

Testbeam 2019

General overview and status at LAL

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SiW ECAL Groups in CALICE:



Testbeam preparation Meeting – 16/5/2019

Beam time:

24/6/19 – 7/7/19 at DESY

- Reserve your hostel room!!!!
- **Reminder Training: Each Monday 1pm, obligatory before entering the beam test hall!!!!**

Objectives:

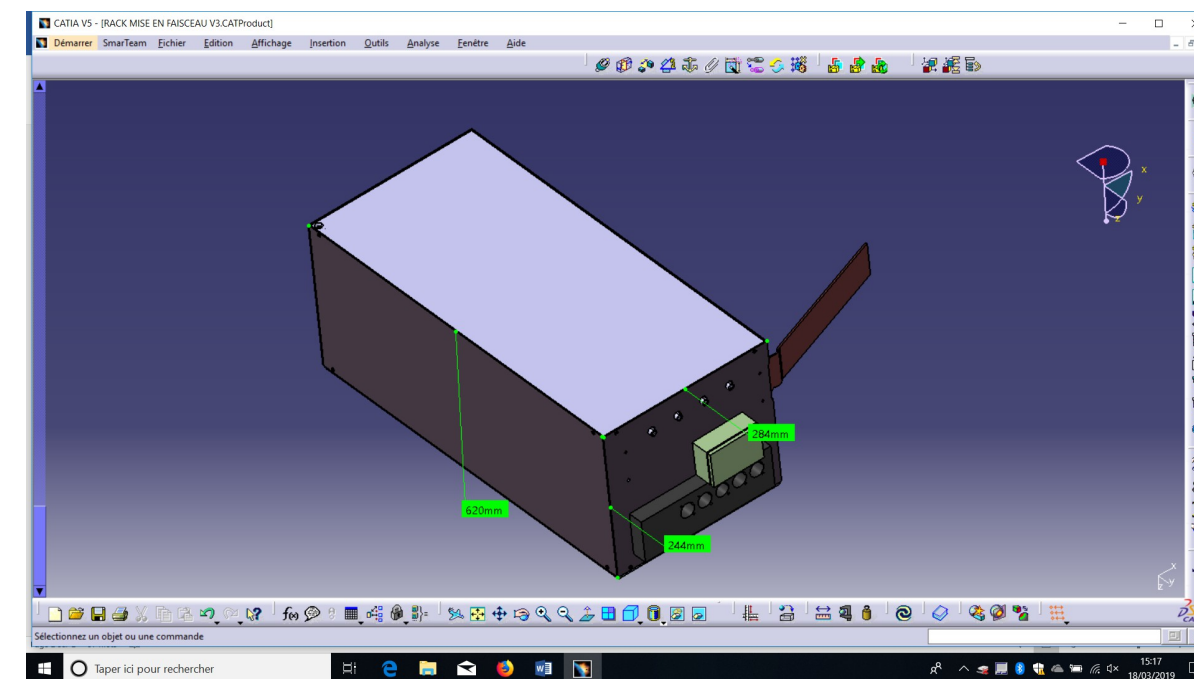
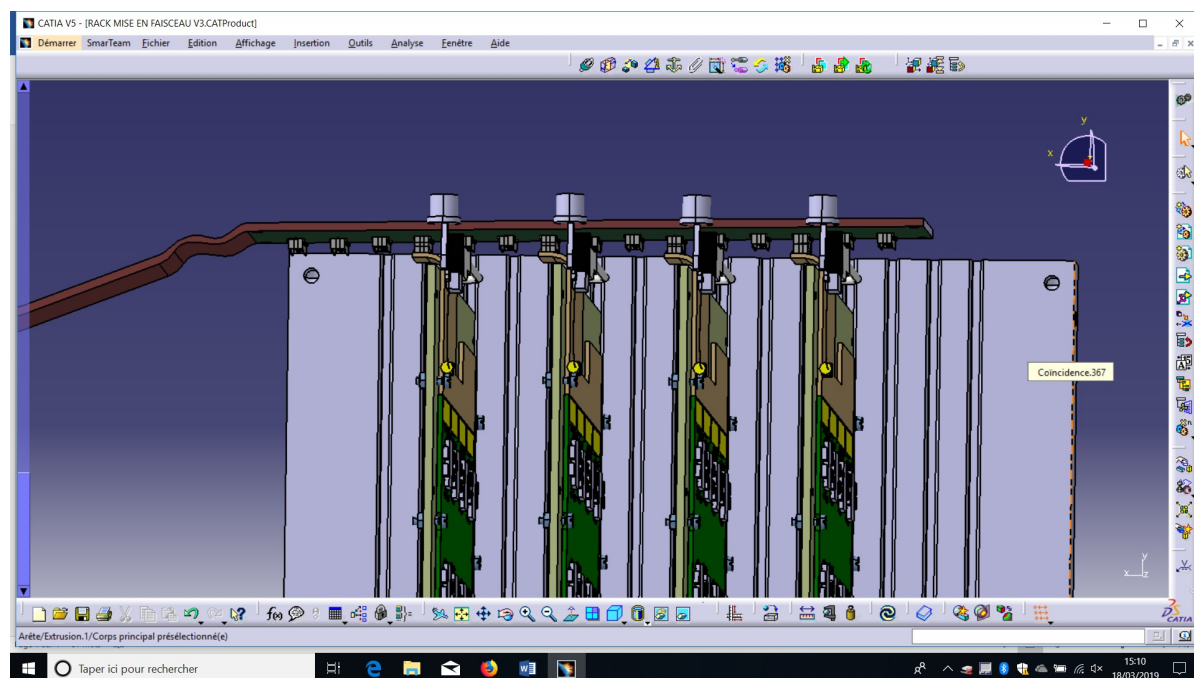
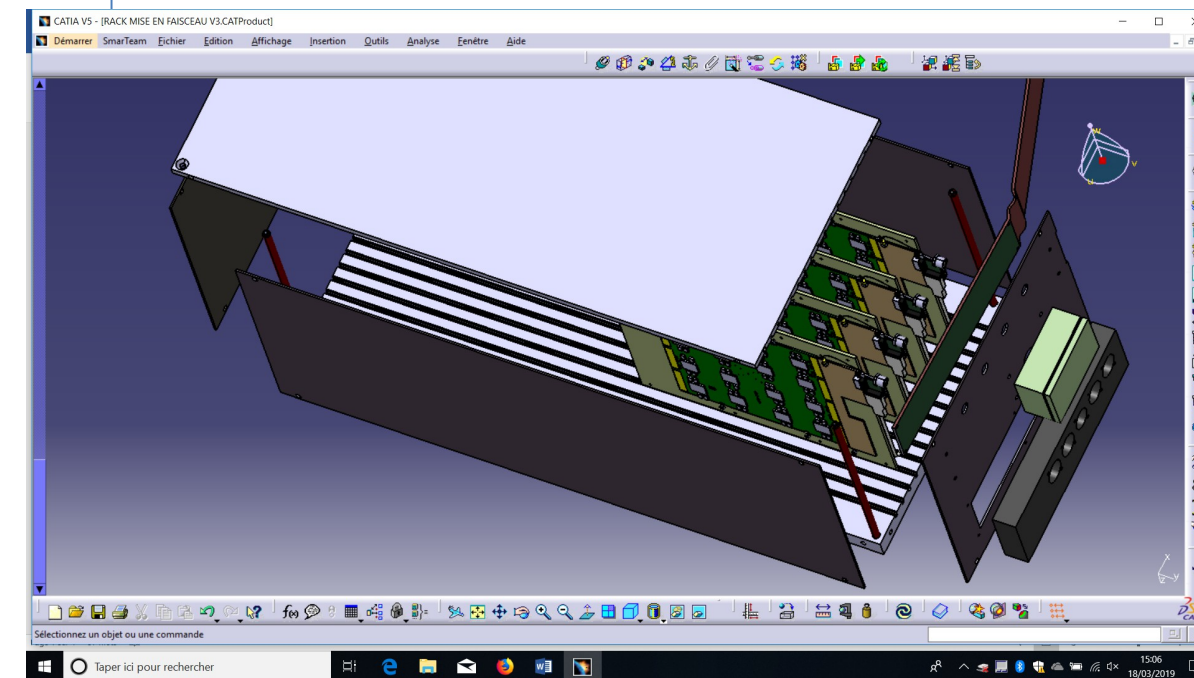
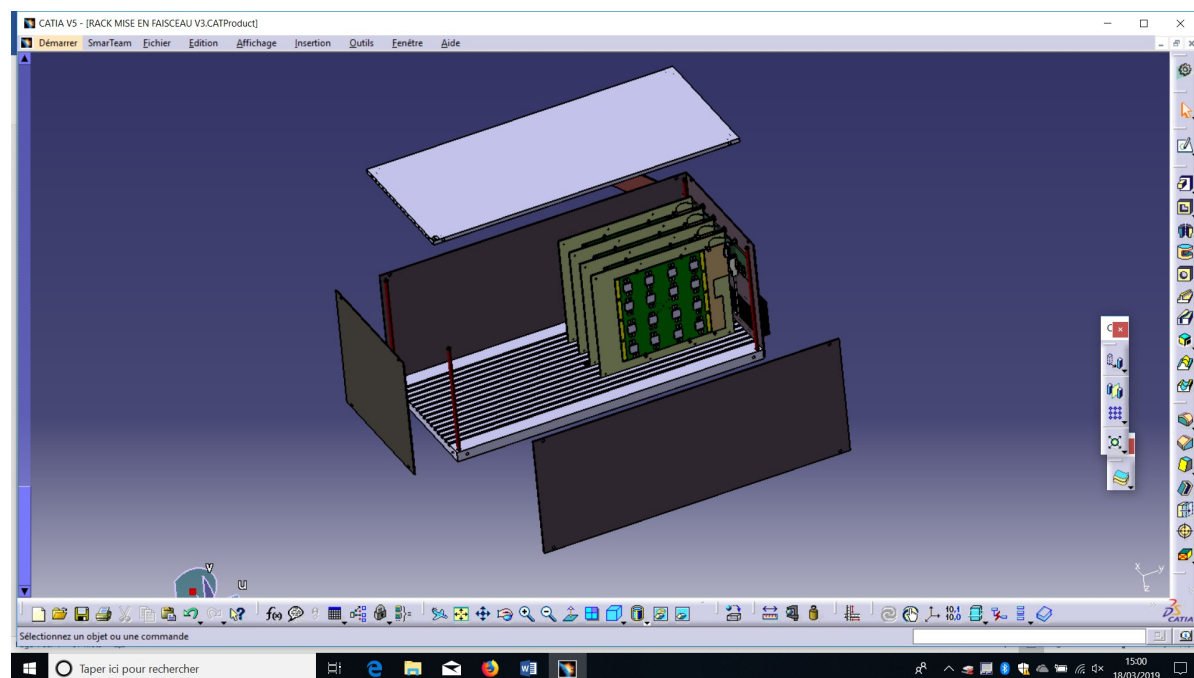
- Comparison of ASU based on BGA and of ASU based on COB
Two of each type = 4 ASUs
- Test of new SL-Boards
- Validation of FEV13-JP Layers (See Taikan's talk)

