DAQ : General Status

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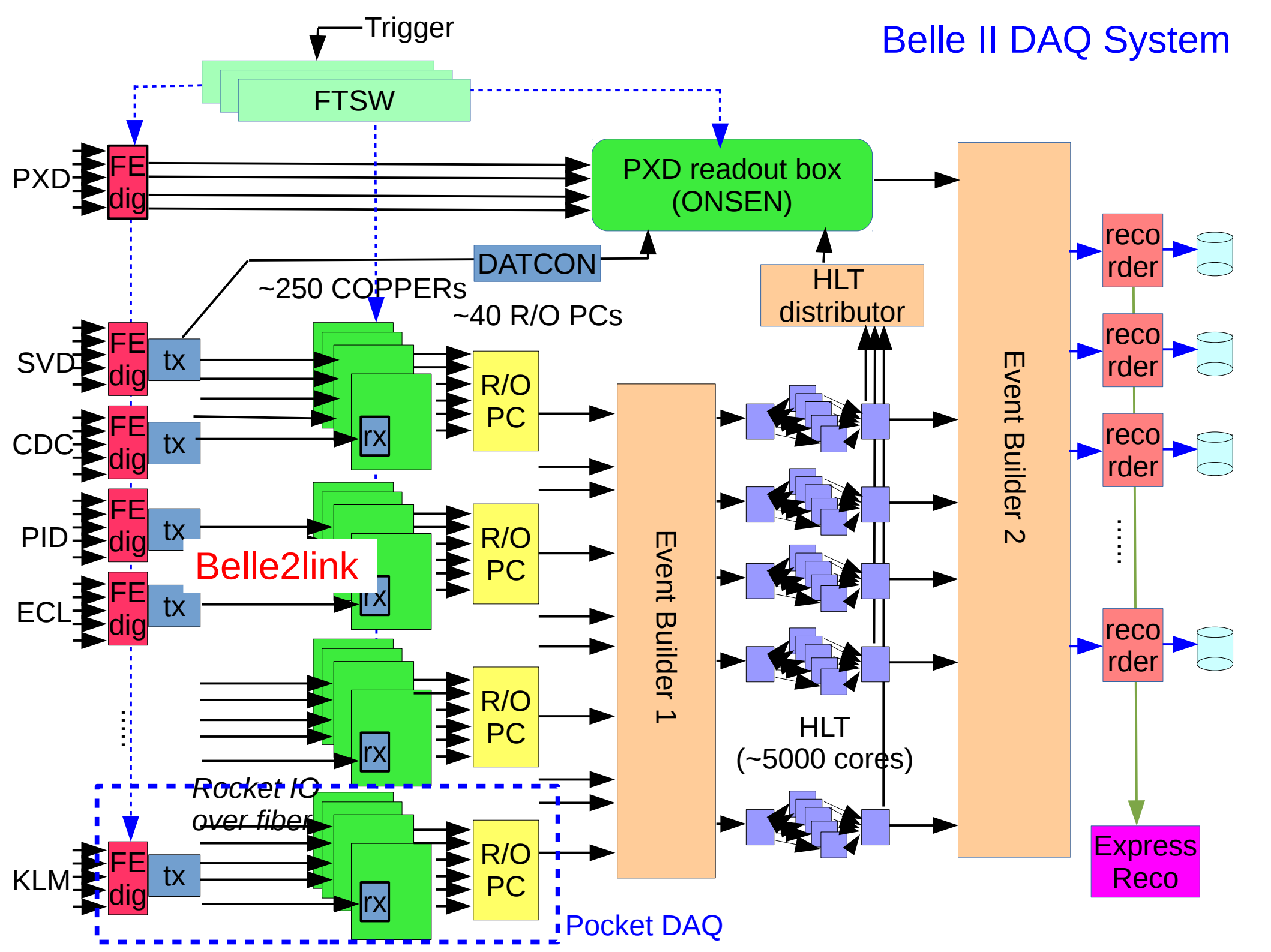
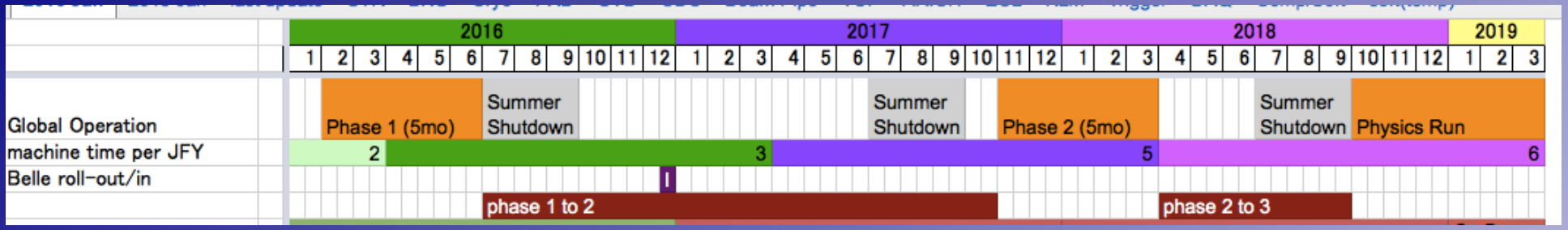

