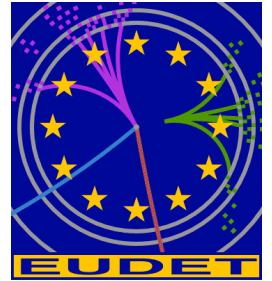


# ECAL Task Status Report



Roman Pöschl  
LAL Orsay



(Mainly) Formal overview



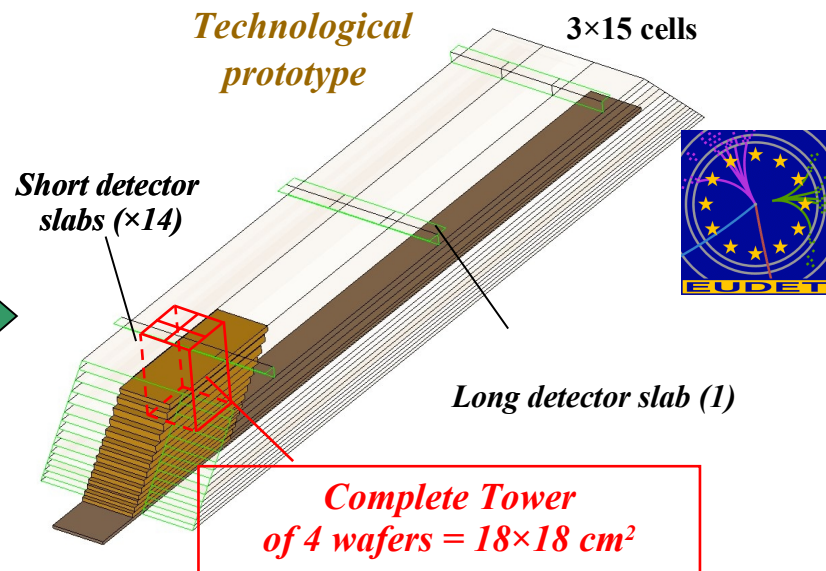
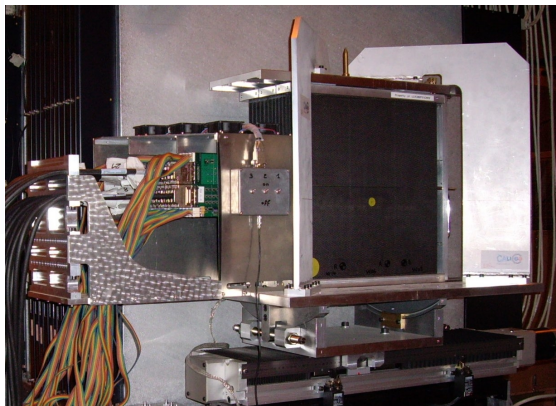
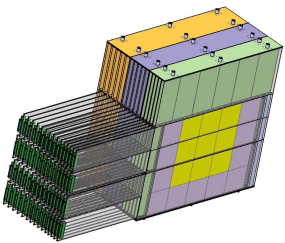
On behalf of the groups working on the EUDET Ecal



EUDET Annual Meeting NIKHEF Amsterdam/Netherlands Oct. 08

# EUDET Prototype

- **Logical continuation** to the physical prototype study which validated the main concepts : alveolar structure , slabs, gluing of wafers, integration
- Techno. Proto : study and validation of most of **technological solutions** wich could be used for the final detector (moulding process, cooling system, wide size structures,...)
- Taking into account **industrialization aspect** of process
- First **cost** estimation of one module



- **3 structures : 24 X<sub>0</sub>**  
(10×1,4mm + 10×2,8mm + 10×4,2mm)
- **sizes : 380×380×200 mm<sup>3</sup>**
- **Thickness of slabs : 8.3 mm**  
(W=1,4mm)
- **VFE outside detector**
- **Number of channels : 9720 (10×10 mm<sup>2</sup>)**
- **Weight : ~ 200 Kg**

