



Summary of Trieste Meeting

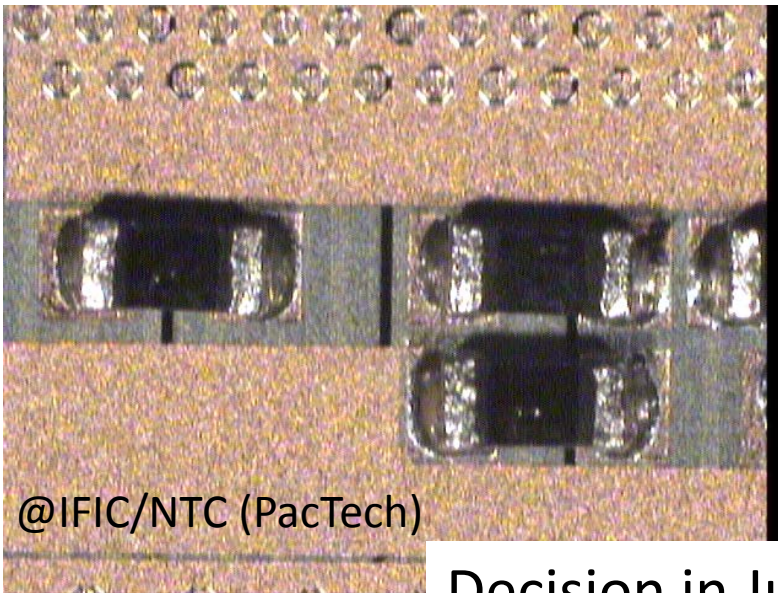


See <https://indico.mpp.mpg.de/conferenceDisplay.py?confId=3730>

- PXD9 Production Site Overview
- Pilot Production (details by Laci)
- Status of ASICs
- Services, DAQ, Slow Control
- CO2 Cooling, Mechanics
- PXD Milestones & Schedule
- Discussion Points and Next Steps
- AOB

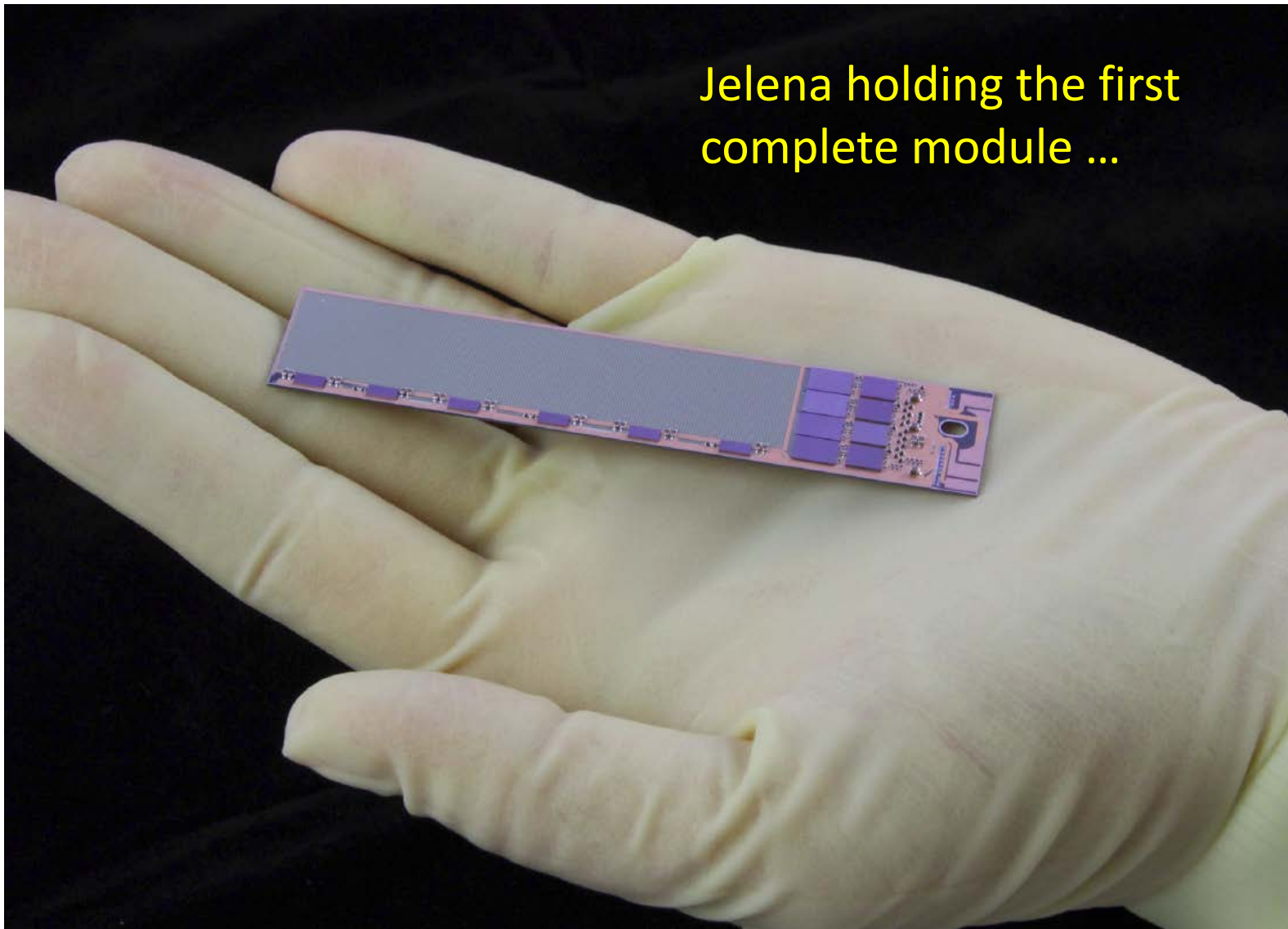
Item	Where
DEPFET Sensor (Phases I, II and III)	Semiconductor Lab (HLL)
Flip chipping of ASICs	IZM Berlin
mount SMDs (classify, no immediate rework)	HLL
Add Kapton cable, wire bonding	MPI Munich
Gluing of two modules (= „ladder“)	MPI / HLL
Assembly of PXD half shells	MPI Munich
Commissioning PXD	MPI Munich
Assembly of PXD and Beam pipe	KEK clean room (B1)
Completion of assembly with SVD (= „VXD“)	KEK clean room (B1)
Commissioning of VXD	KEK clean room (B1)
Installation of VXD into Belle II	on SuperKEKB beam line