Belle II DAQ System
Trigger
FTSW
PXD
FE dig
PXD readout box (ONSEN)
DATCON
~250 COPPERs
~40 R/O PCs
HLT distributor
SVD
CDC
PID
ECL
KLM
tx
rx
R/O PC
Belle2link
Event Builder 1
Event Builder 2
HLT (~5000 cores)
reco rder
Express Reco
Rocket IO over fiber
Pocket DAQ

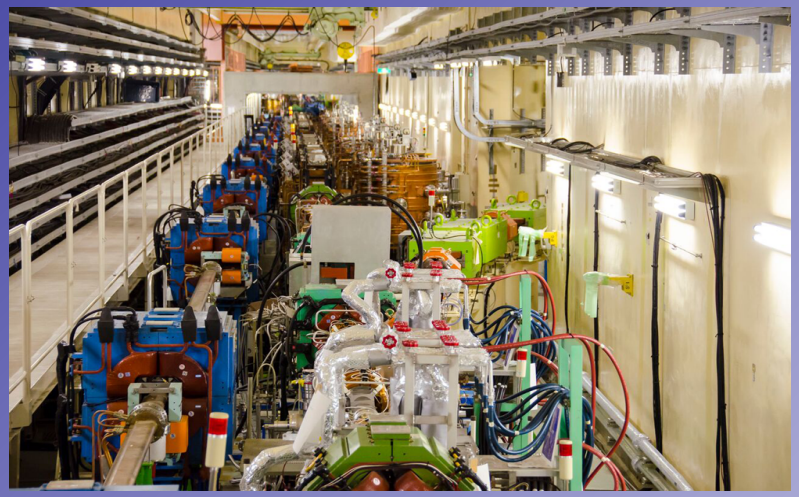
Belle II Schedule



- The operation of SuperKEKB accelerator had been started from the beginning of this year although the beams are not yet collided.

- "BEAST" detector was implemented in the IP to monitor the background level

June 18, 2016 (LER beam current at 970 mA, HER at 870 mA)



Activities of data-taking towards Global CRT

- **Backend DAQ is flexible for standalone or combined cosmic data tests.**
- **FTSW : one combined CRT + standalone CRTs.**

(Except for CDC. It can be combined with another sub-detector like CDC+TOP)

