Plan of production of SiW-ECAL slabs in Japan

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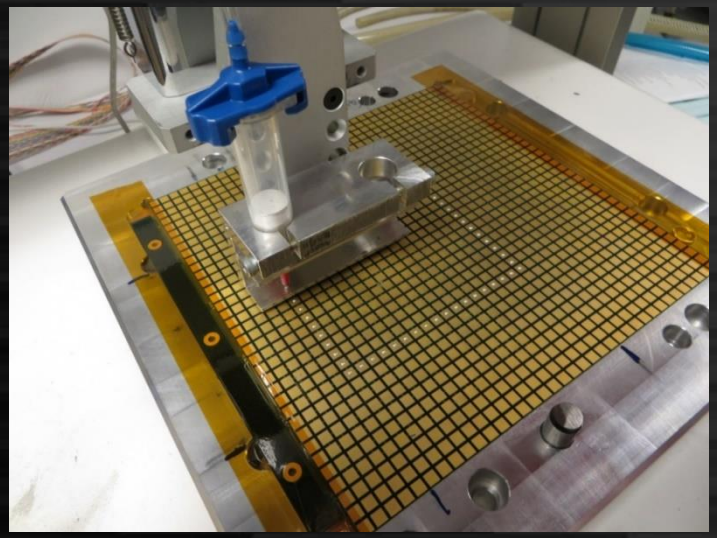
Collaboration with SiW-ECAL team: LLR, LAL, LPNHE, Kyushu, KEK, Tokyo

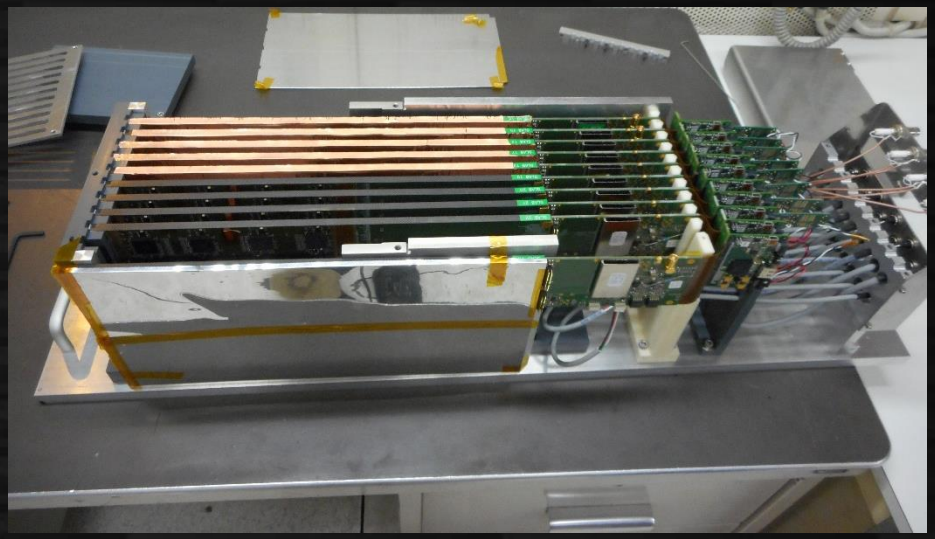
Kyushu activities

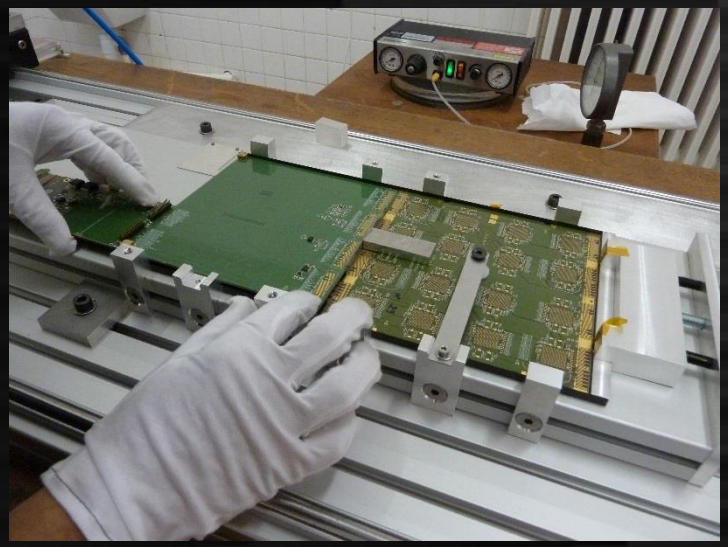
- Ongoing
  - SKIROC2/A studies with testboard:
    - I. Sekiya
  - Participation and analysis of test beam:
    - Y. Miura, I. Sekiya
  - APD/PSD/LGAD study:
    - R. Mori, H. Yamashiro
- Planned
  - Firmware on DIF etc.
    - Y. Miura
  - FEV production & test
    - T. Suehara, Y. Miura, I. Sekiya

Short Slabs - Status

- Successfully tested 7 slabs at DESY testbeam in June
- Several issues
  - Retriggering
  - Interconnection
  - Dead slabs etc.
- Still many things to do