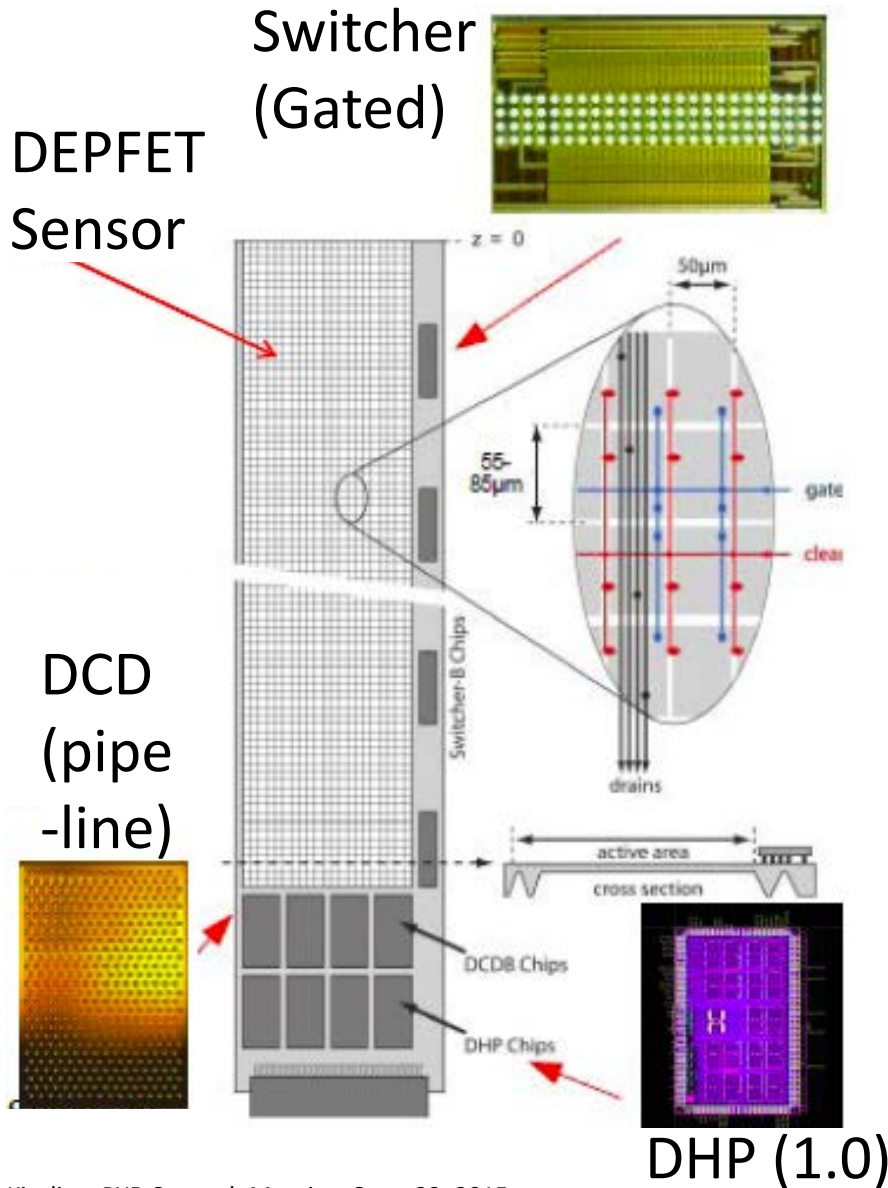
- SMD was under development with two options: (IFIC & HLL)
- prototypes of transport and process jigs available
- @IFIC/NTC: solder ball jetting – process on new machine being installed at NTC, but problem still with Cu oxide layer
- @HLL: solder paste dispensing: method has been proven to work successfully