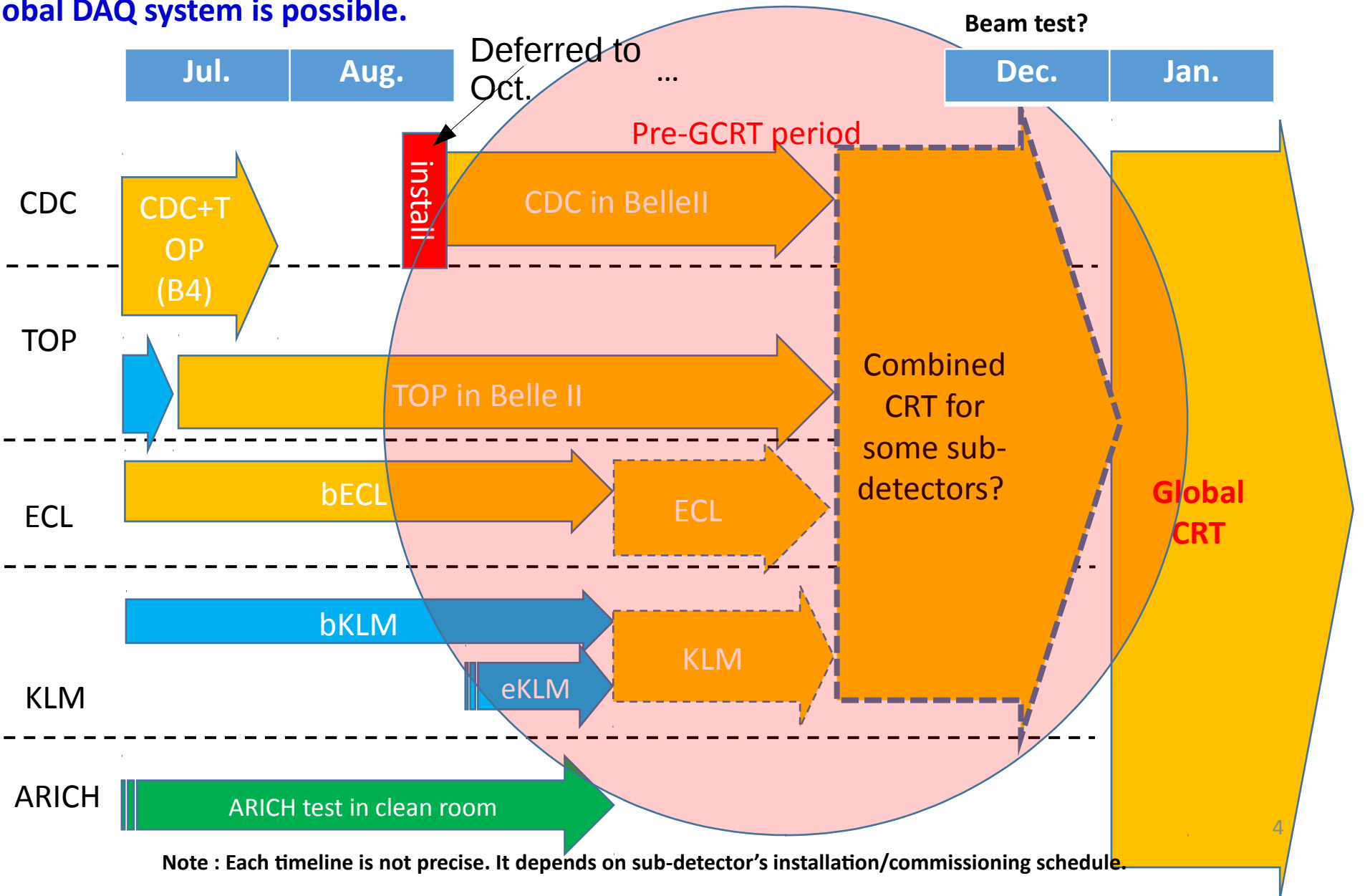
-> As for backend DAQ and TTD(not trigger source), combined CRT by global DAQ system is possible.

Global Belle II DAQ(COPPER to storage)

Pocket DAQ in E-hut

PocketDAQ of each det. Gr.

S.Yamada



Note : Each timeline is not precise. It depends on sub-detector's installation/commissioning schedule.

DAQ status

- DAQ integration of outer detectors is in progress.