- FEV-BGA
 - 1 FEV11
 - 2 FEV12
- FEV_COB
 - 3 FEV COB equipped with ASICs
- 10 SL Boards
- 1 SMBv4 and 1 DIF for check-out of ASUs (“ASU Validation Bench”)
- 5 FEV13-JP

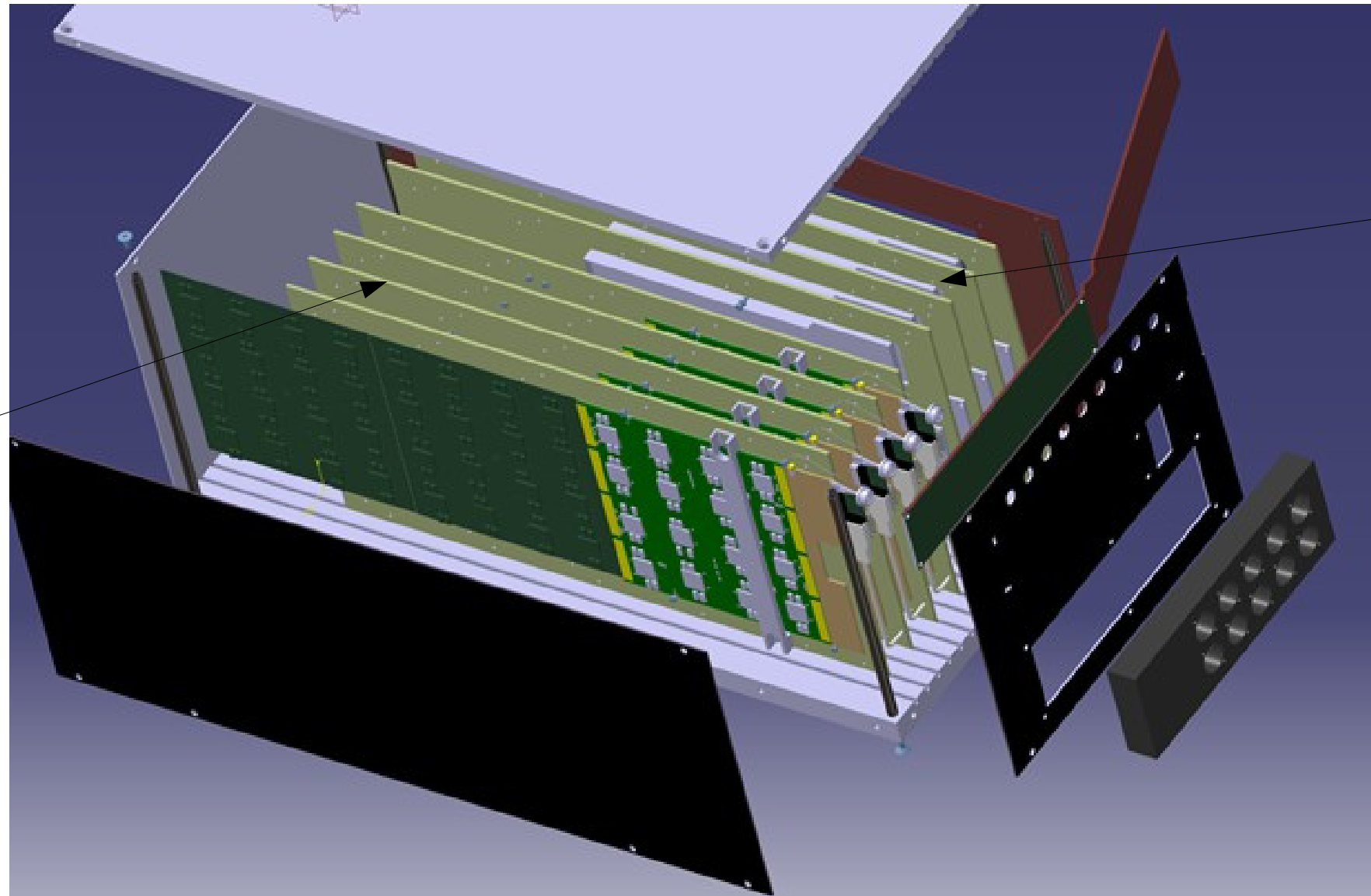
- Design of mechanical structure end of March - **Done**
 - Machining is ongoing. Timescale?
- Fabrication of mechanical structure started 15/4/19 – **Time scale ~1 – 1.5 months**
 - Mechanical integration of FEVs
- Cabling work 1st batch end of March – **Done (see later)**
 - 2nd batch once mechanical structure is available
- Cabling of PCBs middle of April – **90% achieved**
 - **FEV12_1** is fully cabled and tested (with SMBv4 and SL-board)
 - **FEV12_2** is cabled at the 90% (no Gradconns, waiting for gluing/aspirations tests)
 - **COB_a** fully cabled and tested (with SMBv4 and SL-board). One chip faulty... more debugging tests to come.
 - **COB_b** fully cabled and tested with baby wafers.
 - **COB_c** and **d** cabled at 90%, waiting the gluing/aspirations tests for the gradcon soldering.
- “ASU Validation Bench” ready beginning of April -
 - **Based on SMBv with gradcons. Two possibilities:**
 - **Direct contact of the gradcons in the SMBv with the pads in the ASU. Only reliable for basic tests**
 - **With gradcons in SMBv and on the ASU under test.**