Decision in July: production@HLL

The First PXD (Belle II) Module





2nd generation ASICs

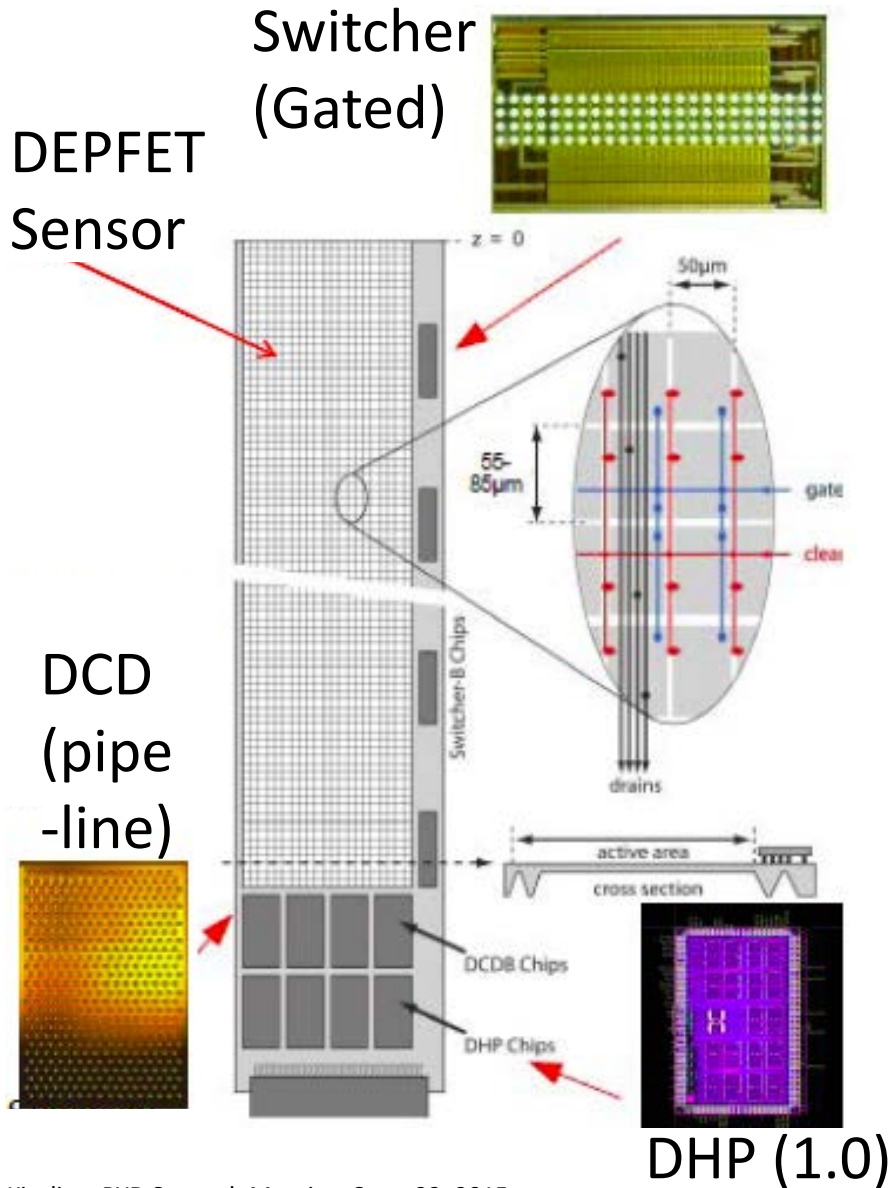
- used in EMCM electrical tests
- used for the **pilot run**

3rd generation under design:

- ASIC-Review in July, (+Report)
- Improve communication between DCD-DHPT
- Faster Switcher

Final Submission:
 SWG, DHPT : August
 DCD (ER) : Sep./Oct.

Final ASICs back in January 2016, to be installed for DESY test and BEAST 2 using Pilot Modules



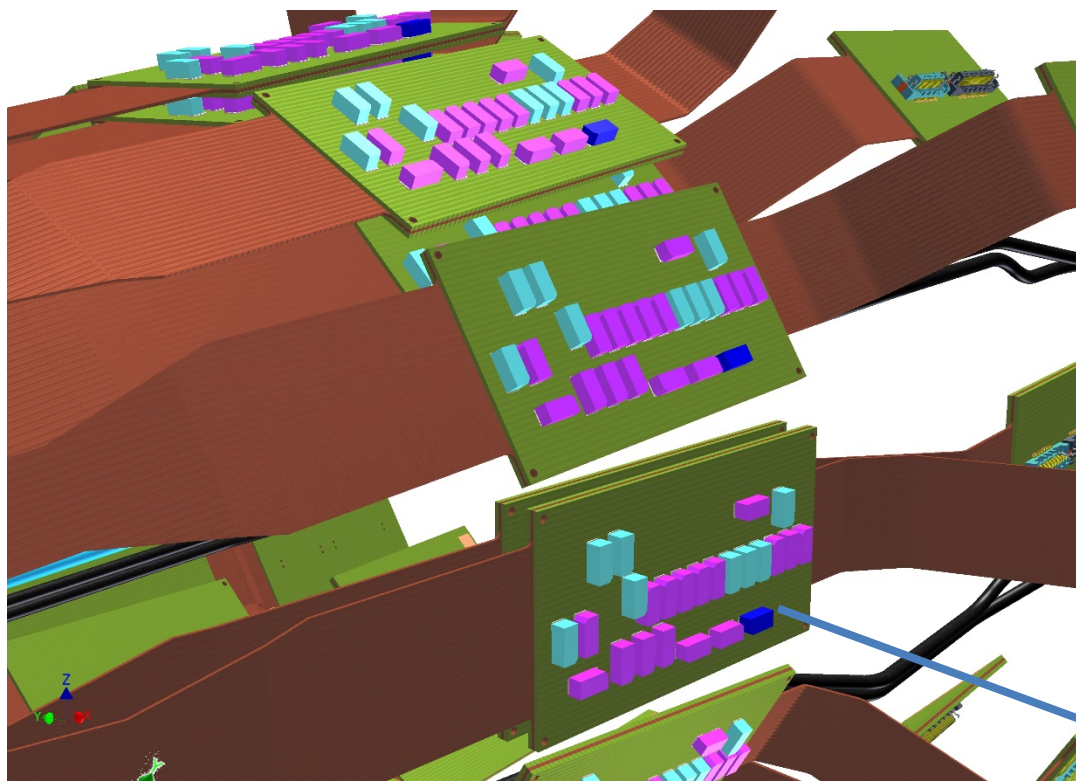
DHPT: Setup for QC mass tests (2nd needle card ordered) in Bonn, ready to go

SWG: “relatively” easy. Heidelberg setup can be used (at KIT)

DCD: No viable procedure at present (HD needle card does not work reliably)

But: KIT management may offer support with infrastructure (engineer and equipment)

4 types: layer 1 (I_Fwd, I_Bwd), layer 2 (O_Fwd, O_Bwd)



First samples (15)
“O_Bwd” delivered &
tested OK in Bonn/HLL

Design “O_Fwd”
finished in July, design
of I_BWD ongoing

4th cable (I_FWD) to be
delivered by spring 2016

Design MPI, production by Taiyo (Japan)

- Application specific PS unit (built by LMU) successfully used in the EMCM module tests
Production of 50 units is under way (includes spares).