- **1 structure : ~ 23 X<sub>0</sub>**  
(20×2,1mm + 9×4,2mm)
- **sizes : 1560×545×186 mm<sup>3</sup>**
- **Thickness of slabs : 6 mm**  
(W=2,1mm)
- **VFE inside detector**
- **Number of channels : 45360 (5×5 mm<sup>2</sup>)**
- **Weight : ~ 700 Kg**

# Timeline of the Project

2008

~Today

Construction Phase

June 2009



**Deliverable  
Structures  
and  
moulds**

**Deliverable  
Ecal Design  
originally planned  
for 6/08**

**Ecal Prototype  
available for  
TNA**

- No major delays
- Design Phase concluded  
Details see talk in JRA3 parallel session  
and ...
- Milestone(s) are accompanied by two EUNET Memos

# Two EUDET Memos published in 2008

EUDET-Memo-2008-07

## EUDET-Memo-2008-07



### ECAL Si/W – Design and Fabrication of moulds for the EUDET Module

M. Anduze, R. Poeschl

July 01, 2008

Covering aspects of the alveolar structures

**Memos do document the significant progress of the project in 2008**

## EUDET-Memo-2008-11



### JRA3 Electromagnetic Calorimeter Technical Design Report

M. Anduze<sup>1</sup>, D. Bailey<sup>2</sup>, R. Cornat<sup>1</sup>, P. Cornebise<sup>3</sup>, A. Falou<sup>3</sup>, J. Fleury<sup>3</sup>,  
J. Giraud<sup>2</sup>, M. Goodrick<sup>4</sup>, D. Grondin<sup>5</sup>, B. Hommels<sup>4</sup>, R. Poeschl<sup>3</sup>, R. Thompson<sup>2</sup>

September 30, 2008

#### Abstract

This note describes the design of the prototype for an Silicon Tungsten electromagnetic calorimeter with unprecedented high granularity to be operated in a detector at the International Linear Collider (ILC). The R&D for the prototype is co-funded by the European Union in the FP6 framework within the so called EUDET project in the years 2006-2010. The dimensions of the prototype are similar to those envisaged for the final detector.

Already at this stage the prototype features a highly compact design. The active and passive parts as well as the readout electronics are fully integrated within 2000  $\mu\text{m}$ .

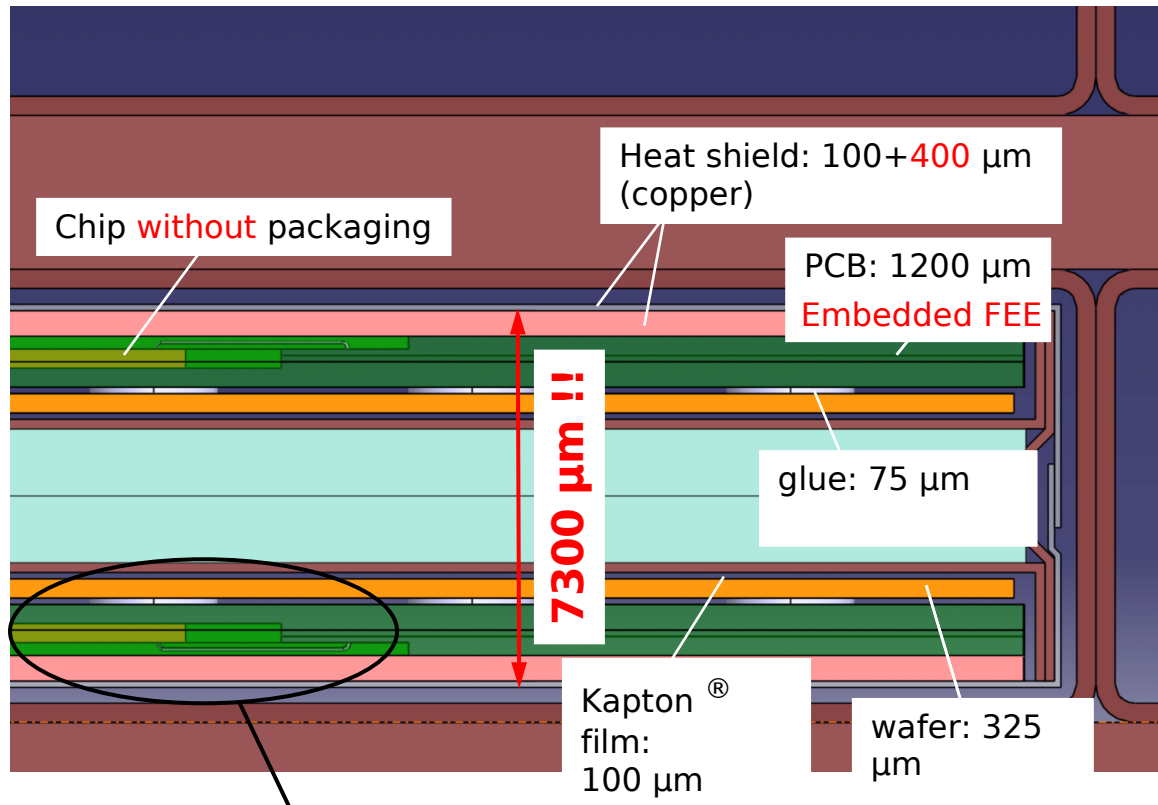
Addresses all issues of the technical realisation

