Status of DATCON

B.Lampshades, J. Deferring,C.Marinas
C. Vessel,
University of Bonn

lampshades@physio.uni-Bonn.DE

Status of DATCON

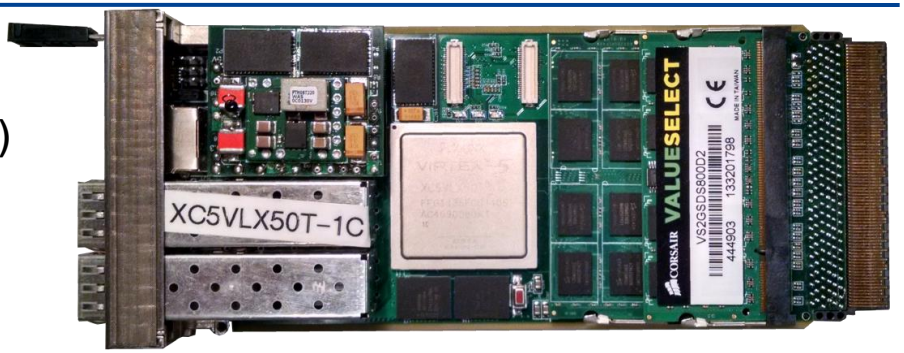
B.Deschamps, J. Dingfelder,
C. Marinas, C. Wessel,
University of Bonn

deschamps@physik.uni-bonn.de

Setup at KEK

UNIVERSITÄT BONN

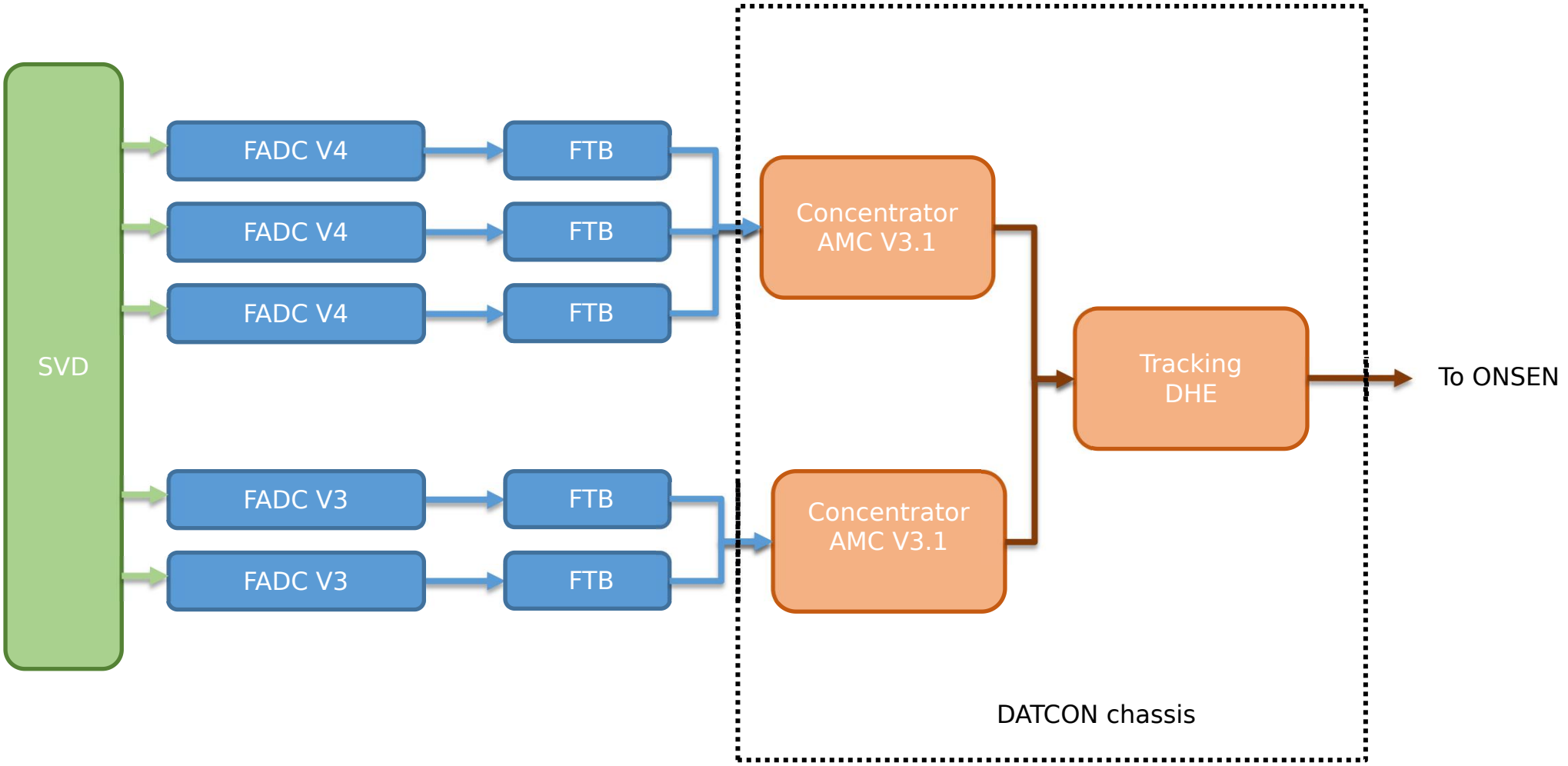
- **Currently at KEK** :
  - 2 chassis with MCH (chassis managment) and PM (power module)
  - 2 DHE (used for tracking)
  - 4 AMC v3.1 (used as concentrators)
  - 2 extension boards



