Integration at CERN

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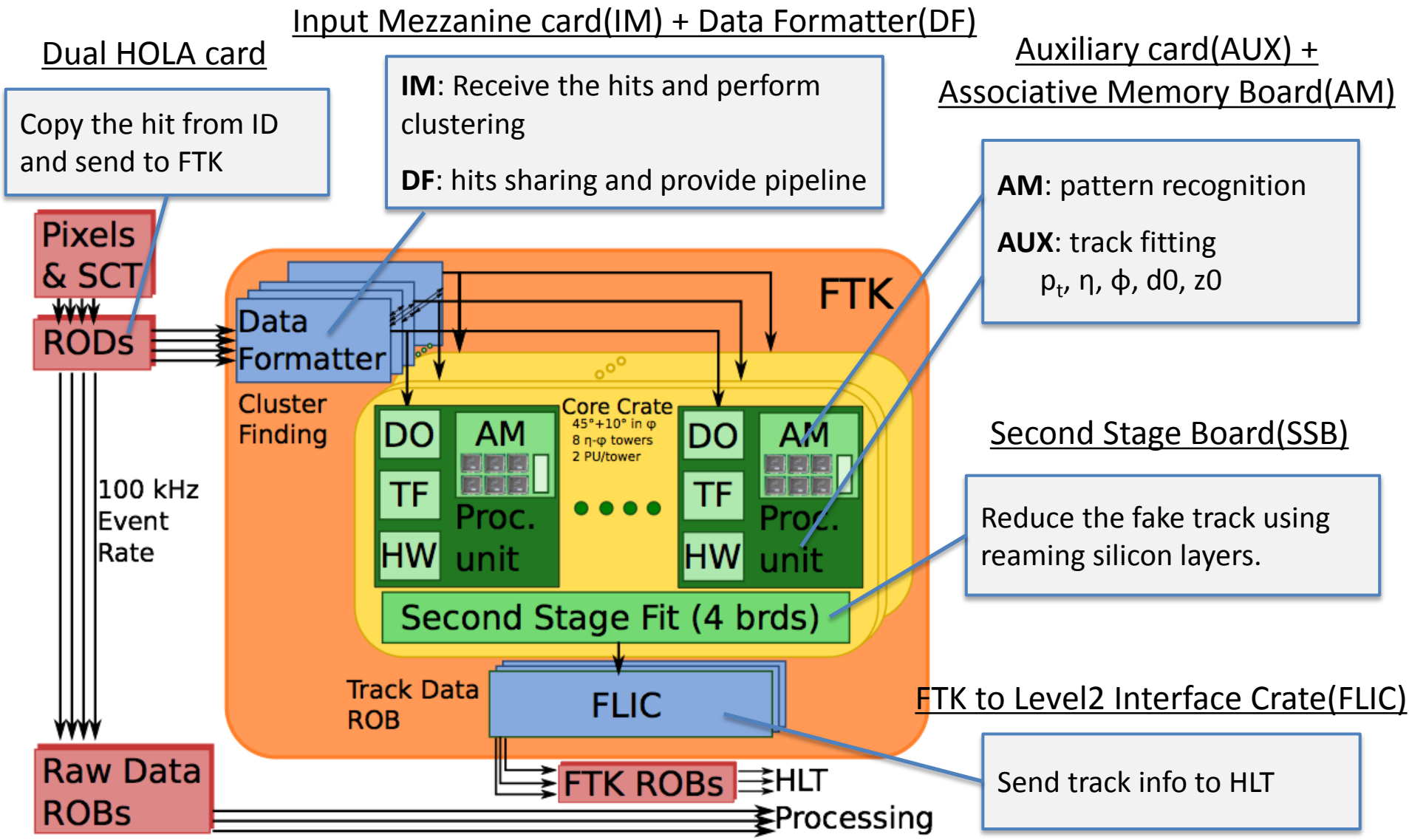
SEVENTH FRAMEWORK PROGRAMME

