Plans at LAL – Visit to SKKU

Roman Poeschl

Group Organisation

Responsable du groupe
Roman Pöschl

Physics studies

J. Rouëné, F. Richard, D. Zerwas, M.S. Amjad, E. Kou

Detector R&D

Tests Ecal
Ecal: J. Rouëné (→ Summer 2014),
T. Frisson (‖2013)

Integration Ecal:
J. Bonis (SDTM),
A. Thiebault (SDTM)
P. Cornebise (SERDI)

Integration ILD:
C. Bourgeois (SDTM),
A. Gonnin (SDTM)

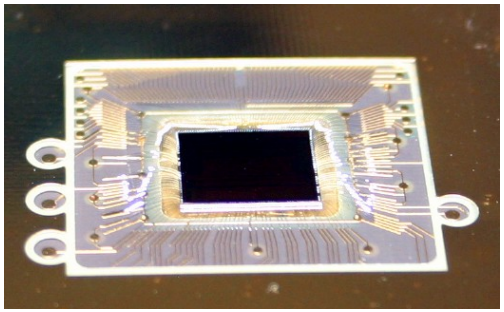
Algorithms and beam Test analysis

N. van der Kolk
(with LLR until Sept. 2014),
B Kegl

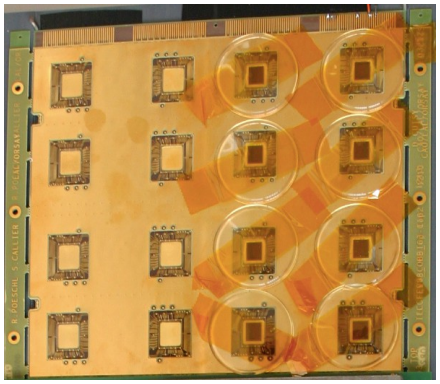
Request for P2IO postdoc

Detector R&D
- LAL Contributions -

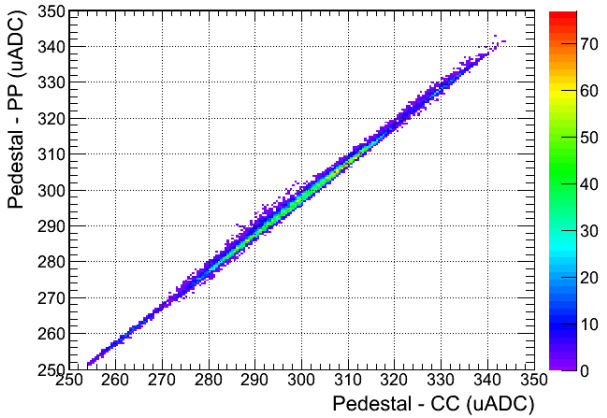
Realisation and tests of front end electronics for the Ecal



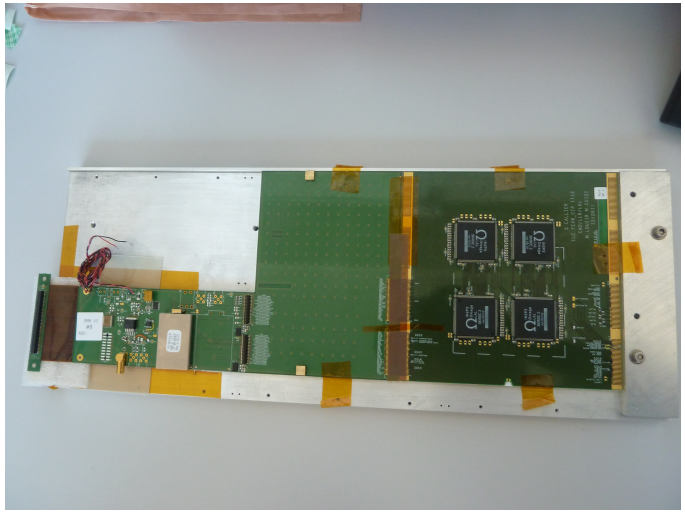
SKIROC chip as part
of series of chips for
highly granular calorimeters