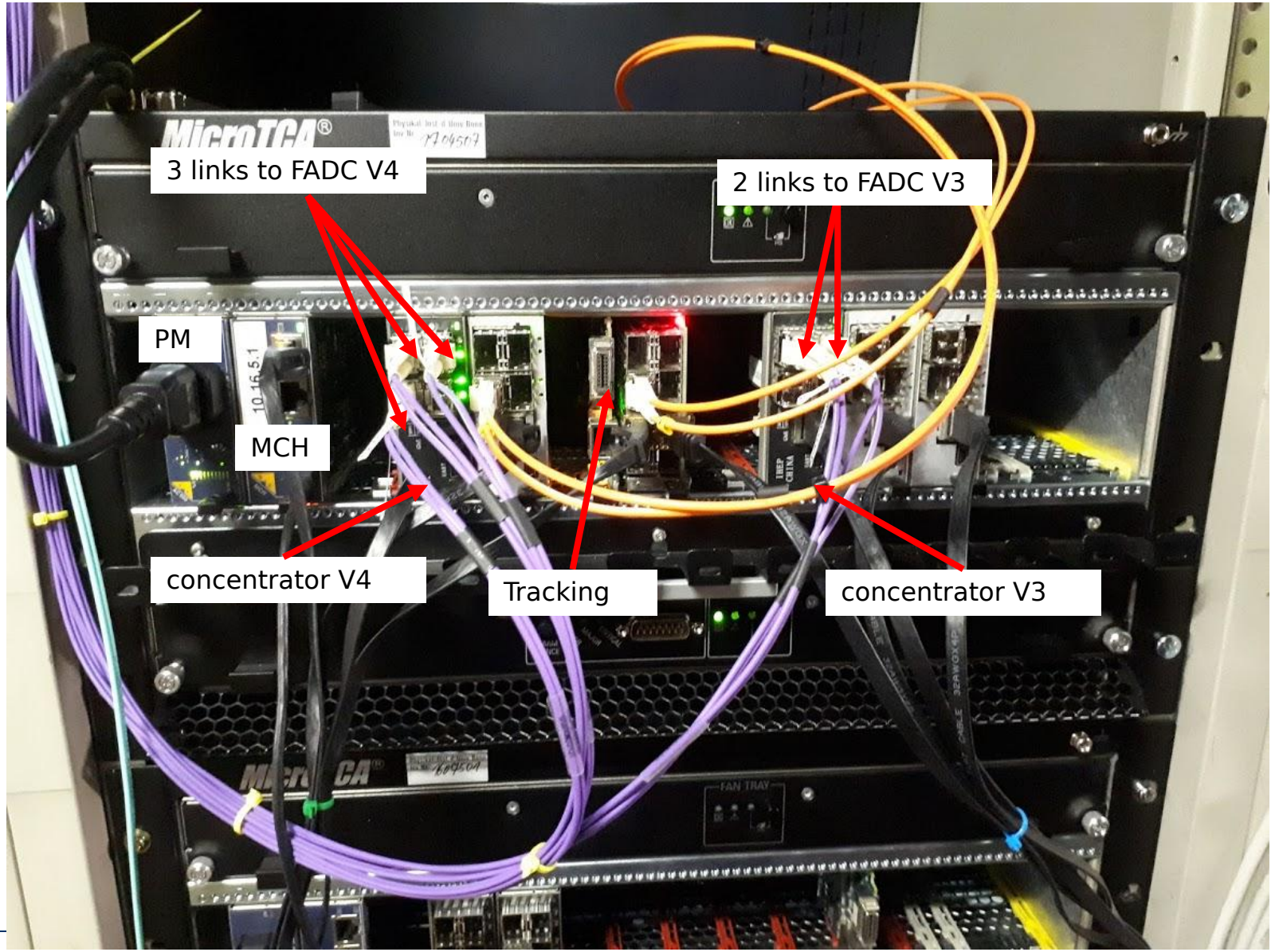
- Out of which the following parts will be used for **PHASE 2** sytem
  - One chassis will be used with 2 concentrators
  - One to receive FADC V4 data and one for FADC V3
  - One DHE