- Firmware of SL Boards for SC loading and data readout ready end of May – **Ongoing**
 - Cross check of sent and read SL by software and scope. **Done**
 - Slab debugging in different modes of data acquisition (external trigger generated by firmware, auto trigger with only noise and injected charge) **Done and data checked by scope**. Preparation of the state machine for the data readout is **ongoing** (~ end by before end of May)
 - Slabs synchronization by the kapton connected to the Mother Board - **To be started at end of May.**
- Gluing of wafers – **in close contact with LPNHE**
 - 4 wafers (500um) for 4 ASUs (one wafer per ASU)
 - Robot aspiration tests done at LPNHE with BGA and COB ASUS with and without gradconns.
 - For the BGA we need to remove the Gradconns and few other residual soldiering dots. **Beginning next week.**
 - For the COB, due to their differences with the BGA, we need to create a mask to adapt the board to the aspiration plate. Prototype in plastic done (Gallas et al). To be checked with LPNHE experts (Cornat et al) on (Friday) and then it will be built in aluminum. **Ongoing.**
- Gluing purchase will start at the end of this week or next week. **Ongoing.**
- Tests with “fake” glue to be started as soon as the ASUd are in LPNHE. **next week/ end of May.**
- **Gluing will start in June.**
- Gluing the wafers in the COB with the mask will require some recalibration of the procedure. **After BGA gluing.**

- Commissioning of detector in lab – end of May beginning of June
 - All ASUS without wafer are already commissioned or under commissioning process. **Done.**
 - Commissioning with wafers will happen after gluing. **Mid June.**



Agreement at preparation meeting 20/3/19 to host FEV13-JP in
=> Adaptation of mechanical structure

