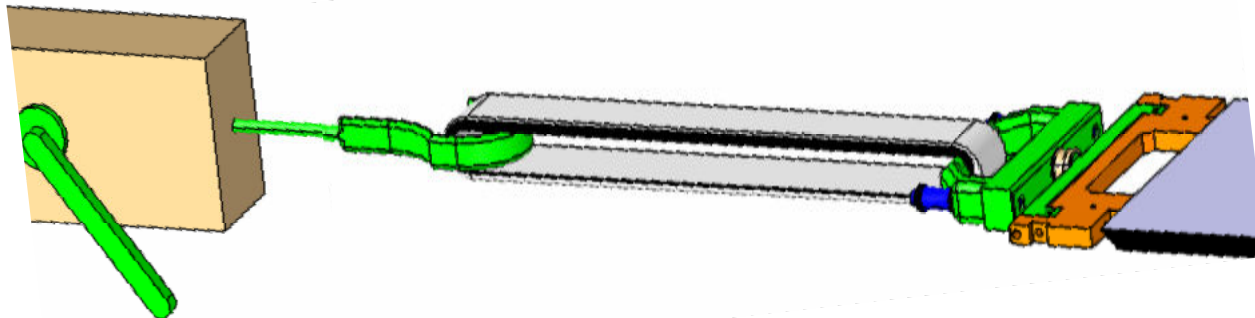


- the assembly consisted of
  - 15 alveolar layers + 14 Tungsten layers
  - 3 columns of cells : representative cells in the middle of the structure
- Width of cells : 182.1 mm
- 2 Thickness cells (7.3 mm and 9.4 mm)
- Identical global length : 1.495m
- Fastening system ECAL/HCAL
- Total weight : ~ 800 Kg

- EUDET handle core
  - Safety Transport
  - Facilitate the wrapping core



- Winch extraction core
  - Control the traction force (max 6000 N) and the speed extraction (0,5 m/min)

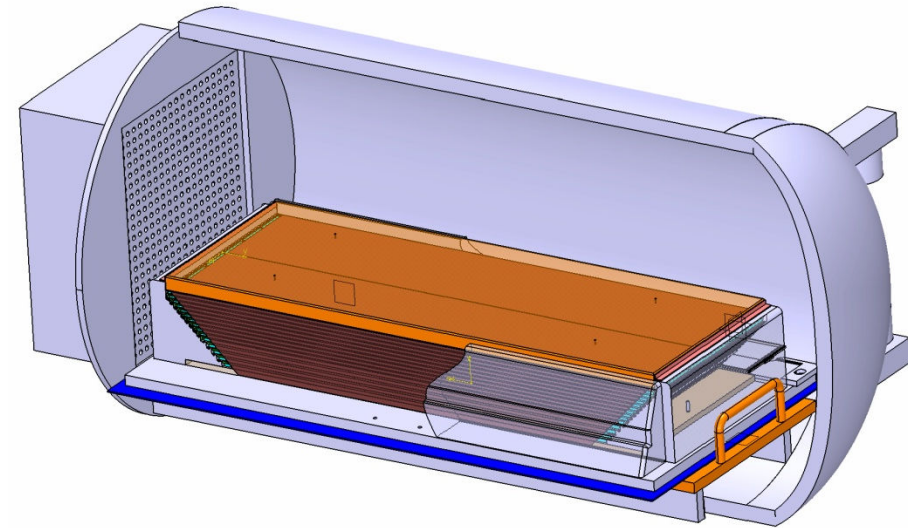
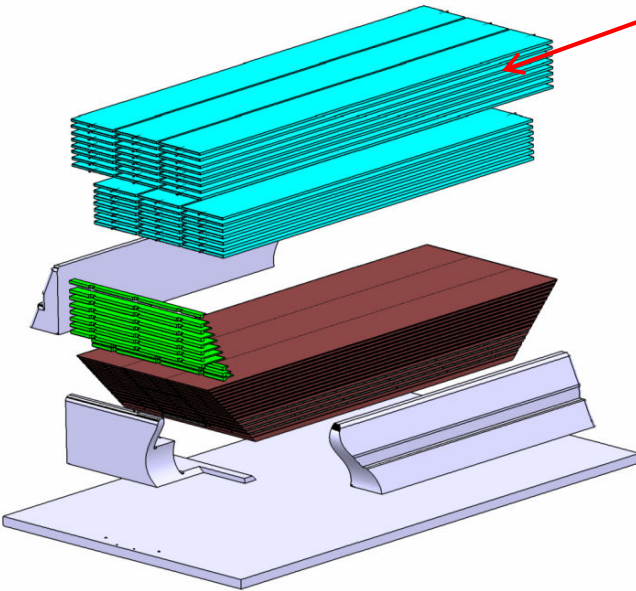
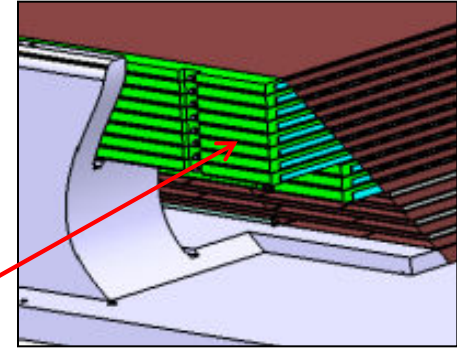