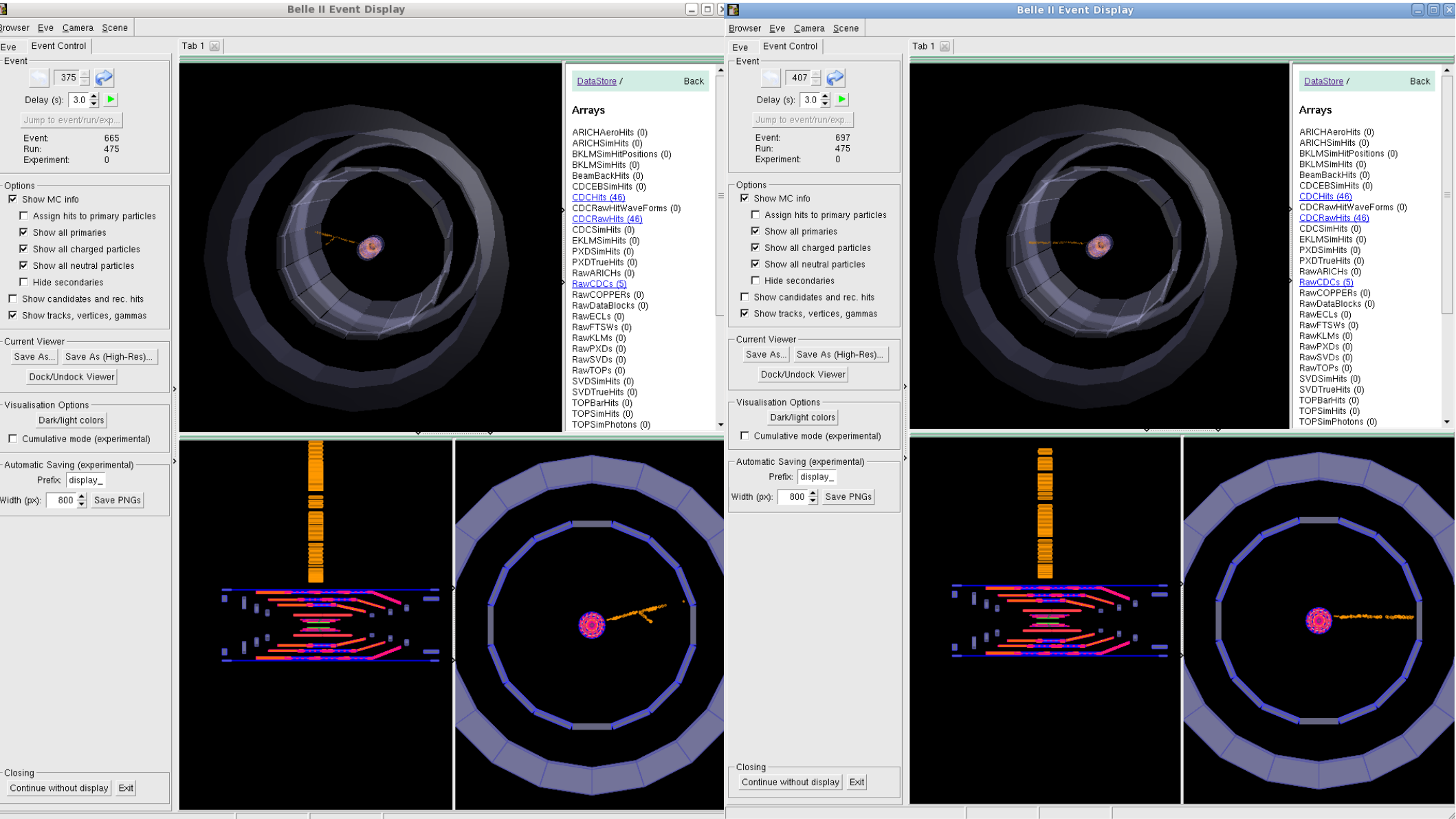
+ Detectors integrated in structure:
  * ECL (barrel) - Completed and stably running with the global Belle II DAQ.
  * KLM (barrel) - Being tested with Pocket DAQ. Firmware debugging in progress.
  * TOP - All installed modules are being tested using Pocket DAQ(stand-alone DAQ), module by module basis. Integration in Belle II DAQ is in progress.
    + Cosmic ray data taking with Pocket DAQ is going on for all installed modules
    + Feature extraction firmware (TOP) is still under debugging.

+ CDC test stand:
  * A separate Belle II DAQ is prepared.
  * The cosmic ray data taking with 60 FEE modules is stably running.

  * One TOP module is installed near the CDC for the test in the cosmic ray with a tracking information.
  * The data stream from TOP is combined with the CDC data stream and the data taking is started.
    -> The ending date of data taking was enlonged to Sep(?).