ARISTOTLE UNIVERSITY OF THESSALONIKI

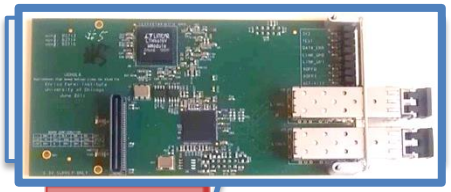
FTK System and Boards

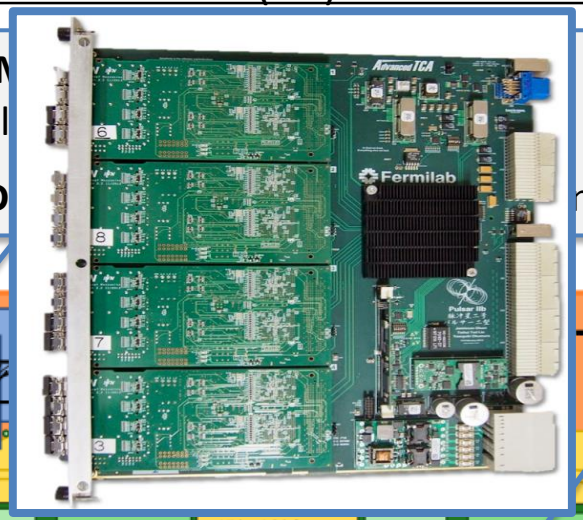


FTK System and Boards

Input Mezzanine card(IM) + Data Formatter(DF)

Dual HOLA card





Auxiliary card(AUX) +
Associative Memory Board(AM)

Pixels & SCT

RODs

Data Formatter

Cluster Finding

100 kHz Event Rate

DO

TF

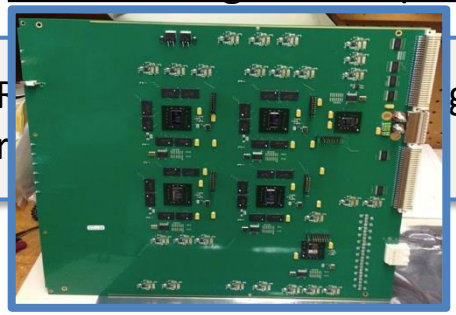
HW

AM

Proc. unit

45°+10° in φ
8 η-φ towers
2 PU/tower

Second Stage Board(SSB)

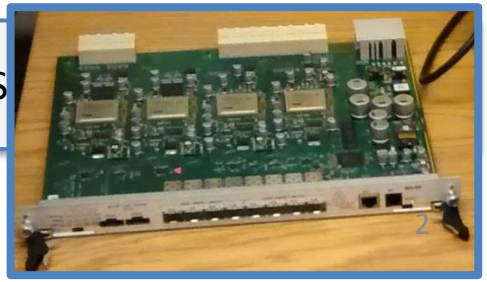


Second Stage Fit (4 brds)

Track Data ROB

FLIC

FTK to Level2 Interface Crate(FLIC)