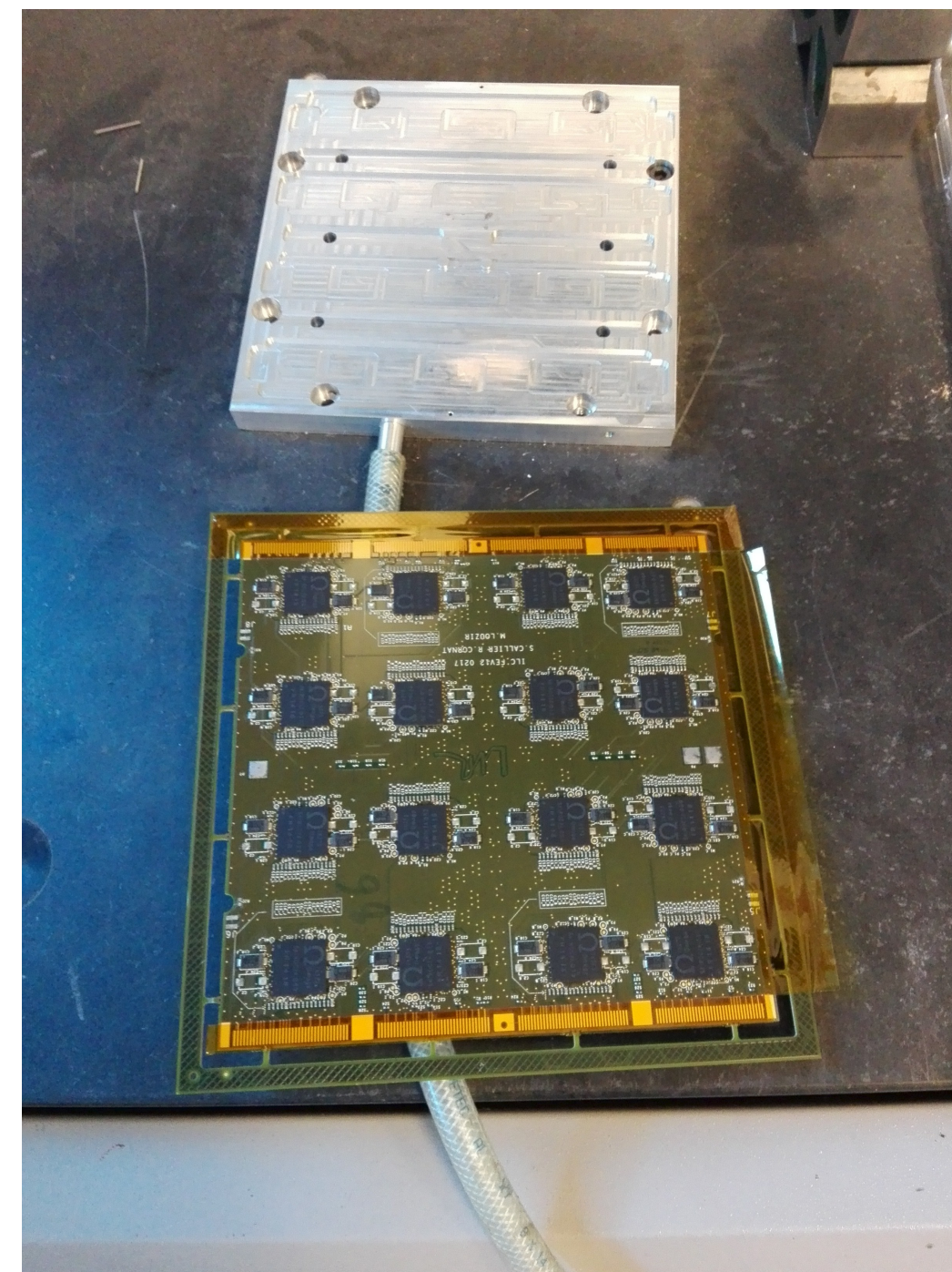