- Pocket-Onsen system installed at KEK, tested successfully with HLT and EVB
Next steps: 30 kHz high rate test in 10/2015, DESY test 04/2016: Here support needed (again) by KEK DAQ group
- Optical transmission (dock->DHH) tested for radiation hardness: Glenair OK, now serious steps towards realization, to be implemented for DESY test in April 2016

Slow Control & Cooling

- PS / DHE / JTAG control and startup sequences stable and in daily use, including software interlock.

IPMI interface for ONSEN with actual hardware successfully tested, but still lot of work to do on the software side ...

IBBelle CO2 cooling plant GUI in development for commissioning @ MPI

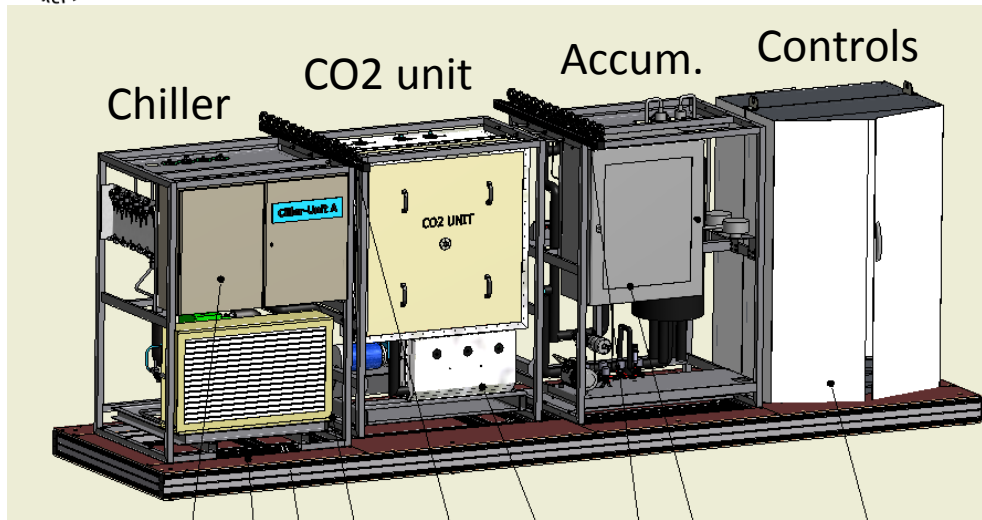
First GUI demonstrator according to new guidelines under development.
Milestone: Full system test during next test beam @ DESY (April 2016)

- CO2 Cooling unit (“IBBelle”) for VXD under construction at MPI (on schedule).

TÜV being involved in certification process.

A first meeting scheduled for Sep. 30 at MPI

IBBelle Construction @ MPI



Built in two phases (due to space limitations in Tsukuba hall):

1. “Little Brother”: fully functioning CO2 unit, but no operation redundancy
2. Later: add “Little Sister”, identical, but no accumulator



IBBelle Construction @ MPI



Construction on schedule, industrial chiller to be delivered end of September

Cooling “Strategies”

CO2 cooling needed in the following phases:

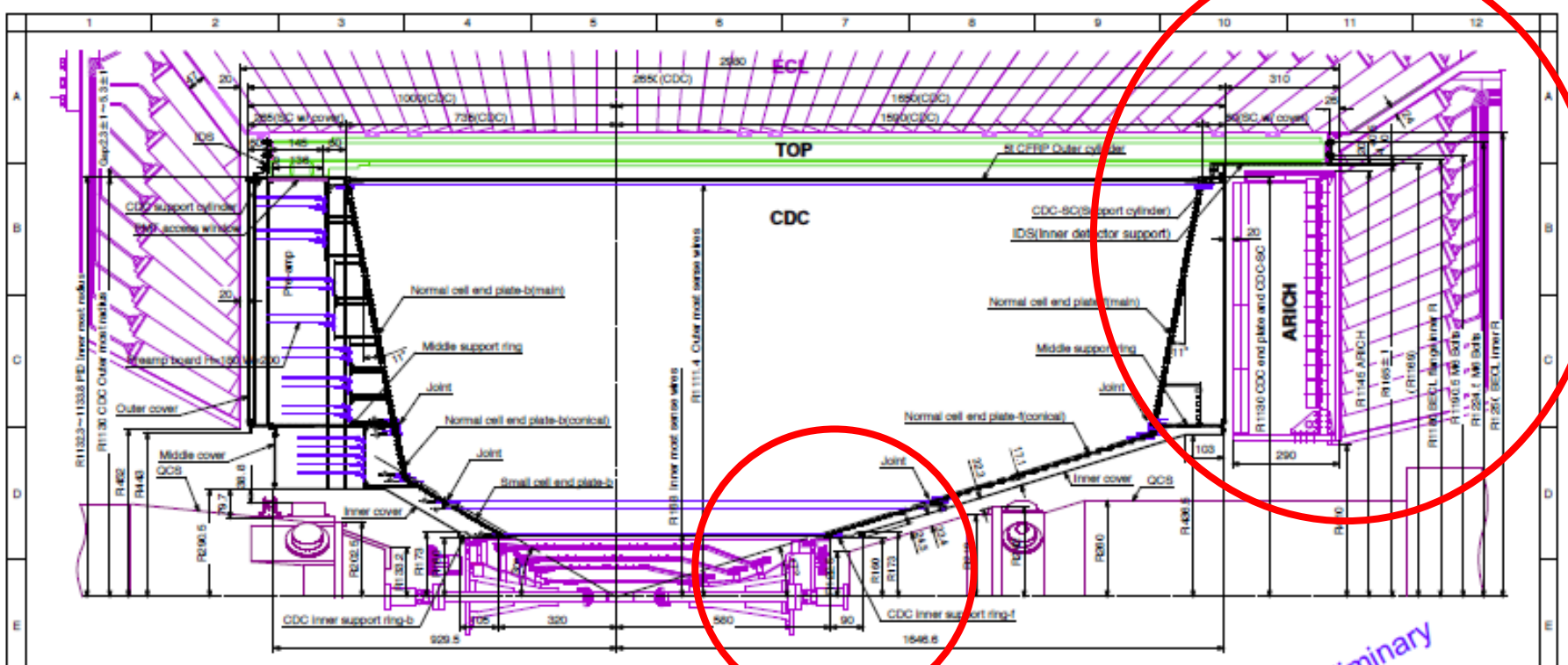
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|--|---------------------------------------|
| - assembly of “DESY Test” ladders at MPI | MPI cooler
(alcohol, OK for SCB) |
| - DESY Test itself | MARCO
(new pump ordered) |
| - Assembly of half shells @ MPI | MARCO (-> MPI) |
| - BEAST Phase 2 @ KEK (in Belle) | IBBelle (decided) |
| - Test of VXD @ KEK B1 | MARCO (decided,
but needs CERN OK) |

TÜV certification for MARCO also needed
(will be addressed in the pre-meeting with TÜV on Sep. 30, 2015)

[PXD] Mechanics

Present activities:

- Preparation of jigs for the module / ladder production
- Final design and construction for AIM and RVC
- Construction of IBelle and thermal mockup
- Work on service (cable routing)

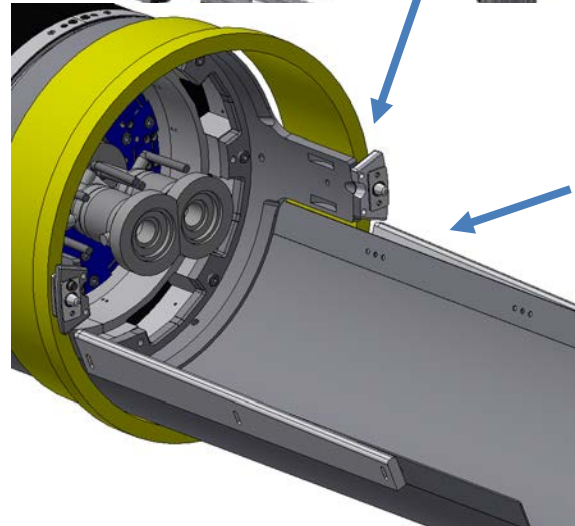
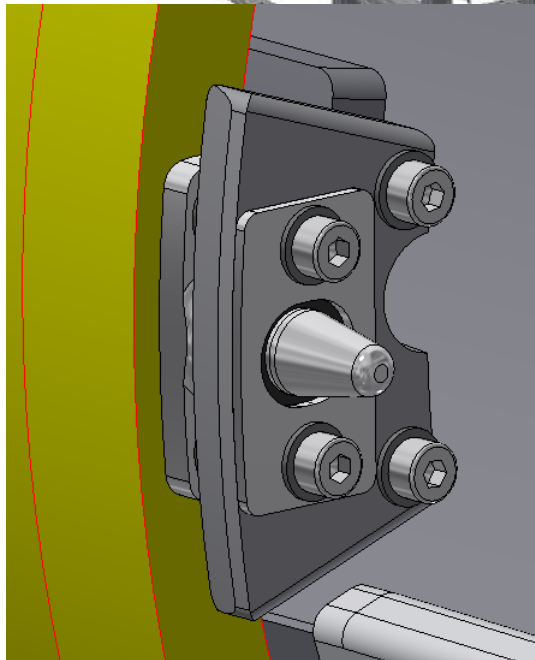
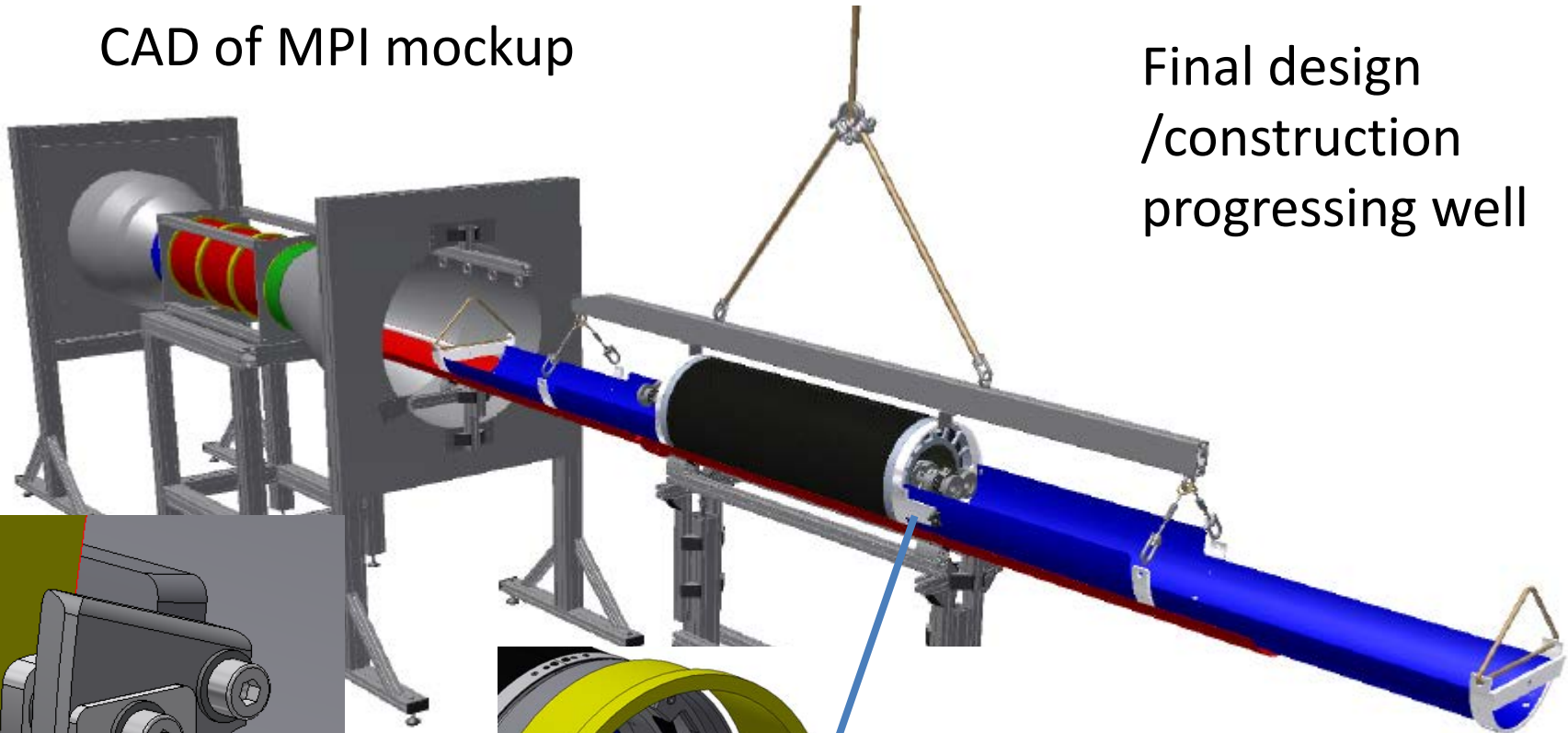