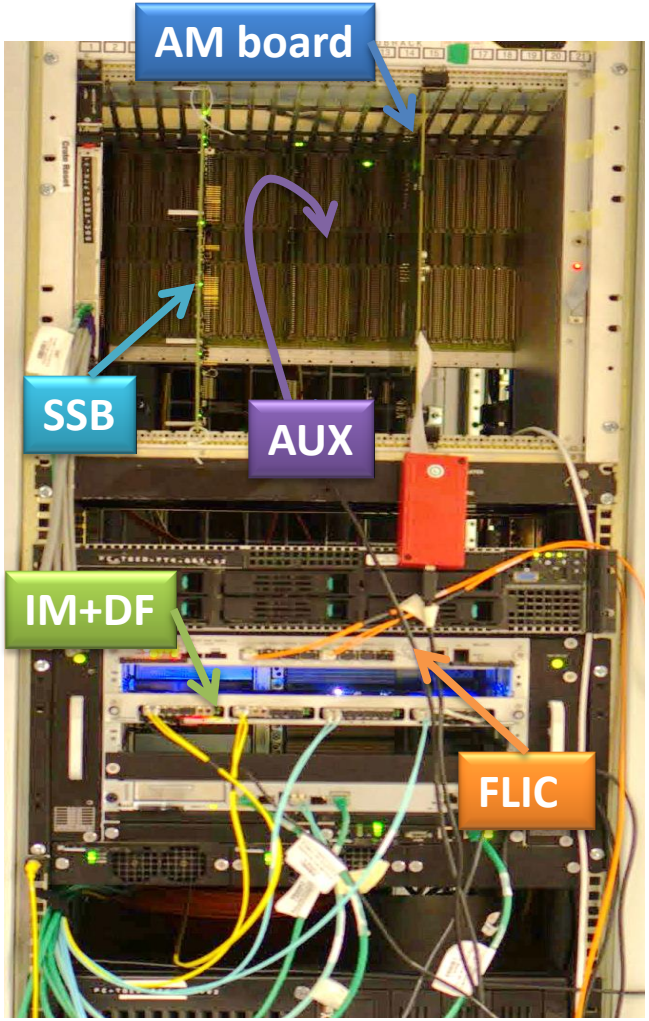


Raw Data ROBs

FTK ROBs

HLT Processing

Integration test using pseudo data at Lab 4 (test room at CERN)



Communication and data flow test of few sets of all kind of boards using pseudo data are ongoing at Lab4.

- Boards by boards connectivity and communication were confirmed.

- Data flow of
  input->IM->DF->AUX->ROS
  were tested using Pseudo data.

All boards integration test are progressing day by day!

History of Hardware test at CERN

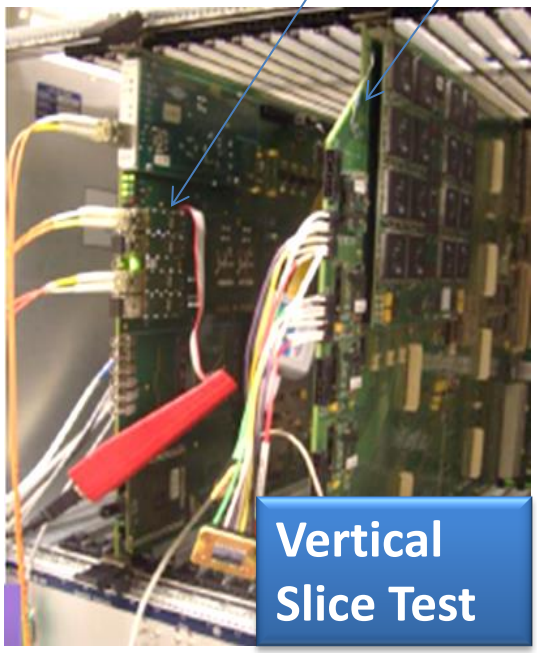
2013 2014 2015 2016 2017

Barrel install

Vertical Slice Test (VS Test)

Only SCT, test ROD with simulated 70 kHz L1 data

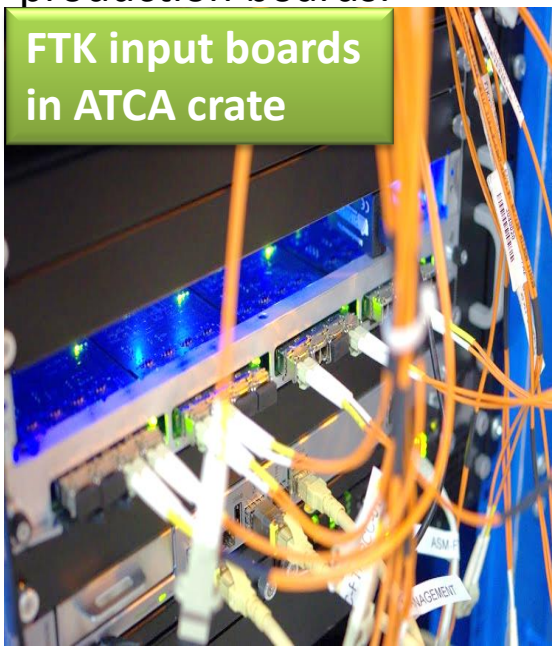
Old prototype of IM and AM Boards and AM chip



Global Integration Test

SCT and Pixel, real ROD with Cosmic or test data with maximum 100 kHz Test trigger.

Final Prototype or production boards.