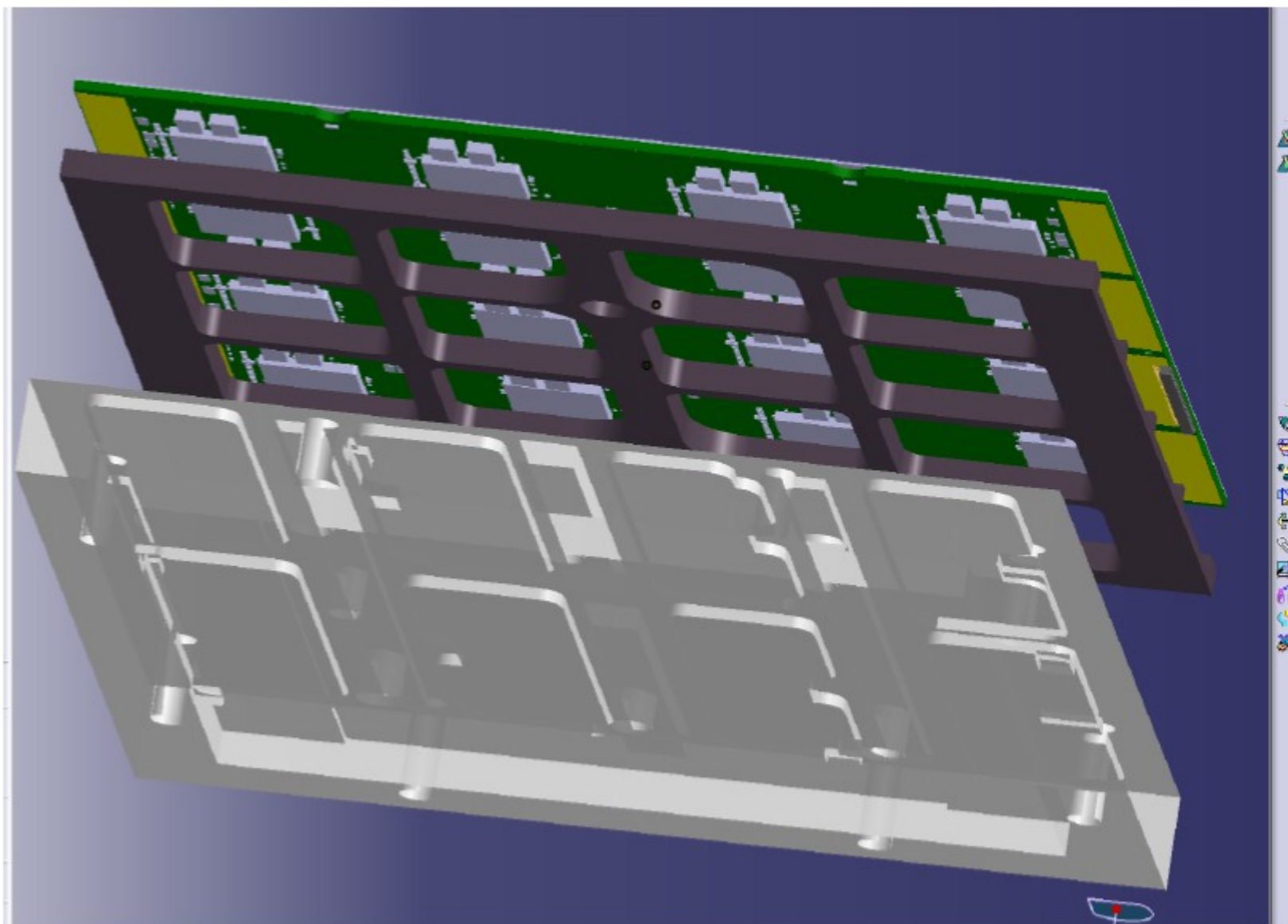