Flat PCB,
The « impossible »
becomes real

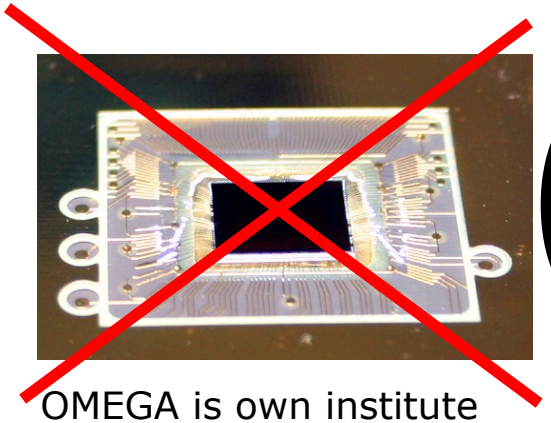


Characterisation on electronics
Tests of power pulsing
Test beam analsyis (see also later)

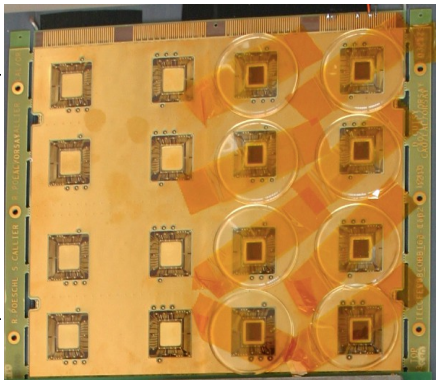


Assembly of layers for beam test

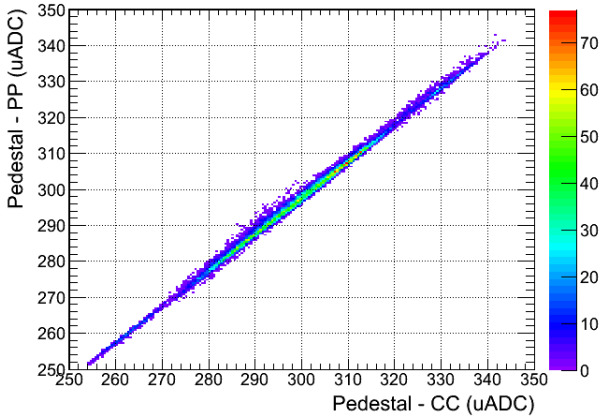
Detector R&D
- LAL Plans -



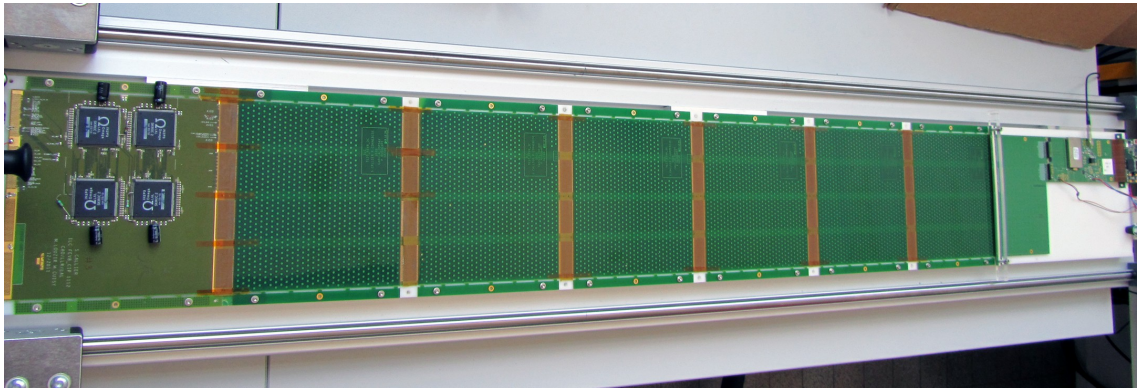
OMEGA is own institute
No clear way how to
Continue collaboration



Will follow up as much
as possible (see also later)