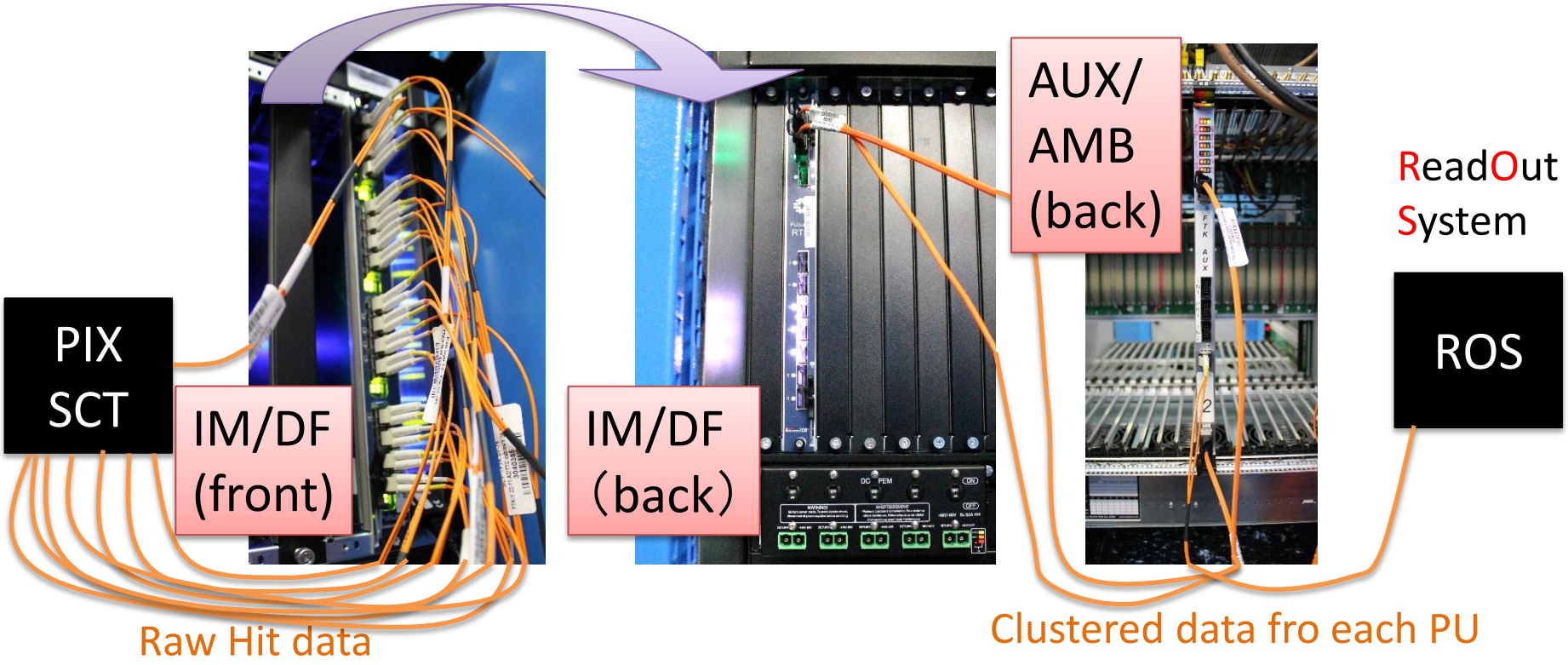
Current test

SCT, Pixel and IBL with Real Collision data with ~ 50 kHz

Several sets of production and porotype boards.

Testing

Integration and data flow test at USA15 (Real ATLAS hardware room)



Using Real 16 (8 sct and 8 pixel) ROD. And sometime IBL also.
~50 kHz L1 inputs with Real Collision data.

There were very good NEW feed back from these test!

Feed back from data flow test

- Unexpected data and data flow stop
- Difference of timing or data size in channel
- Different environment and configuration

We need to implement more robust data flow.

Issue appears in 1/1 G event order.

 Error treatment and good monitoring.

 Optimization of buffer size.

 Improve the processing speed.

etc

Integration to ATLAS main control

Integration test of FTK control, monitoring to ATLAS global control system.

Summary

FTK Global integration is working smoothly.

All boards are improving day by day and we are getting good feedback from tests.

We keep concentration!