Layers
with
SL-Boards

FEV13-JP
(require HDMI feed)

- Plans are ready
- Fabrication started
15/4/19
- Available ~end of may

Gallas/Thiebault



Gallas/Thiebault

- HV delivery for SL-board slabs: **(done)**
 - Keithley 6487 picoammeter / volt source connected via SHV to a delivery box in the prototype with 10 MMCX sockets. Cables ready.
- HV delivery for DIF/SMB slabs **(partially done)**
 - Only available an ISEG T2XP 030 405p Power supply. **Imprecise current reading**. Same supply system with SHV going a box and cables with MMCX connectors.
- Patch panels **(done)**
 - LV patch panel in the electronic rack for both systems
 - LV/HV/signal patch panels in the detector for both systems (design finished)
- Rack to detector cables:
 - LV cables from the rack to the detector (DIF and SL-board) **(done)**
 - HV cables **(done)**
 - HDMI long cables **(still missing)**
- LV + USB cabling inside the stack FOR THE SL-BOARD system. **(done)**
- Powering of the DIF and SMBV5 **(still missing, LAL cabling department is a bit saturated)**

- 24/6/19 (+maybe 25/6/19) setup
- 25/6/19 - 30/6/19 calibration and position scan w/o tungsten over the 18x18 cm² area
- We may have to turn the detector once by 180 degrees to have alternatively SL-based slabs and FEV13 slabs hit first by the beam.
- 1/7/19 if everything runs smooth we can try to setup a common data taking and then take some data with up to nine more or less synchronised layers (not trivial however).
- 4 Should we plan to turn the detector by 45 degrees to allow for S/N measurements with 1 and $\sqrt{2}$ x1 MIP?
- Tungsten program(?)
- What else?

- Transport to DESY 20/6/19 -> Arrival 21/6/19
 - Unloading with help from DESY
 - Transport from DESY ... depends on availability of driver
- LAL
 - Adrian 24/6/19 – 7/7/19
 - Roman 24/6/19 – 4/7/19 (could come back on 8/7/19 for AOB e.g. Packing and loading)
 - Jimmy 24/6/19 – 28/6/19
 - Alexandre ou Alice 24/6/19 - ???
 - Dirk 1/7/19 – 7/7/19
 - Dominique 1/7/19 - ???
 - Jihane 1/7/19 - ???
 - Ludovic (Stagiaire) 24/6/19 - ??? (to be decided)
- Kyushu
 - Taikan 24/6/19 - ???
 - ???
- LLR
 - ???
- Others
 - ???
- Please fill doodle: <https://doodle.com/poll/yfs9p6rf3zisv98t>

Backup

- 30 (better 40) cm length each
- 5 DIF cables and 5 SMBV5 cables. Exactly as the ones used in DESY and CERN 2017-2018...
 - DIF:
 - side 1 <https://fr.rs-online.com/web/p/connecteurs-circulaires-industriels-et-automobiles/7345779/?sra=pstk>
 - side 2 <https://fr.rs-online.com/web/p/contacts-pour-connecteurs-ci/6706439/> and <https://fr.rs-online.com/web/p/boitiers-pour-connecteurs-ci-/6703613/?sra=pstk>
 - SMBV:
 - Side 1 (same than DIF)
 - Side 2 <https://fr.rs-online.com/web/p/boitiers-pour-connecteurs-ci-/6704174/?sra=pstk> and <https://fr.rs-online.com/web/p/products/6706445/>