- All the other pieces for **PHASE3** (full scale DATCON) are in Bonn
  - One MCH currently being repaired

Setup at KEK


SVD
FADC V4
FADC V4
FADC V4
FADC V3
FADC V3
FTB
FTB
FTB
FTB
FTB
Concentrator
AMC V3.1
Concentrator
AMC V3.1
Tracking
DHE
To ONSEN
DATCON chassis

Setup at KEK


3 links to FADC V4
2 links to FADC V3
PM
MCH
concentrator V4
Tracking
concentrator V3

Firmware update for FADC V4

UNIVERSITÄT BONN

- FADC and FTB:
  - FADC gets analog signal from SVD and digitizes it
  - FTB transforms it into optical signal
  - FTB are connected to COPPER and to DATCON

  - Reminder
    - Previously only used FADC V3 -> only connected to P **or** N side of SVD
    - FADC V4 are now connected to P **and** N side
    - ADC_ID directly defines the side (N= odd , P= even)

- Concentrator
  - P/N splitting -> preprocessor module.

    Preprocessor's job is to extract hits from FADC data, convert it to strip and find a cluster.
  - Number of preprocessor and FIFOs (x2) is doubled
  - Mixed FADC 3 and 4 setup successfully tested with random FTB data
  - **Ready to deal only with FADC V4**

To do list for PHASE2

The PHASE2 firmware is ready, simulated but never fully tested on hardware

1) Event building (tracking excluded)

