IR status

S. Tanaka (KEK)

19th DEPFET workshop

VXD mechanics meeting in DESY

Date/Time: from Friday 08 May 2015 (09:30) to Saturday 09 May 2015 (18:00) (Asia/Tokyo)
Location: DESY
Material: SeeVogh connection details | Slides

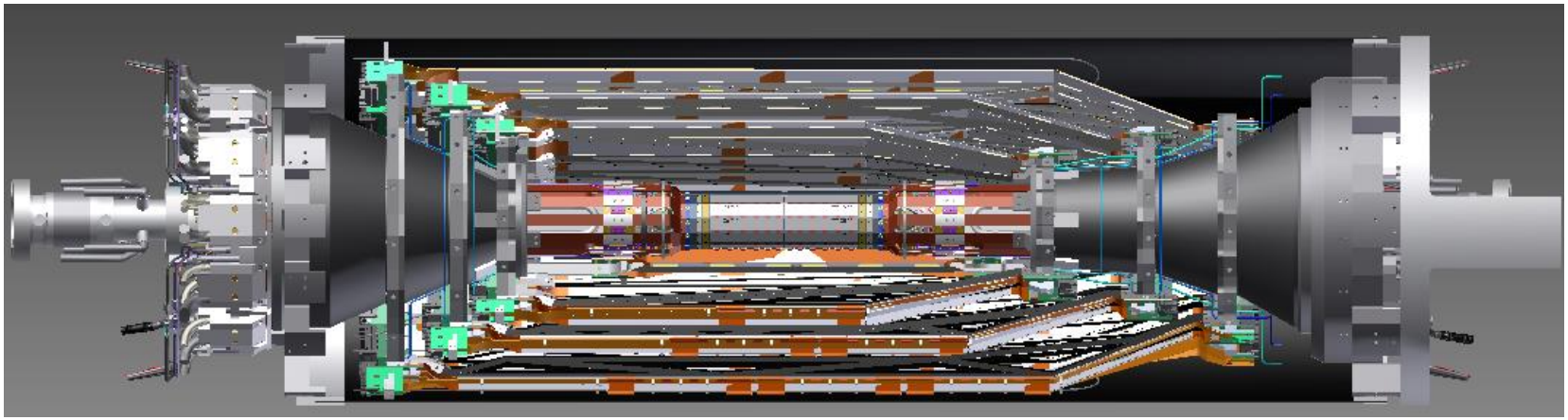
http://kds.kek.jp/conferenceDisplay.py?confId=18516

Friday 08 May 2015

09:30	Slides **KEK mechanics status and plan** (20')	Shuji Tanaka (KEK)
09:50	**PXD mechanics status** (20')	Christian KIESLING (KEK IPNS)
10:10	**VXD service space design update** (20')	Tscharlie Ackermann
10:30	Slides **VXD environmental monitor** (20')	L.Vitale
10:50	**Environmental monitor system for VXD thermal mock** (20')	L.Lanceri
11:10	Slides **RVC status and plan** (20')	K. Gadow
11:30	Slides tolerance requirement **SVD endring gluing test** (20')	Katsuro NAKAMURA (KEK IPNS)
11:50	Slides **SVD mechanics status** (20')	F. Buchsteiner, M. Friedl
12:10	**SVD Ladder mount table/ Endring cooling piping** (20') EndRingAssembly LadderMountTable LadderMountTable	Toru Tsuboyama (KEK, High Energy Accelerator Research Organization, Physics department)
12:30	Slides **VXD thermal test status and plan** (20')	Hua Ye (DESY) , Reimer Stever (DESY)
12:50	Slides **BEAST phaseII setup +Dock area space management** (20')	
13:10	Slides **Updating VXD service list** (20')	
13:30	Slides **IBBelle construction** (20')	
13:50	**CO2 piping from IBBelle to Patch panel and services for IBBelle** (20')	
14:10	Slides **Open CO2 cooling system in B1 room and their safety control** (20')	
14:30	Slides **Schedule** (20')	