Primary

AIM: VXD Installation

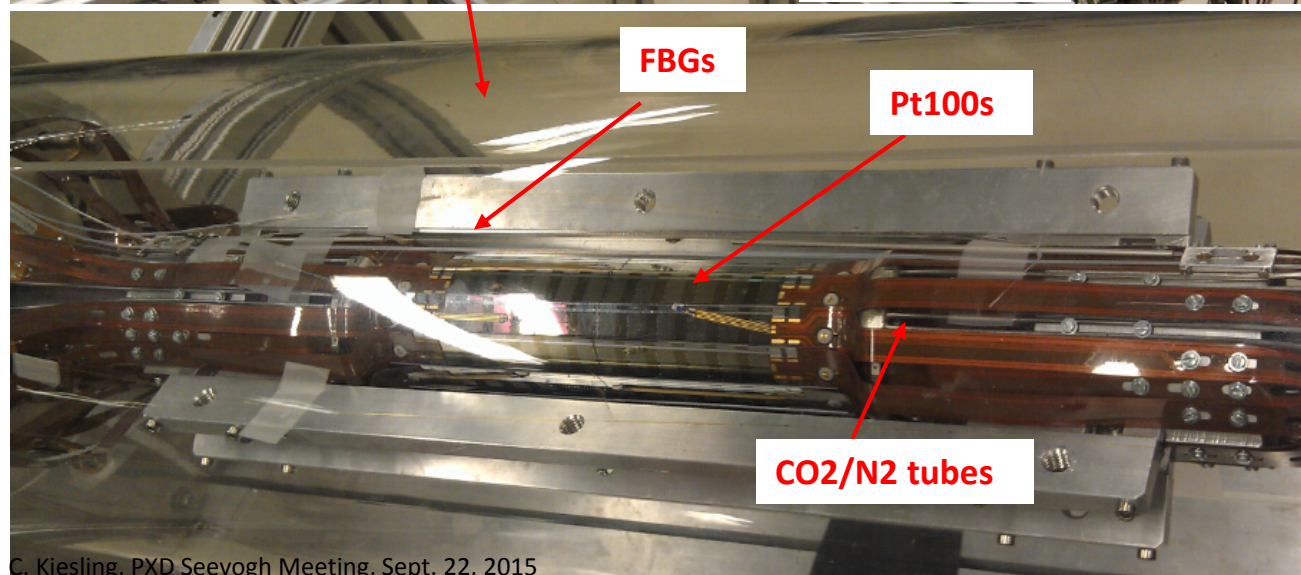
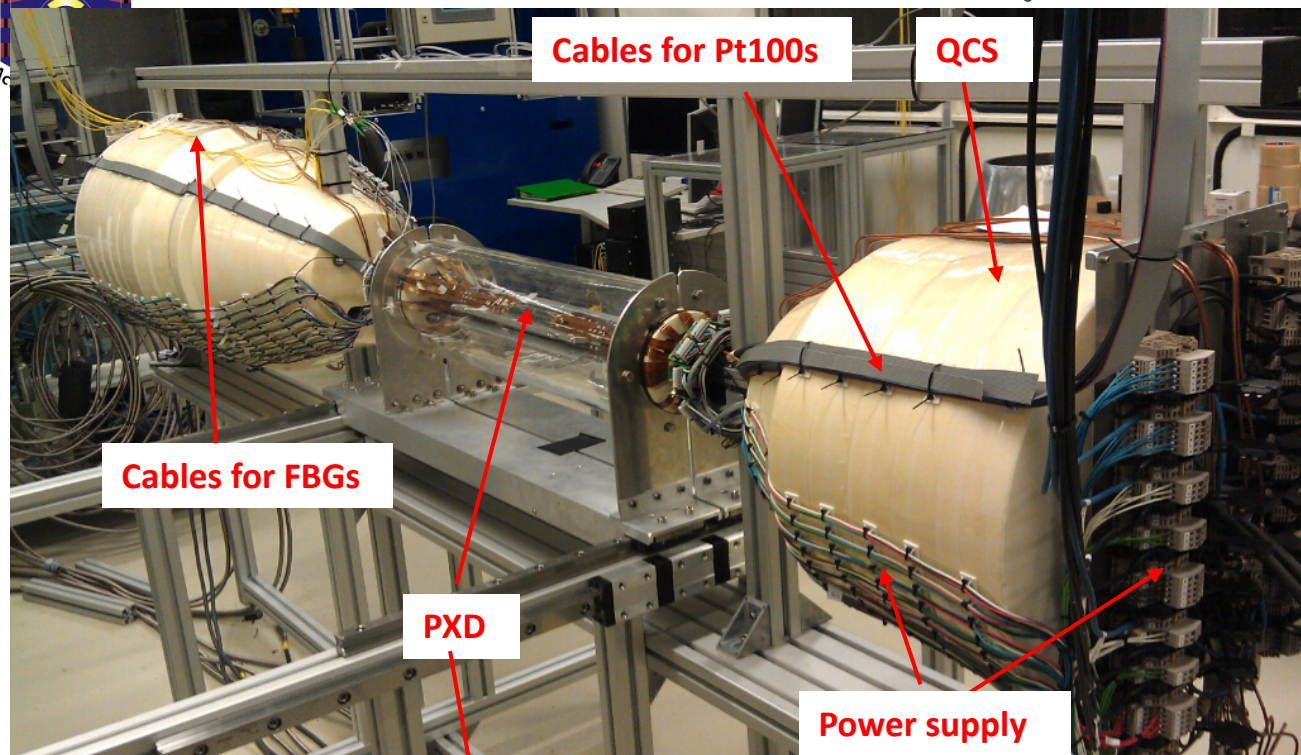
CAD of MPI mockup

Final design
/construction
progressing well



e.g. new design of
positioning pins at
CDC wall and torsion-
free sliding-in of VXD

The Thermal Mock-up at DESY



The thermal mock-up:
optimize the cooling