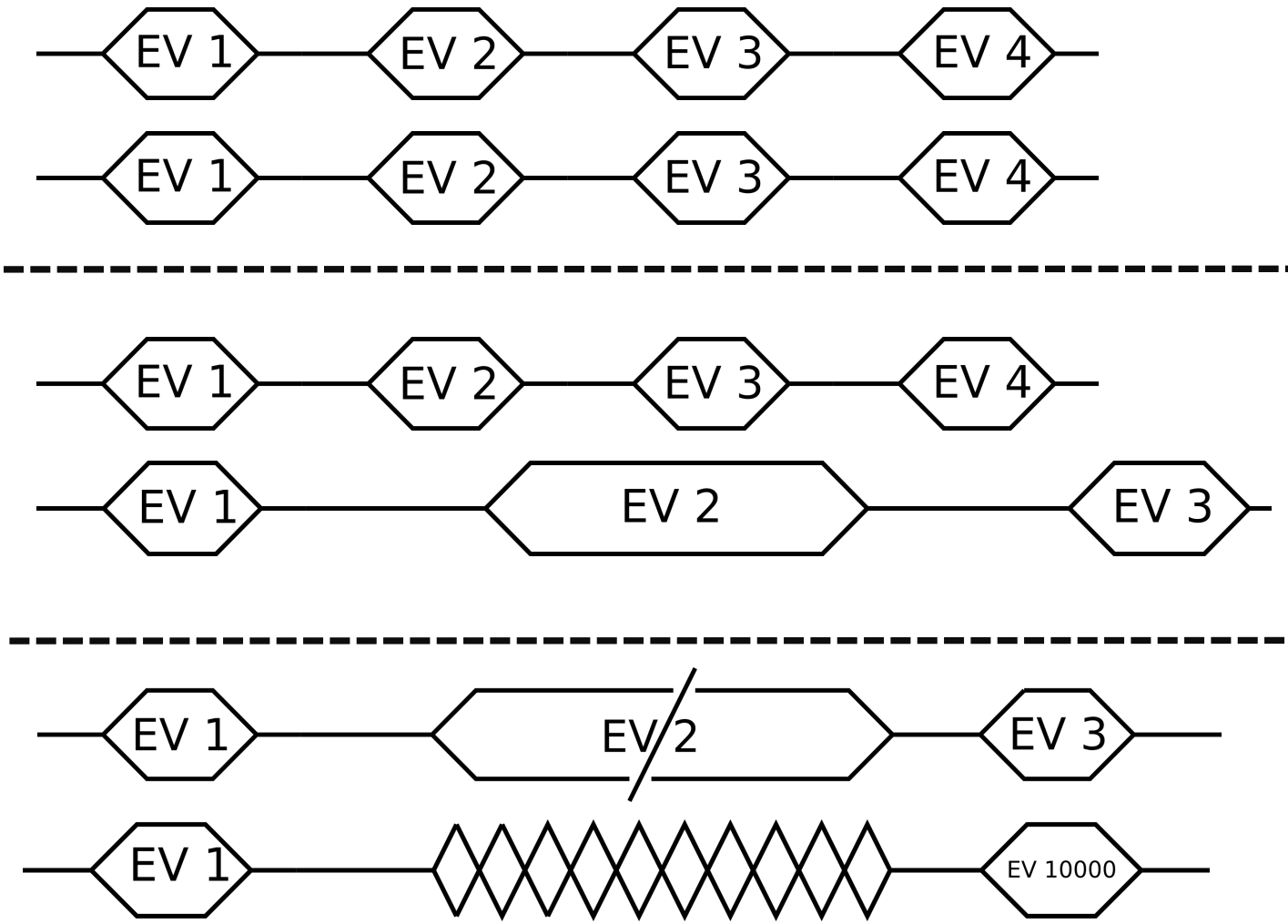
- Tested with dummy FTB data without event mismatch.
- Forced crashes using bad conditions such as :
  - broken link
  - large differences in event ID between links

  -> **Improve protection against pathological cases**
- For every event received, a predefinded ROI with corresponding event number is sent to ONSEN