<sup>1</sup> LLR – Ecole Polytechnique – IN2P3/CNRS, France  
<sup>2</sup> University of Manchester, England  
<sup>3</sup> LAL – IN2P3/CNRS, France  
<sup>4</sup> University of Cambridge, England  
<sup>5</sup> LPSC – IN2P3/CNRS, France

# Design of Slab – Cross Section

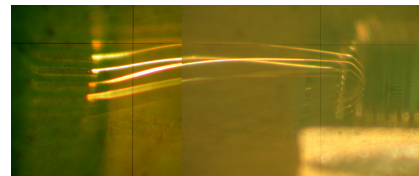
The expected alveolar thicknesses are 7.3 mm and 9.4mm:

*Design EUDET Slab*



- Design of Layout fixed during summer 2008 (compare e.g. Talk at ECFA08)
- Compactness limited by PCB Thickness
- Dimensions are results of dedicated studies

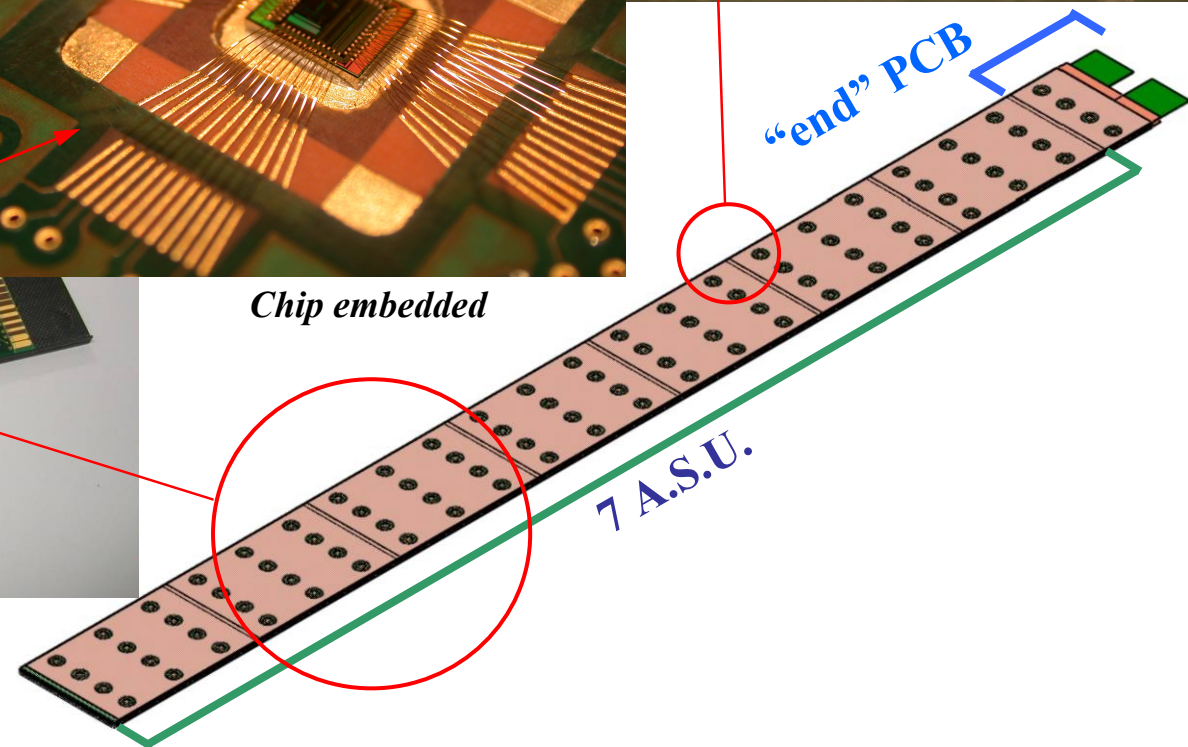
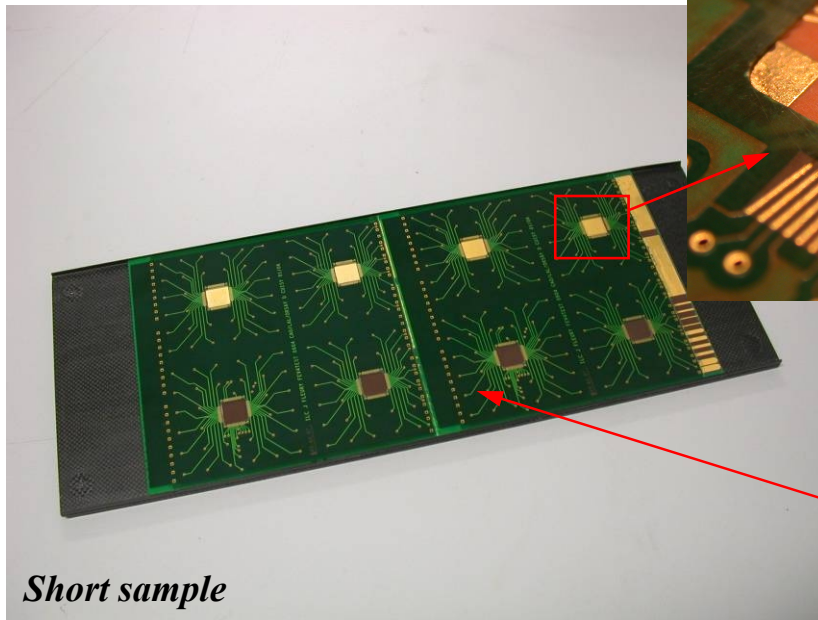
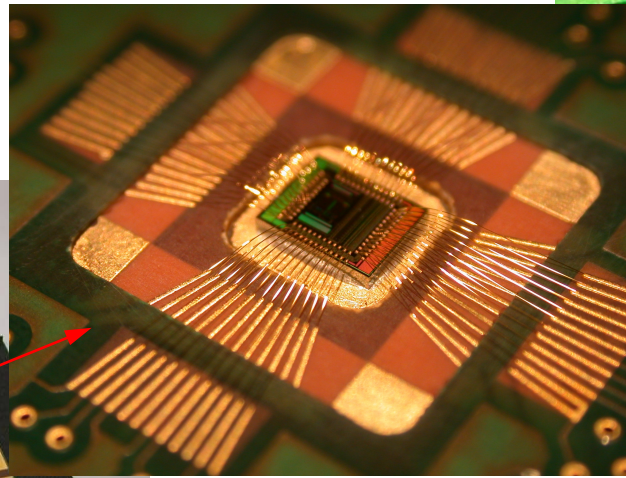
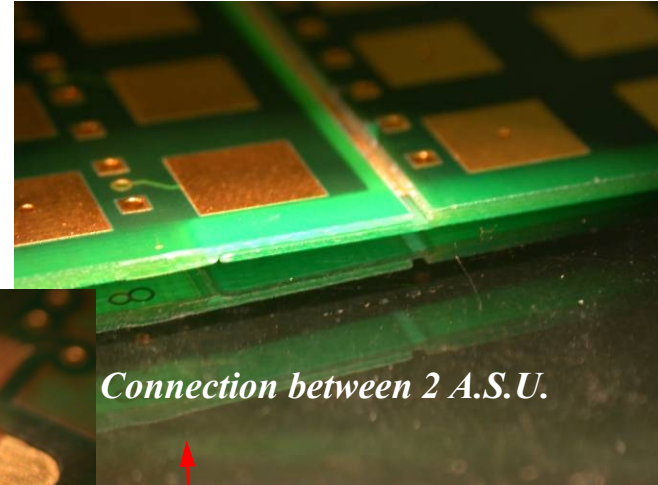
Chips and bonded wires inside the PCB