system for the VXD

- 2 phase CO2 to cool ASICs
- Colde N2 to cool sensors / Switcher
- Pt100s to monitor temperatures
- Fiber Sensors (FBG) for temperature and humidity

Status:

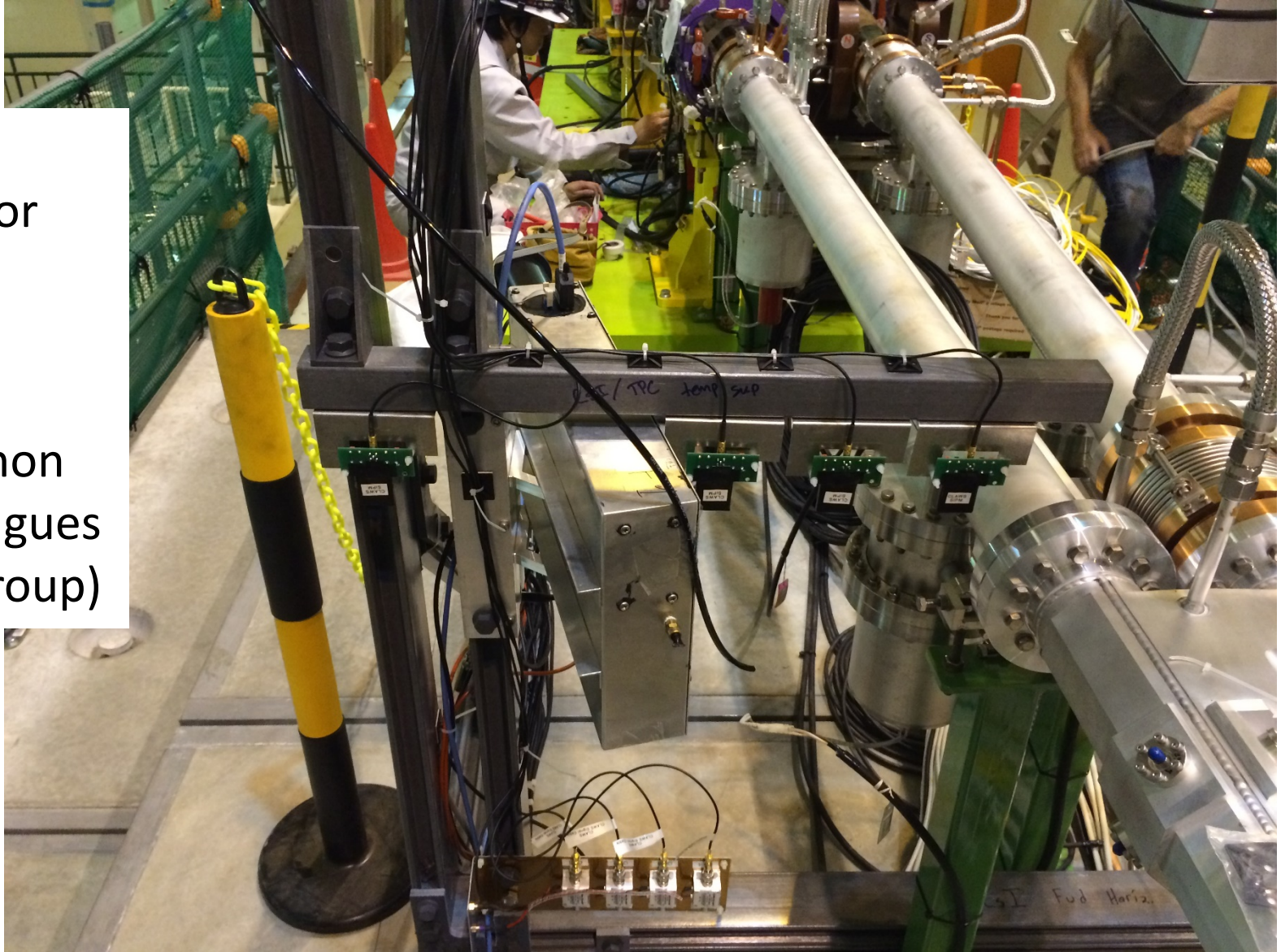
- CO2 and N2 ready
- Pt100s / FBGs ready
- Power supply of PXD in preparation
- SVD ladders being prepared