  -> Verify that no event is missed

  -> Verify stability of ROI transmission

To do list for PHASE2



To do list for PHASE2

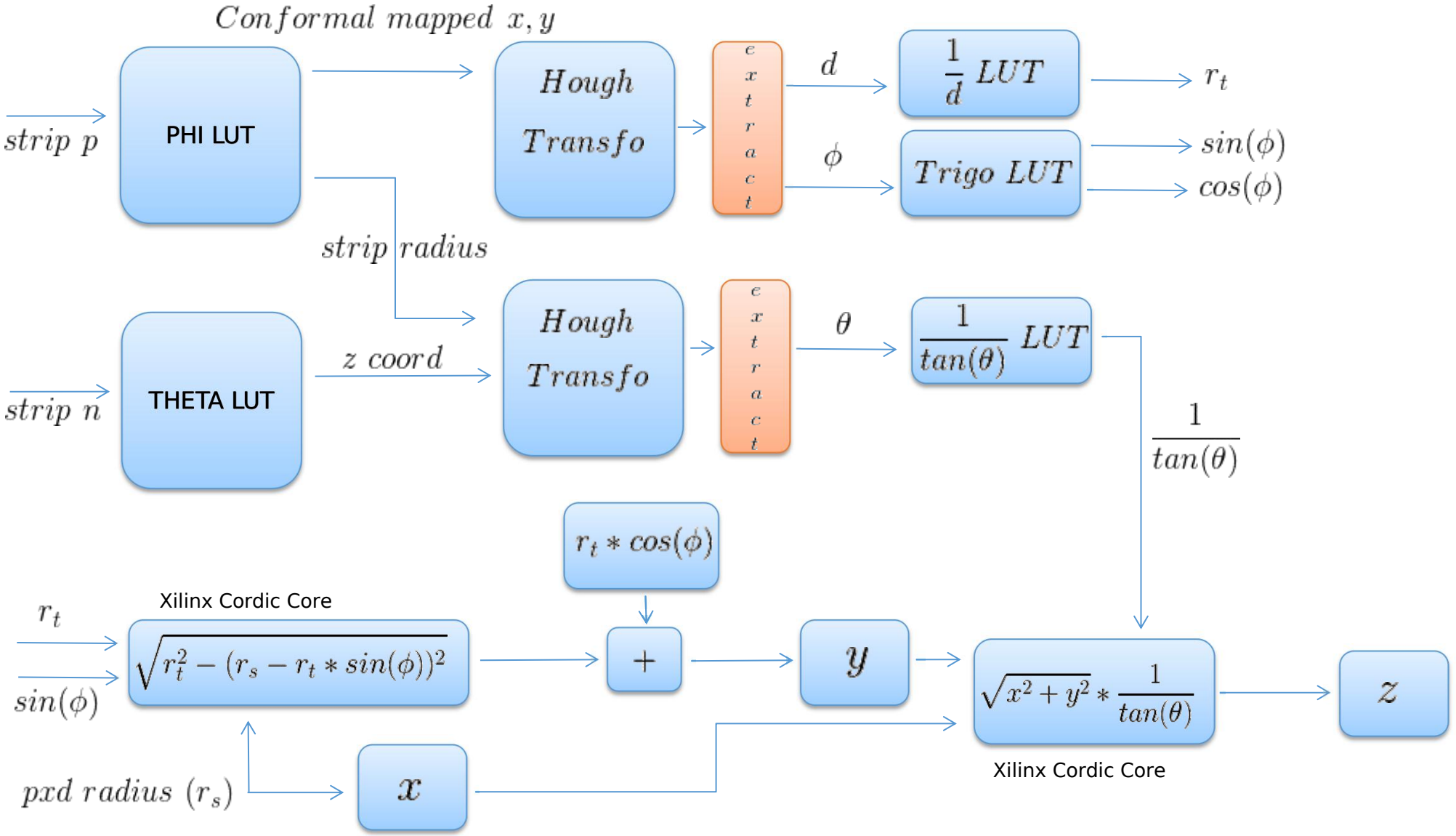
UNIVERSITÄT BONN

2) Include Tracking unit

- Cross-check that SVD hits are correctly received
- Test the Hough Space clustering under realistic conditions (tested at low rate and only for few events)
- Test extrapolation to PXD (only tested in simulation)