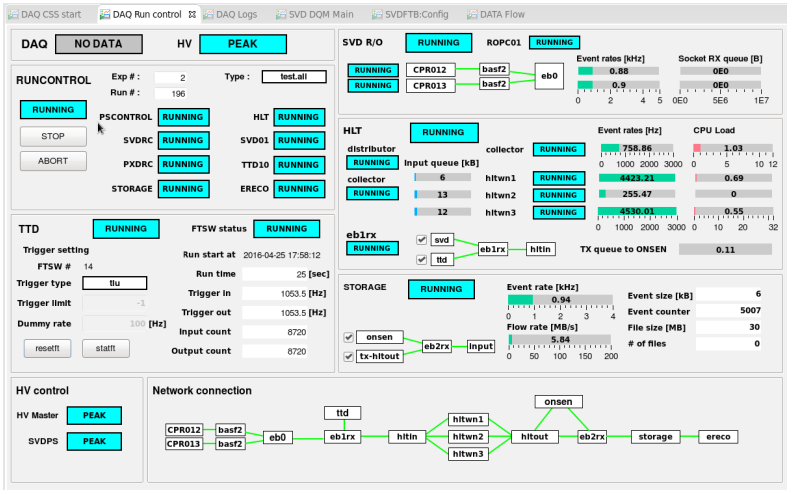
Live CDC event display

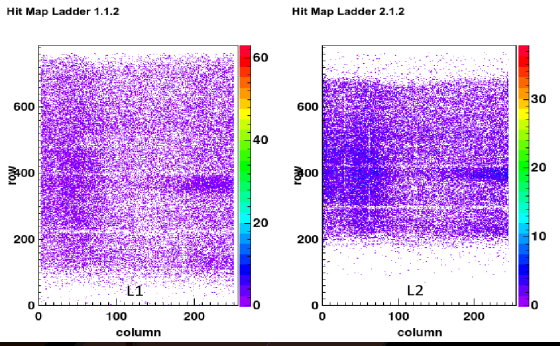
- Full readout chain confirmed to work:
  FEE->COPPER->Readout PC-> HLT processing (Unpacker)
  -> Storage(sampling) -> Express Reco -> evdisp

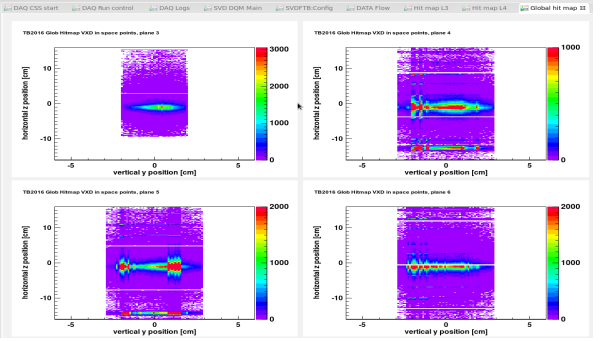


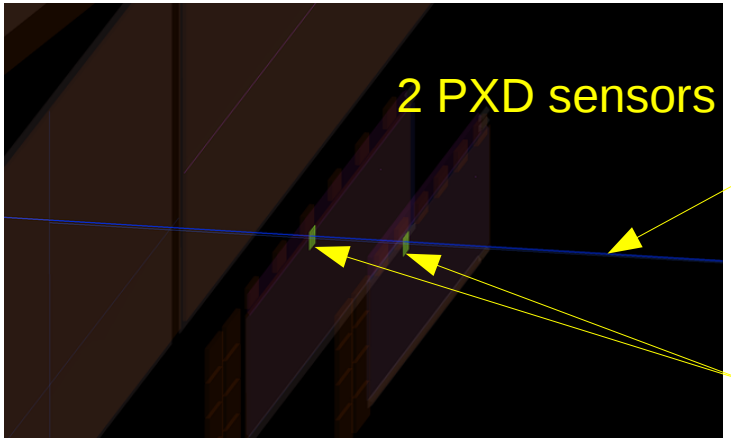
- VXD integration was tested in DESY test beam
  + The DESY test beam DAQ was fully operational and worked stably up to 2 kHz in beam.
  + The Run Control was fully implemented with both SVD and PXD readouts.
  + “Event mixing” was observed inside both of SVD readout (FTB) and DHE/DHC/ONSEN in PXD readout, although the event mis-match at event builder 2 was not occurred.
    * Event numbers are properly distributed to detectors from FTSW which are embedded in the raw data header of each detector data.
    * Event numbers embedded in the raw data body in PXD/SVD were mis-matched.

    -> Investigation by both PXD and SVD FEE experts is being done.
  + The RoI feedback from HLT to ONSEN was confirmed to work.
    * Because of channel mismatch between DHP and DHE, the remapping had to be implemented, which could not be completed during beam test.
      -> Had to use large-size RoIs.