# EUDET Assembly Mould

Now, here is the EUDET assembly mould :

*ALUMINUM CORES*  
(45 cores, 15 references)

*STOP PARTS*  
(30 Parts 15 references)



- ⇒ Global design : **OK**
- ⇒ W and Carbon Needs : **OK**
- ⇒ Detailed design description : **ON going**
- ⇒ Technical drawing : **January 10**
- ⇒ Ordered : **January 10**

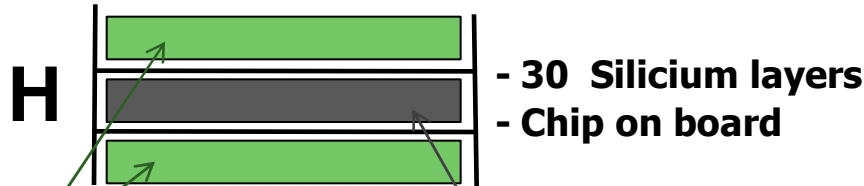
*Mould EUDET module  
in the autoclave*

# EUDET H or U SLAB

Study of one mould for whole slab structures:

- All slabs are made by several short but **precise plates**, assembled in 2 layers, in order to control the thickness and the flatness

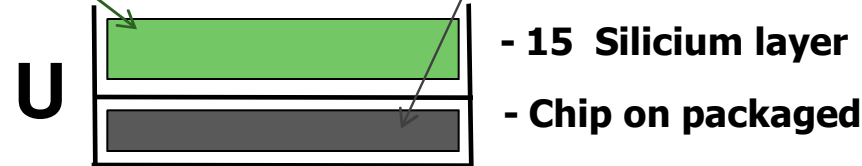
If PCB  $\leq$  1.2 mm



precise plates

W plates

If  $>$  1.2 mm



**Building an other MOULD**

- 2 months  
- 3 k€

- ⇒ Design and Machining: **OK**
- ⇒ first H structure (1300×124): **OK**
- ⇒ EUDET short and long H SLAB: **Fev 10**
- ⇒ EUDET short and long U SLAB: **Fev 10**

- The next step :
  - Build 14 mono-EUDET layer.
  - Cutting layer operation.
  - Studies the thermal inerties parameters 1.7 T
  - Insertions slab tests
  - Characterize material Test
  - Continue the mechanical tests (with bragg grating) until destroy ?



# Conclusion : schedule

■ For Eudet module :

□ We will plan:

□ "Assembly mould" design in

***January ( 2010)***

□ 14 alveolar layers in

***first half-year (2010)***

□ Eudet structure assembled in the

***first half-year (2010)***

□ "14" H or U Short structure in

***second half-year (2010)***

□ "1" H or U long structure in

***second half-year (2010)***