- >Verify stability of ROI transmission

Extrapolation



To do list for PHASE2

UNIVERSITÄT BONN

3) Systematic test suite

DATCON internal

- Set of different test patterns of FTB input
- Load balancing test
- On-purpose failure test (link down , large event size, large event mismatch)
- Nominal test with 30 kHz and expected occupancy
- Variation of occupancy (varying SVD threshold) :
    - Effect on track/ROI finding
    - Effect on stability

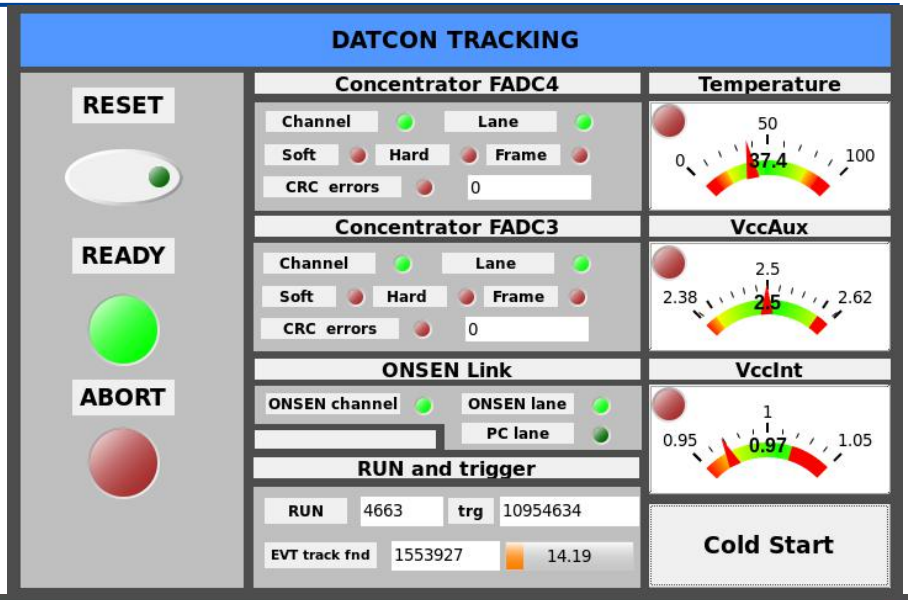
DATCON-ONSEN interplay

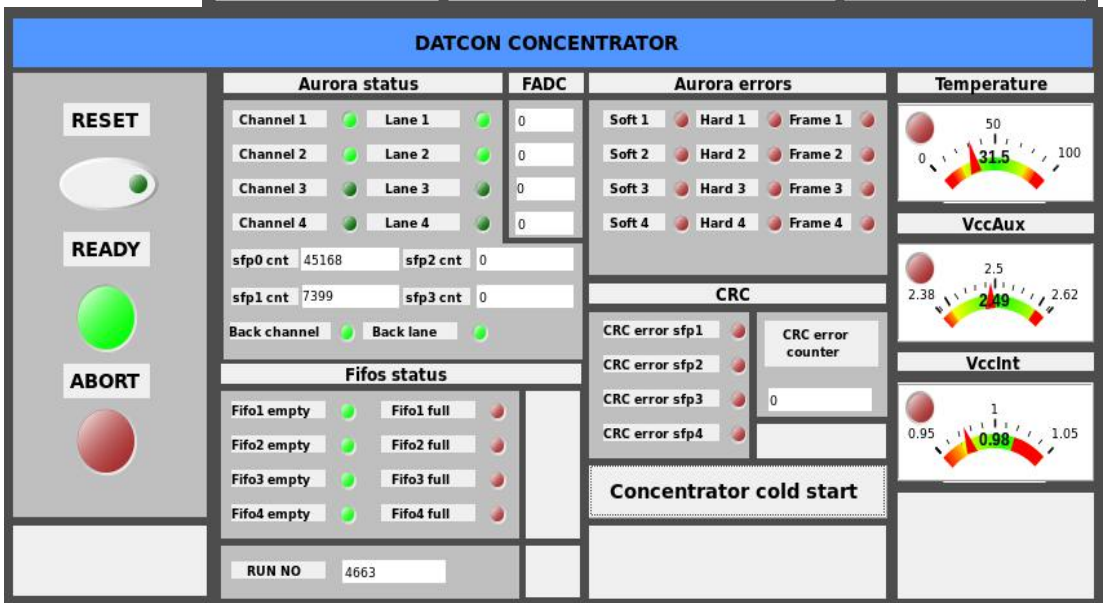
- Send same frame twice or different frames with same event ID
- What happens in ONSEN if DATCON sends ROI for an event that already arrived from HLT
- Generate back pressure