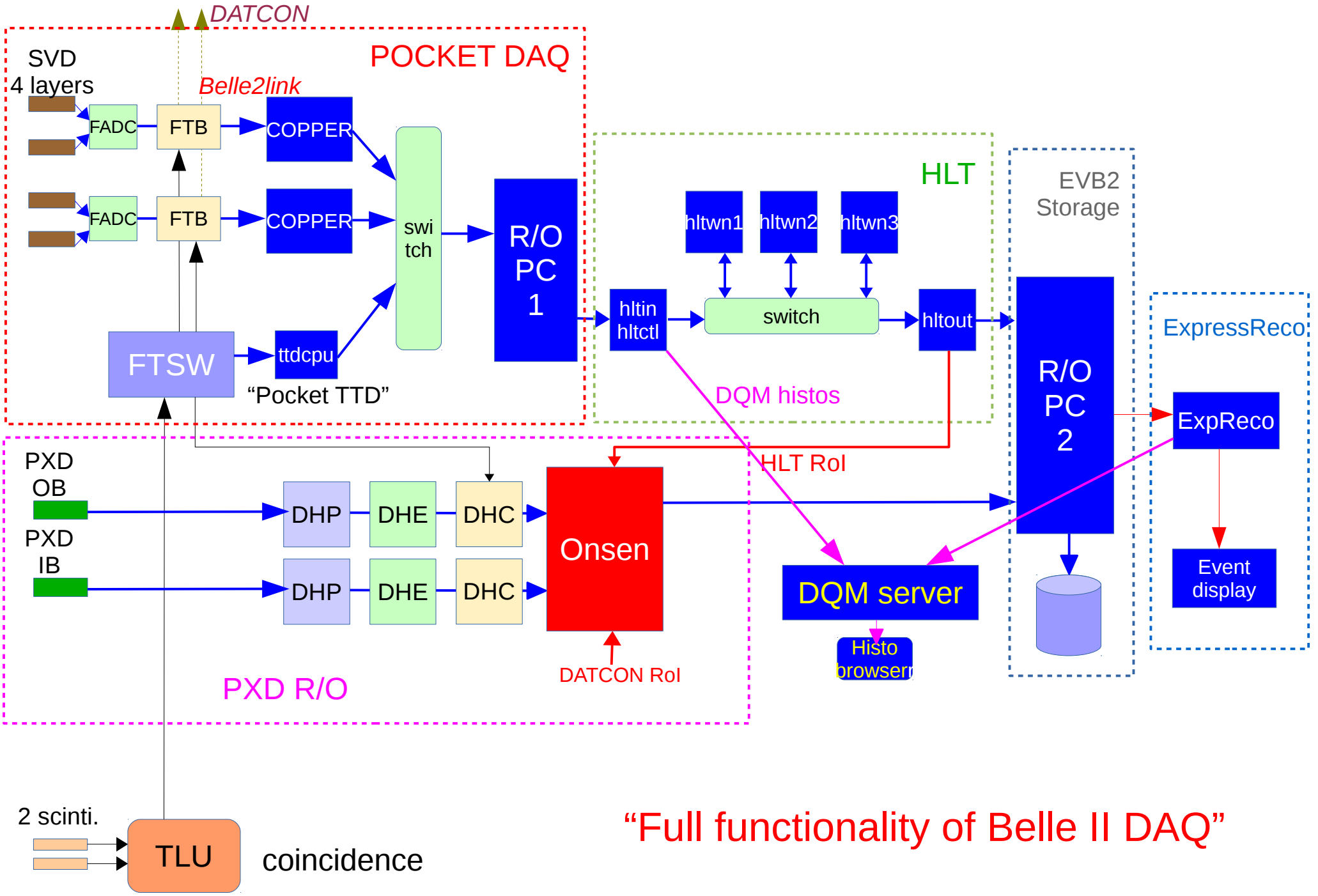








DAQ for DESY beam test



"Full functionality of Belle II DAQ"