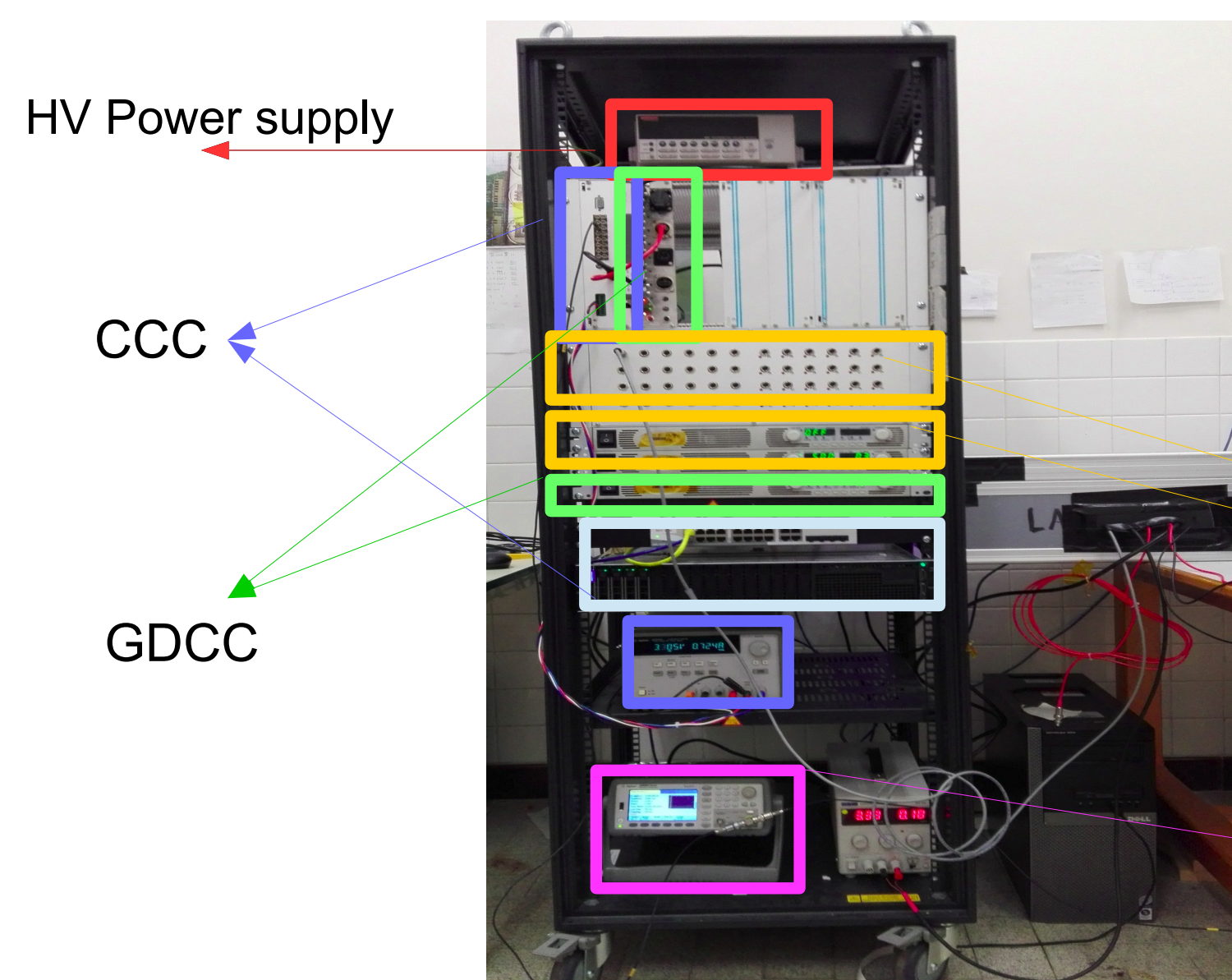


• DIF



• SMBV





- New electronic rack set-up at LAL with help of R.Cornat (LPNHE)
 - So far only tested with single slabs.
 - It can handle up to:
 - 24 DIF+SMB based slabs.
 - 48 SL-board bases slabs
 - Some combinations: i.e. 12 DIF+SMB + 12 SL-Board based slabs
- LV patch panel (LAL Cabling service):
 24 for SMB
 and 24 for DIFs or SL-boards
- “beam” spill generator

To this adds:

- Boxes for HV Distribution and leakage current monitoring
- Cables for “intrastructure” services (LV, HV, signals)