4) Introduce two-way DATCON <-> ONSEN communication ?

DATCON Slow Control

- Final DATCON slow control ready for PHASE2
- Essential information as frame, ROI , event counter -> now functionnal
- Now integrated into EPICS: live plot of SVD hits and ROIs.
- **Integration into Run Control:**
  - Only **Abort** and **Ready** PVs





Conclusion

UNIVERSITÄT BONN

- Communication with FTB-FADC V4 has been implemented

- Defined to-do list for PHASE2
  - Event building
  - Test every single part of the tracking unit (HS, clusterizer, extrapolation)
  - Systematic test suite
  - DATCON-ONSEN interplay

- Slow control ready , should be intergrated to RC

- Before cosmic ray DATCON without tracking should be tested and stable

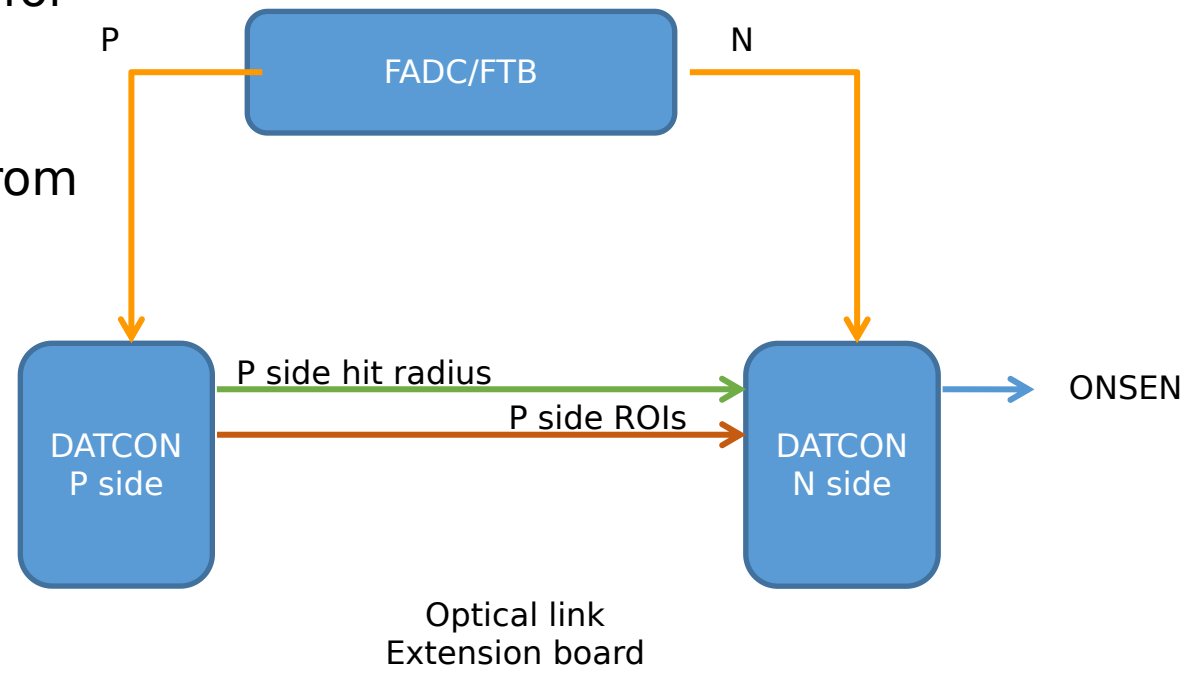
- Time before first collision will be used to test the tracking part