# ECAL detector slab

- Chips bonded on ASU (Active Sensor Units)

Unity of Chips, PCB and Si Wafers



# From the Design to the Construction Phase ...


Fulfilling the requirements on the pure mechanical aspects ...

In detail, a prototype will be developed that is scalable to the final calorimeter in terms of number of layers (30) and length of the barrel (1.80 m), which will allow to study all the mechanical, thermal and connectivity questions. The consumables will cover the mechanical

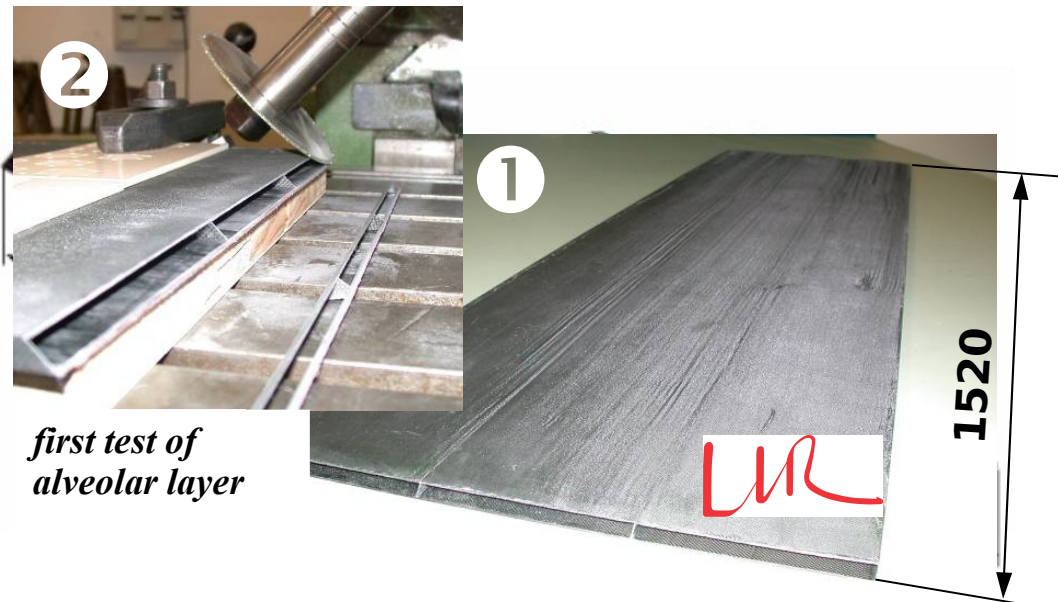
... using existing material

**A Demonstrator Module**

# Demonstrator design

- We ~~plan to~~ build a first **small demonstrator** to validate all process before the EUDET module
- Dimensions based on physic prototype (cells width : 124 mm)
-  need to validate all Eudet dimensions !!! (see Aboud's talk)
- <sup>Will</sup> Could be used for **thermal studies** and analysis : design of a thermal PCB and cooling system.