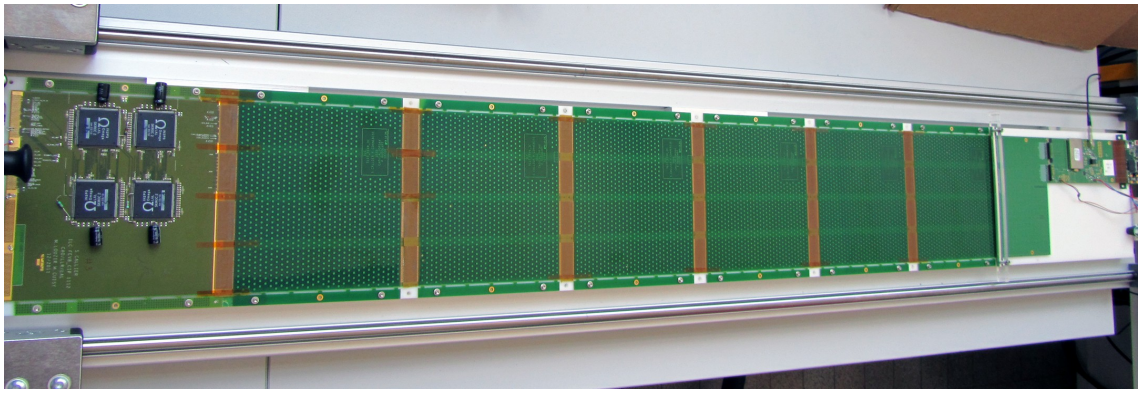


Will finish 2008, 2012 papers
Power pulsing analysis
Beyond ?????



Towards long layer ...

Detector R&D
- Towards long/real layers -

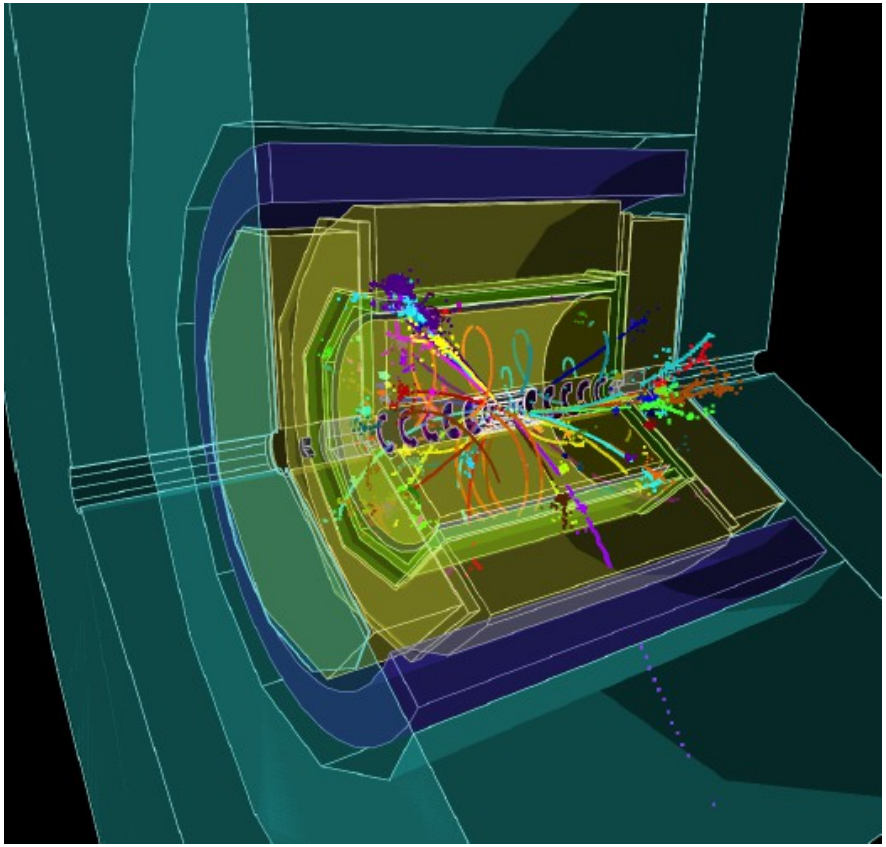


- Study of long slab signals (Winter 2013/2014)
- Revision of interconnection according to PCB specs
- Automatic measurement/recording across interconnections
  Completion of measurement station in Spring 2014
- Evaluation of mechanical stress during ASU positioning in H/U structure
  Order of a sensor device to measure pressure during positioning
  Tolerances of PCB dimensions, wafer dimensions
  => Set of specifications for automatised procedure
  answers until spring 2014
  Application of results for assembly of long slab, scrutinisation of assembly tools (including monitoring of elements) at LAL to assemble long slabs
  => Full robotic system, semi-robotic system, in-house assembly or outsourcing ?
  First proposal until end of 2014

LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE

Visit to SKKU

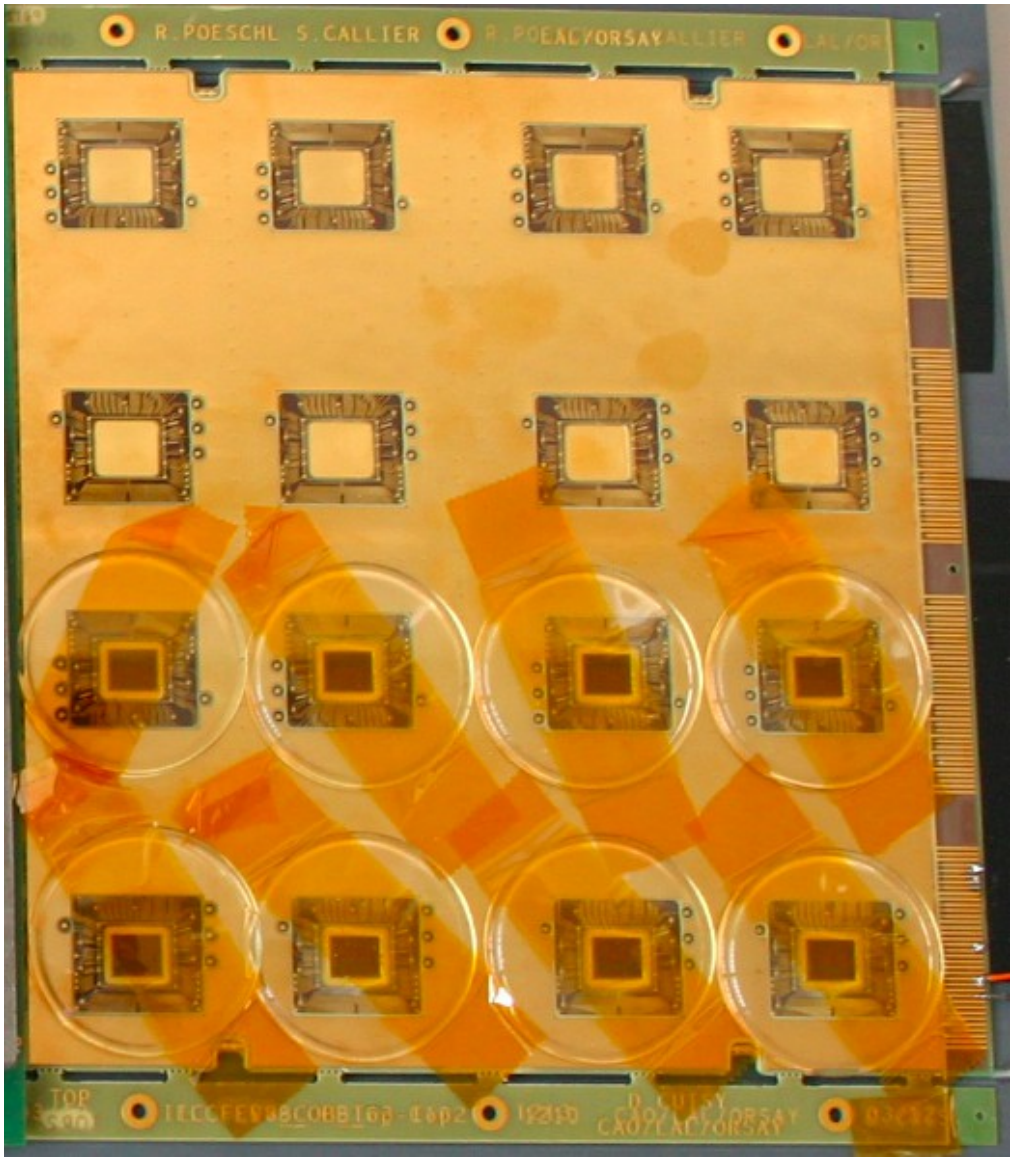
1-6 November 2013
Funding through FKPPL



cnrs IN2P3 Les deux infinis

UNIVERSITÉ PARIS SUD

Reminder FEV_COB



- Interface board with Chip On Board
  - Assures compact calorimeter

- Not trivial specs
  Ultrathin : 9 layers with thickness of about 1.2mm
  Deviation of total planarity of about 0.5 mm (3mm is industrial standard)