- Christian and I will be at KEK next week

Thank you

New FADC implications

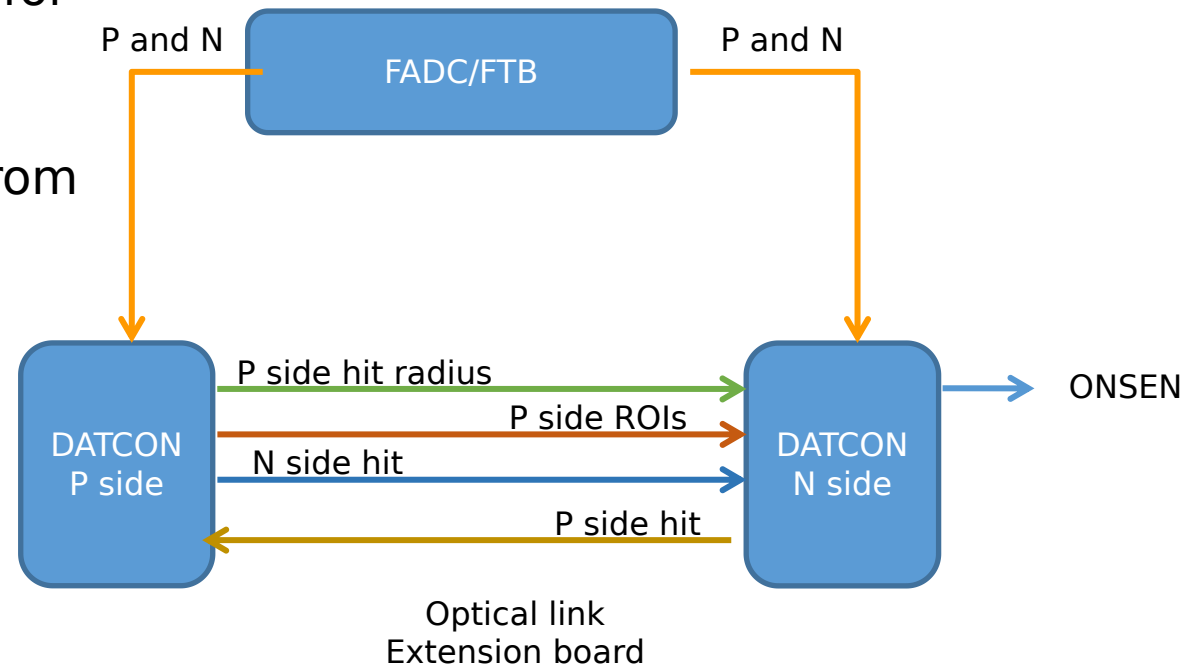
- The first idea of DATCON's hardware was based on separated P or N side data coming from FADC and FTB
- New FADC will process both P and N side
- Backplane connection and DATCON architecture was not imagined for mixed side input
- Only one backplane channel available to send mixed data from concentrator to tracking



deschamps@physik.uni-bonn.de

New FADC implication

- The first idea of DATCON's hardware was based on separated P or N side data coming from FADC and FTB
- New FADC will process both P and N side
- Backplane connection and DATCON architecture was not imagined for mixed side input
- Only one backplane channel available to send mixed data from concentrator to tracking



deschamps@physik.uni-bonn.de