- | | | |
|--|---------------------|-------|
| - Bare PXD9 pilot modules: | July 2015 | ✓ |
| - Decision of SMD site/process (-> HLL): | July 2015 | ✓ |
| - External ASIC review: | July 2015 | ✓ |
| - final ASIC submission: | Aug / Sep 2015 | (✓) |
| - first pilot modules assembled: | September 2015 | (✓) |
| - pilot module testing: | Sep - Nov 2015 | |
| - start main sensor metallization (Phase 2/3): | December 2015 | |
| - final ASICs tested: | February 2016 | |
| - test beam (DESY) with final ASICs: | April 2016 | |
| - Install IBelle (Unit A) at Tsukuba hall: | Summer 2016 | |
| - Commission BEAST 2 detector: | February 2017 (?) | |
| - PXD at B1: | March 2017 (?) | |
| - VXD Integration and Cosmic Tests (B1): | June 2017 (?) | |
| - VXD installation | Summer 2018 | |

- Preparation of DESY VXD Test
assembly of 2 PXD ladders on SCBs + SVD 4L cartridge
(special support for SCBs, replacing the beam pipe)
-> possible bottle neck: Kapton cables
- Pre-assembly of BEAST 2 commissioning detector in Europe
(2 PXD ladders, 4 FANGS, 2 CLAWS, 2 Plume ladders = "PXD-type")
- Final assembly of BEAST 2 commissioning detector at KEK
"PXD-type" to be mounted on beam pipe, add SVD 4L cartridge)
+ all services
- Commissioning Team BEAST 2
Leader the BEAST 2 campaign: Carlos Marinas (deputy from SVD)
Tasks: How many people are needed, who will be in the crew?
More complex compared to DESY test, but VXD crew same

First "PXD" Life on the Beam Line

CLAWS
installed for
injection
studies
in Phase 1
(Frank Simon
and colleagues
MPI-ILC group)



We need to better document the work share between European groups and our Japanese colleagues.

IBBelle will cool BEAST Phase 2

MARCO will cool the PXD / SVD / VXD setup in B1

Examples: We need to provide a list of services for the CO2 cooling unit IBBelle, such as

- European 3 phase power supply with 2 x 65 A current limit,
- water supply specification, including connectors
- N2 supply with min pressure and flow rate
- piping from IBBelle to the junction box,
- support for junction box and manifolds
- vacuum pump for flex lines

We need to write the requirements down in a document, check and sign mutually and put the document onto the Twiki

Let us proceed step by step:

- CLAWS BEAST Phase 1 Frank Simon (confirmed)
(this project is already ongoing -> still document useful)
- CO2: IBelle and MARCO Hans-Günther Moser
- BEAST Phase 2
Commissioning Leader Carlos Marinas
 - > need to define a deputy from the SVD crew
 - > need to form a commissioning team
 - > collect the requests for services provided by KEK, e.g.
P/S, N2, vacuum etc.
- Installation of services, e.g. requirements for brackets to fix CO2 lines
and cables across the CDC endplate (already needed for Phase 2)

First Module is ready up to Kapton attachment: this will happen next week

Important coming months: Test of Pilot Production modules

Goal #1: verify metallization layout

Goal # 2: find so far unknown bugs in the ASICs
(e.g. in tests of the Gated Mode)

Crucial: need to prepare a **solid test program** addressing the two issues

Goal # 1 must be reached by end of November: Phase 2/3 of DEPFET
Production must be started in December

For Goal # 2 we might have some one more month (end of 2015)

- Carlos has applied for the DESY Combined Test (weeks 15-17, 2016)

- Coming Dates:

KEK	VXD Mechanics Gemba	Oct. 17
KEK	BEAST 2 mini workshop	Oct. 18
KEK	B2GM	Oct. 19 – 23
KEK	VXD – BPAC (!)	Oct. 24 - 26
[DESY?]	Next VXD Workshop	April 2016