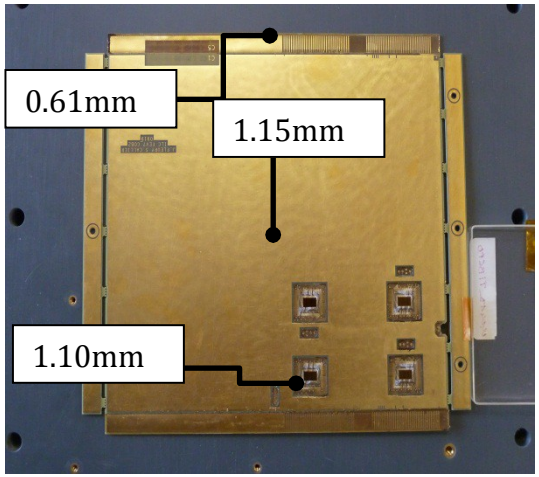
However it's now there in a first version

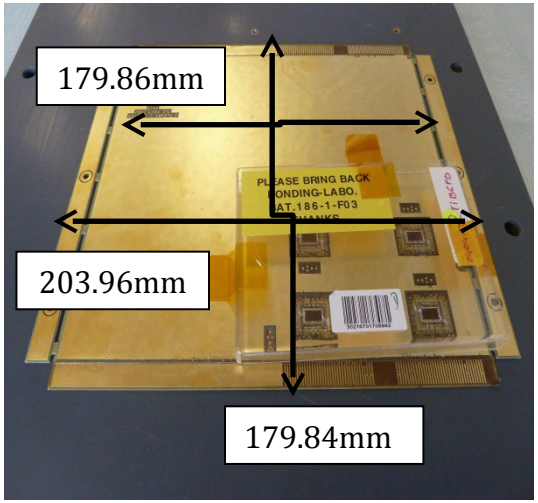
- Design and routing OMEGA/LAL
- Fabrication end of 2012
- Metrology at LAL
- Chips mounted beginning of 2013 by CERN bonding lab

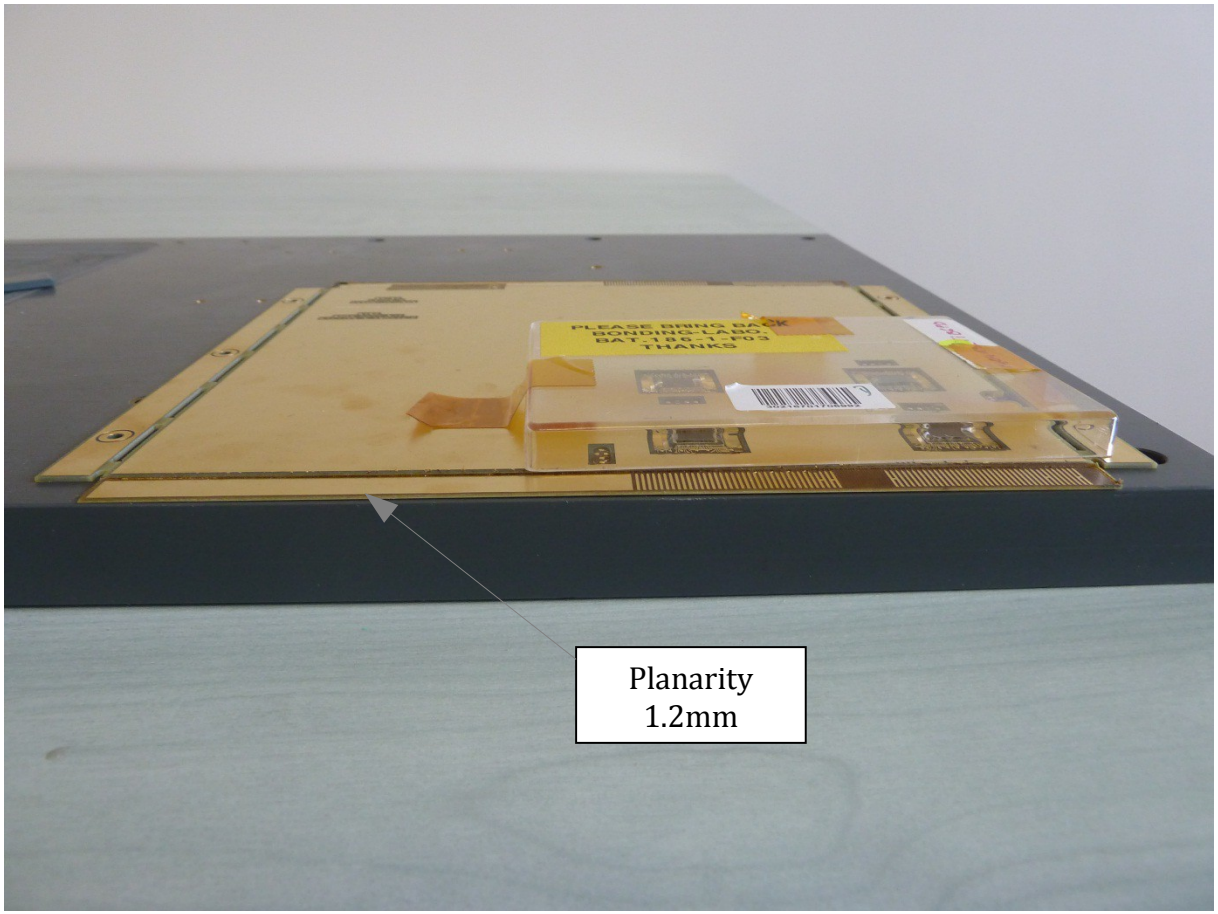
- First tests in summer 2013 at LAL
  See Annecy meeting
  Characterisation continues as much as possible
  Roeune/Callier (R.P.)