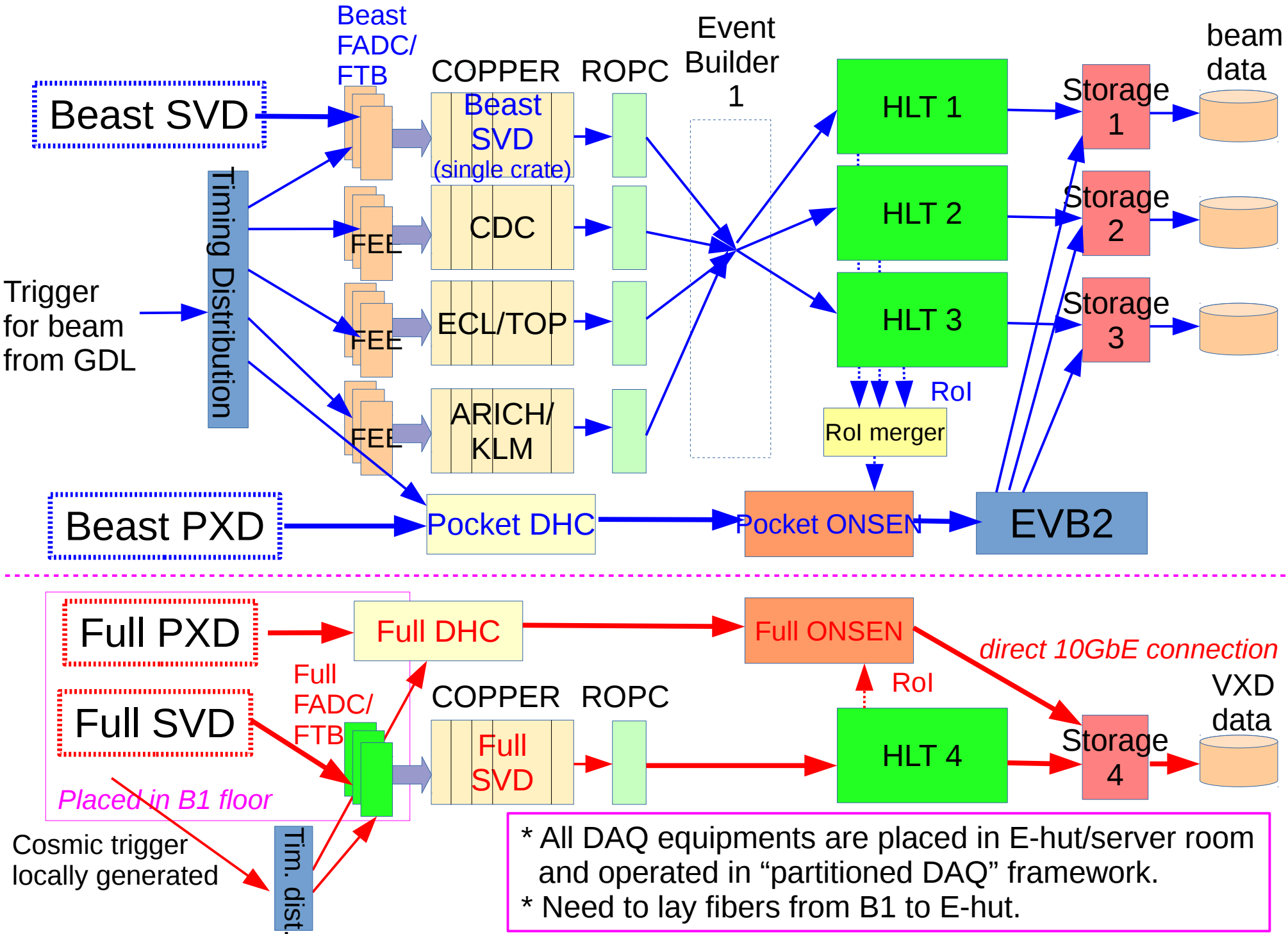
Goals of this workshop (for DAQ)

- Discussion on the status and problem in the further detector integration
  * TOP <- On-going top-priority issue.
  * KLM <- When can we integrate in global DAQ? Urgent issue.
  * ARICH
  * Endcap ECL

- Prospects for GCRT (Global Cosmic-Ray Test)
  * Trigger for GCRT
  * Schedule : What detectors in DAQ?, Detector Roll-in schedule.

- Preparation for Phase II run
  * Test of VXD readout at DESY-TB
  * Issues in DAQ preparation for Phase II run.
  * DAQ configuration for Phase II

Partitioned DAQ operation during Phase II run



* All DAQ equipments are placed in E-hut/server room and operated in “partitioned DAQ” framework.
* Need to lay fibers from B1 to E-hut.