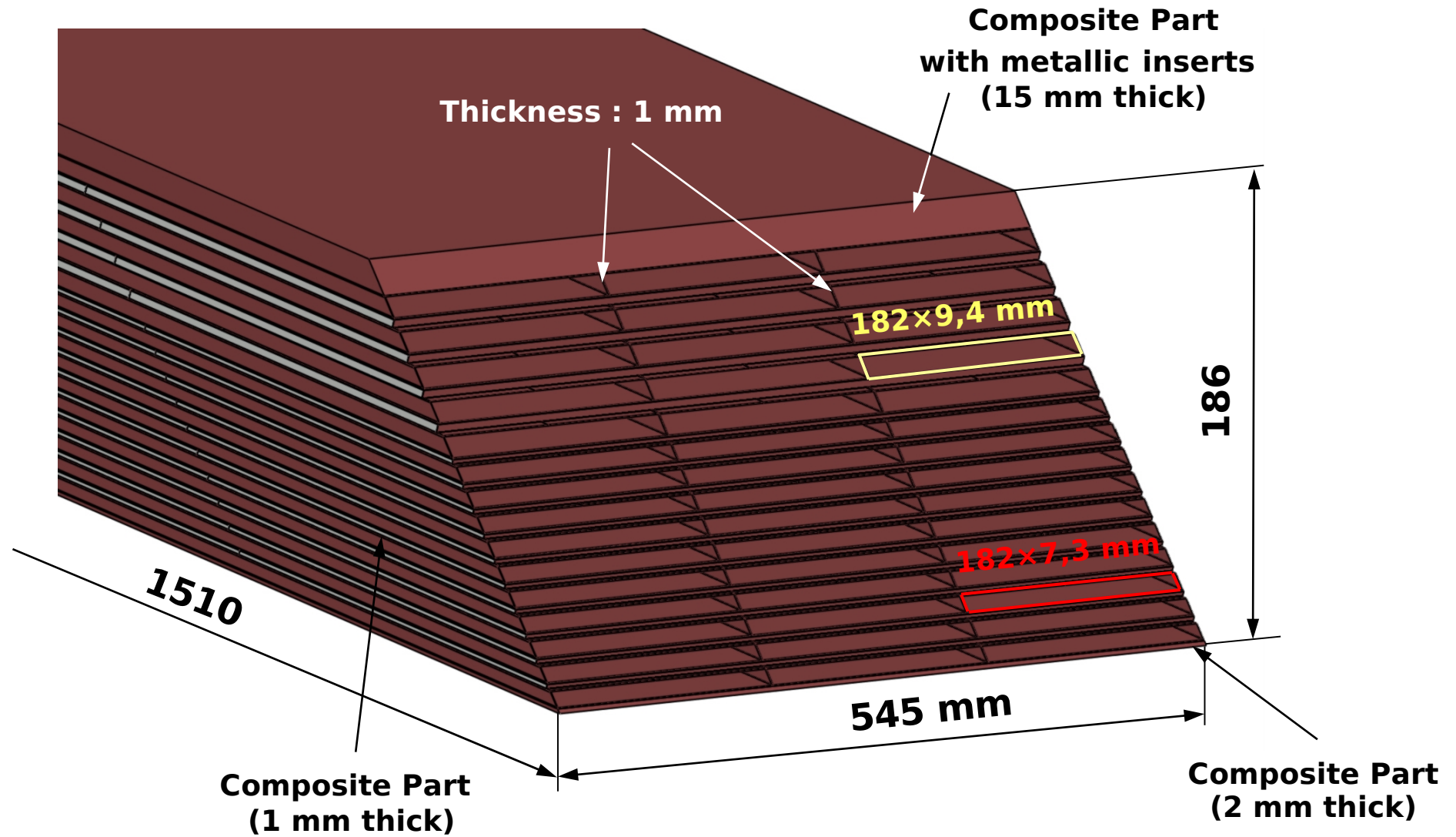
- **3** alveolar layers + **2** W layers
- **3** columns of cells : representative cells in the middle of the structure
- **Thermal studies** support
- Width of cells : **124 mm**
- Identical global length : **1.3m** and shape (trapezoidal)
- Fastening system ECAL/HCAL