FEV7_COB – Test production by EOS

… under supervision of SKKU at Suwon







- Very promising from mechanical point of view
  (Better than anything we have ever found in Europe)
- Could not be tested since it came somewhat late

Meeting at SKKU

- ANME lab of SKKU is accelerator group for medical applications

  Recent realisations: Compact cyclotron, plan for short LC for computer tomography

- Prof. Chai has "history" in particle physics (PHENIX) and wants to keep competence for detector instrumentation in his group

  Contact since 2009, introduced to CALICE by Henri Videau
  Internship of Korean students at OMEGA

- 2 1/2 days of meetings/industrial contacts
  - Presentation of SKKU projects, Cyclotron visit
  - 1/2 day of CALICE i.e. Ecal seminar
  - General discussions on next steps

  Many thanks to Seung-hyun and Ho-Seung for the efficient meeting

- Visit to HSDGT company for PCB production

  Solid company but not very specialised for high tech i.e. multilayer PCBs
  Still will send them our files

Meeting with EOS company

- EOS company specialised for thin multilayer PCBs

  PCB producer for Missile, space, aerospace and medical applications
  Capability of mass production
  See brochure

- First visit to EOS company by R.P. in November 2011

  Arranged by SKKU
  Delivery of FEV7_COB in April 2012

- 1 afternoon meeting on 5/11/13 at SKKU

- EOS represented by
  Eun Duck Oh General Manager Quality and Engineering
  Alex Kim Assistant General Manager Overseas Sales Dpt.

- ECAL represented by Stephane Callier and R.P.

- Lot of detailed technical discussion between mainly Stephane and Mr. Oh

FEV_COB – Fabrication process

CAO/LAL/ORSAY

Experiment : ILC

Board : FEV8_COB

PCB FEV8_COB is made of the assembly of the 2 pcbs number 1210 and 1213 with electrical connection of GND

Assembly process :

After manufacturing, both board should be assembled together with an adhesive conductive tape or a conductive glue under specific operation conditions (low temperature, limited pressure on boards) to avoid any board bending.

=> GND copper plane of layer C2 of PCB 1210 and copper plane of layer Top2 of PCB 1213 will be electrically connected.

Top layer of PCB is connected to GND.