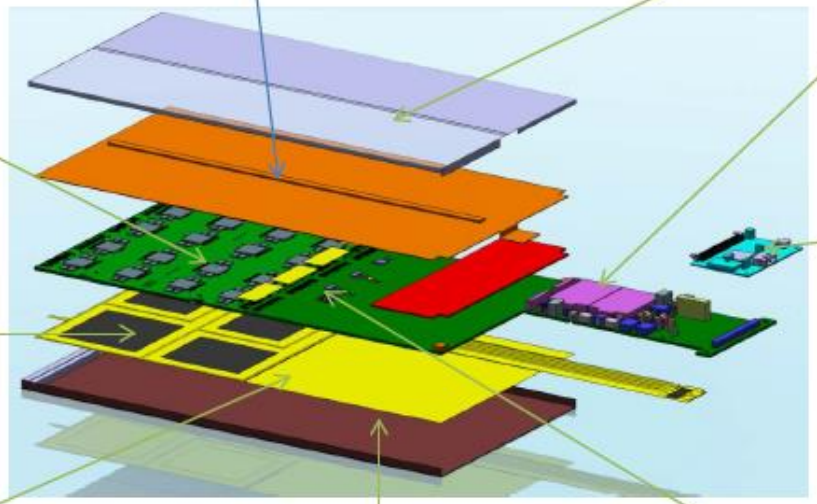




Production in Japan - Targets

- Optimization of production/test method
  - Benefits from Japanese industry
    - PCB, FPC, dispenser, …
    - We have close connections to design companies
      - (instead of work by in-house engineers in Europe)
- Quick studies in Japan by having more slabs
  - Firmware development
  - Development of test stands
    (ASIC, slab with RI, cosmic, …)
- Get more slabs by production at multi-sites
- Investigate optimal price

Breakup of a short slab



Single layer, 'U' stiffener

Breakup of a short slab (cont.)

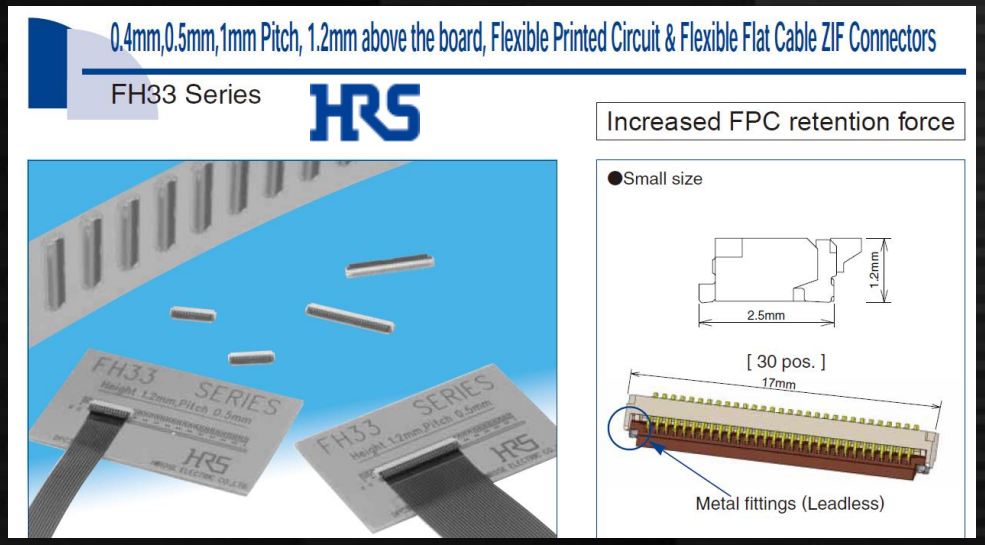
- Sensors by HPK
- FEV with SKIROC2(A)
- Gluing sensor to FEV
- SMB board (adapter to DIF) and interconnection
- FPC (Kapton) for bias (and gluing them)
- Copper sheet and cover
- Stiffener
- DIF

Preparation

- Sensor (just buy)
  - Will obtain ~20 sensors in Jan/Feb 2018
- FEV/SMB (production in Japan)
- Interconnection
- Gluing / alignment (dispenser + robot)
- FPC (for bias)

FEV/SMB production

- FEV: flatness
  - They confirmed < 0.4 mm (measured after virtual reflow)
- Interconnection FEV-FEV and FEV-SMB
  - Plan to replace them with FPC connector/cable
- SMB: small bugfix shared with LLR (under discussion)



FEV/SMB production (cont.)

- SMB – currently mixed rigid-flexible PCB
  - Cost is high (-800 EUR/board @ 5 boards)
  - Can be replaced by connectors/FPC (as same as interconnection)
    - Mechanical strength?

Gluing

- We will buy a dispenser in Kyushu with other projects
  - ATLAS pixel upgrade
  - Muon g-2/EDM in J-PARC
- Investigating several providers
  - Musashi engineering
  - Iwashita engineering
  - Cost: 12-20k EUR (dispenser + robot)
- Target
  - Experience of assembling slabs (glue + alignment)
  - Optimization of glue etc.

(Optimistic) Schedule

- First FEV with single SKIROC2: Nov.-Dec.
- Dispenser arrival: -Dec.
- First test & assembly: Dec.-Feb.
- Production with 16 SKIROC2(A): Feb.-Mar.
- Testbeam with 5 slabs from Japan: ~summer