**Studies to be completed by ~Dec. 08**

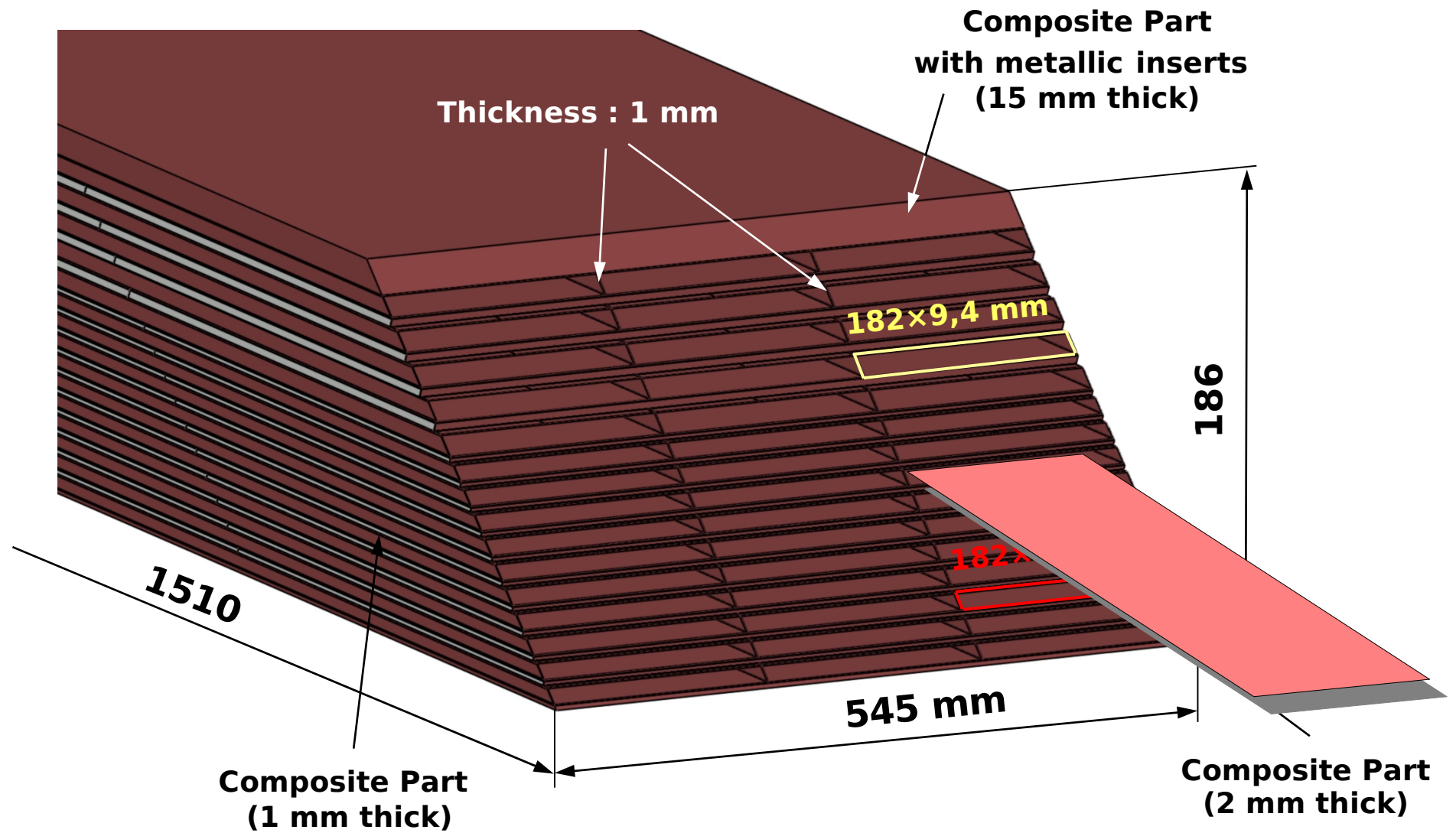


# The 'real' EUDET Module



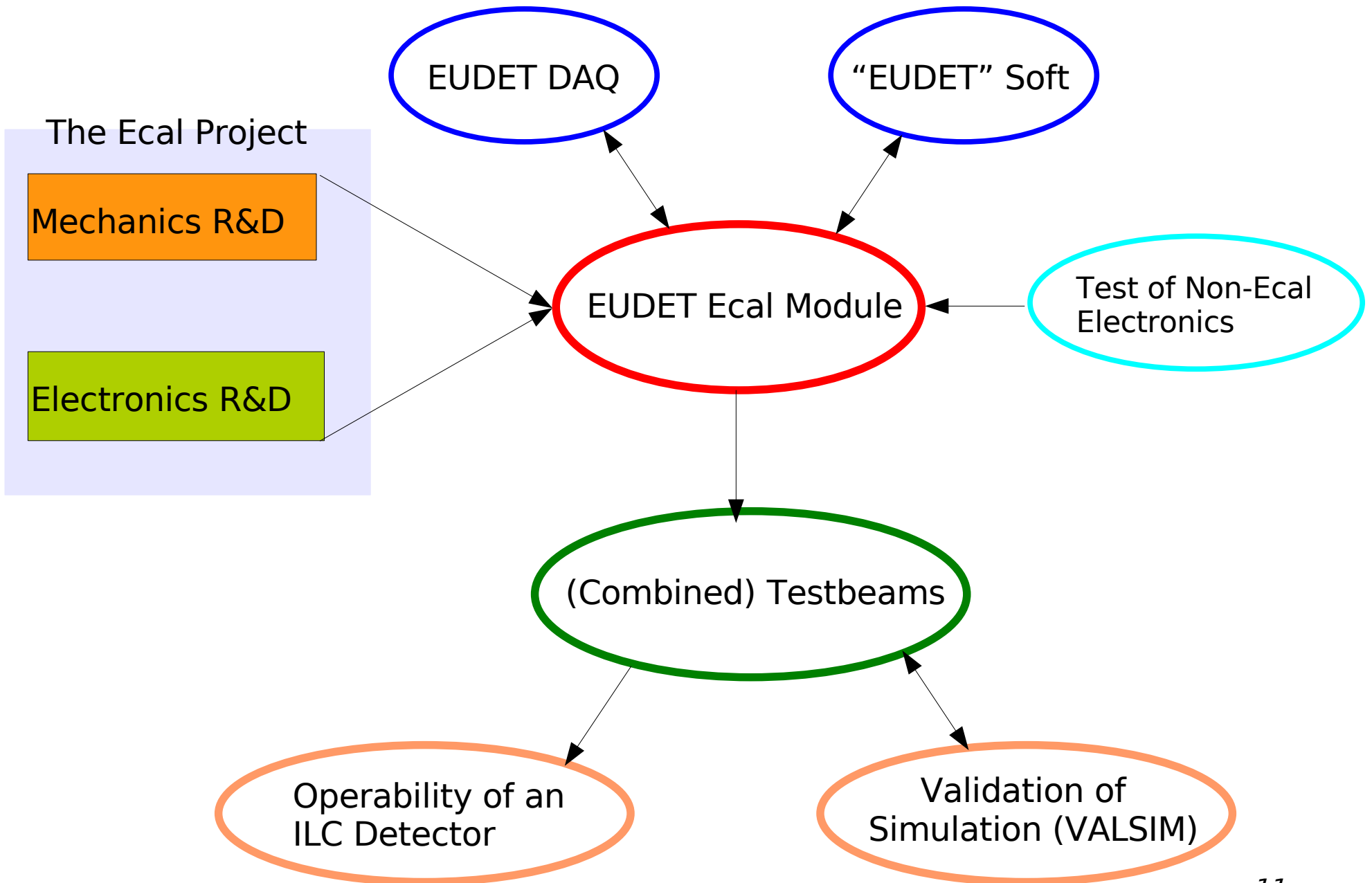
- Construction pursued parallel to demonstrator studies

# The 'real' EUDET Module



- Construction pursued parallel to demonstrator studies
- Will be progressively equipped with the full functional ASUs

# EUDET Module and Transnational Access - > June 2009



# Summary and Conclusion

- Design Phase for EUDET Ecal Module concluded  
Two Notes on design have been published
- Construction Phase starts with the Construction of a demonstrator  
**Construction of Ecal Module will be pursued in parallel**
- Full Exploitation of device requires mutual interplay with other EUDET Projects
  - DAQ
  - Software
  - Combined testbeams
  - VALSIM
- Important step towards an SiW Ecal to be operated at the ILC