06/07/2012

D.CUISY +33 1 64 46 85 36

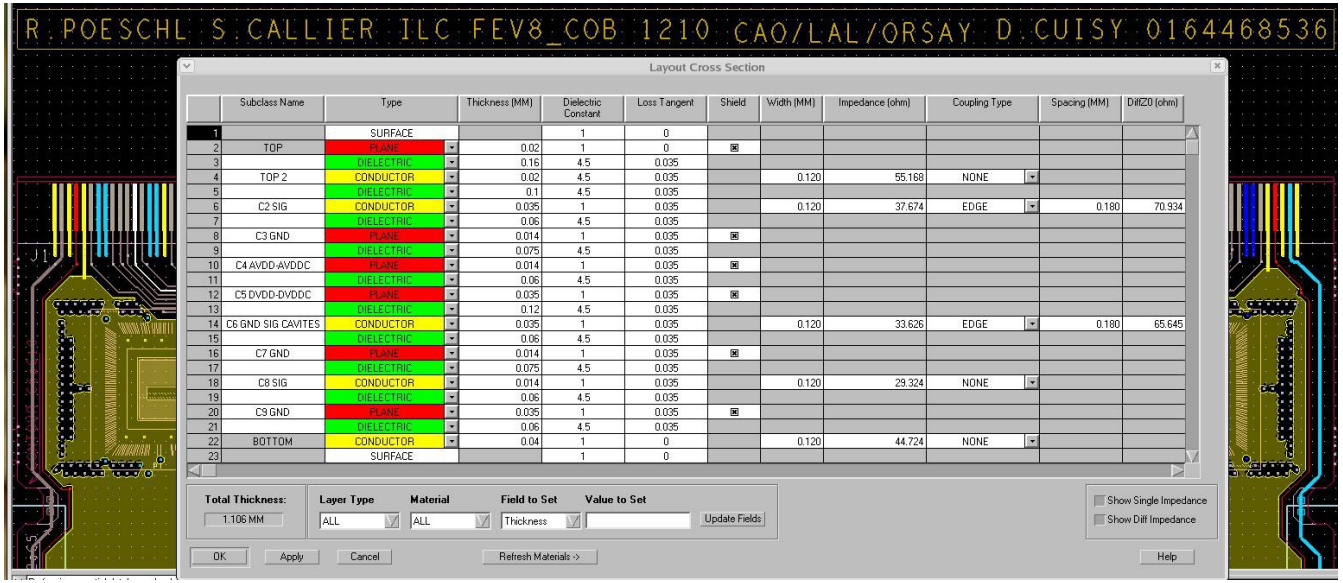
- EOS understood the step from a 4 chip board to a 16 chip board

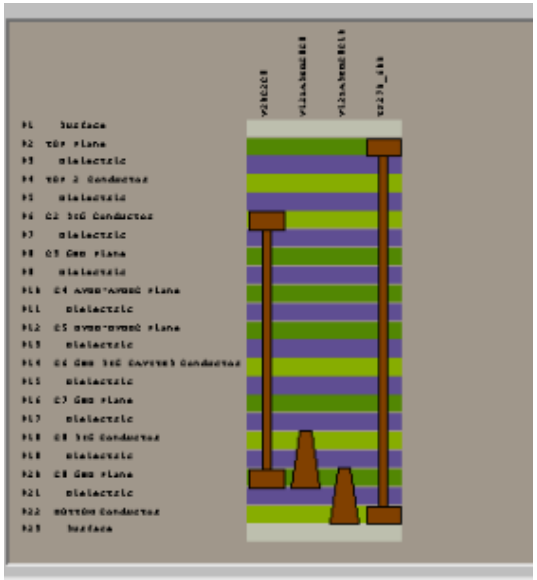
- Discussion emerged around fabrication process
  2 piece board -> 1 piece board (see demonstration)

- EOS will produce alsp 2 piece Board but expressed confidence that they can produce the board in one piece
  Would relax mechanical stress during curing

  Btw.: EOS able to realise cold pressing of PCBs

Cooperation with EOS





- Discussion of details of layer arrangements and drilling holes
- Questions on specifications
  Main spec formulated: Maximum deviation from planarity 0.5mm
  Let EOS propose reasonable thickness of board under this constraint

Next steps:
- Stephane will revise layout of FEV_COB PCB to provide proper alimentation of ASICs
- Layout will be validated by Specification Control Team of EOS
  -> Will propose modifications if necessary
- Production of FEV_COB PCB

EOS Conclusion

Concluding remark by EOS Engineer

"We will make you a perfect board"

Well, let's hope for the best