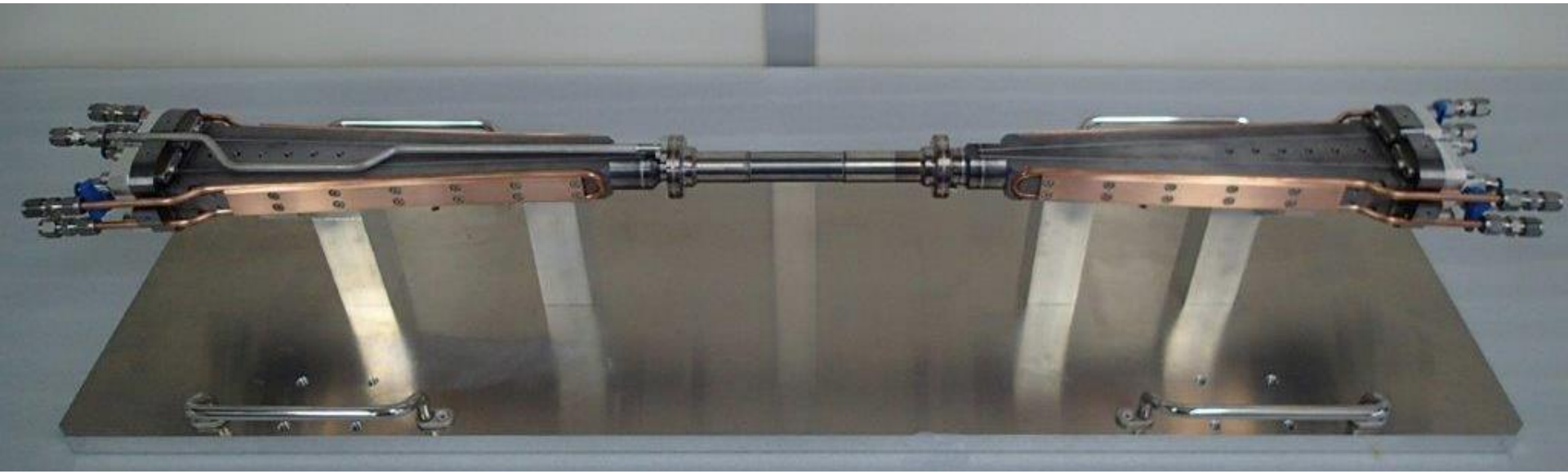
VXD mechanics Status

- Mechanical design: Done (still minor updates are happen)
- A tentative assembly procedure: Yes
  - Some study to check the feasibility is necessary
- VXD installation procedure: Yes
  - AIM tool by MPI
  - Supports/Scaffoldings will prepared by KEK
- Service list: : almost summarized, but not finished
  - Service design: not final
- IBBelle location: yes
- CO2 piping path: yes
- Dock area design: yes (CO2 pipe connection is not final)



Beam pipe for phase II

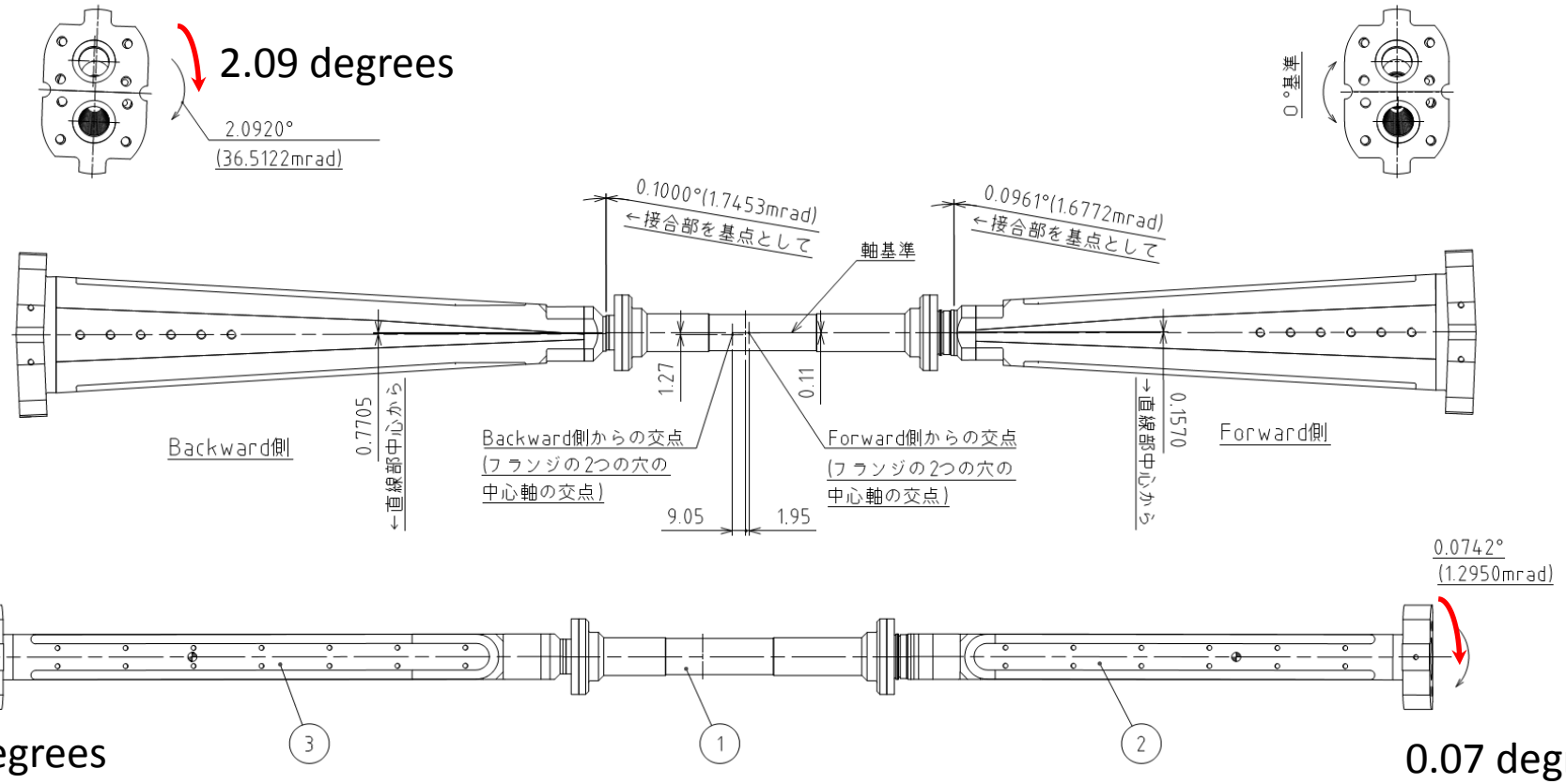
- After the EBW connection of IP chamber with BWD crotch part in Nov., we found 2 degrees of displacement at the connection point.
- No vacuum leak has found after this process
- By using CMM measured data, Kanazawa-san (KEKB machine group) has verified the usability of this pipe for phase II operation



Measured displacement after EBW connection

36mm (between each pipe center)

a point of reference

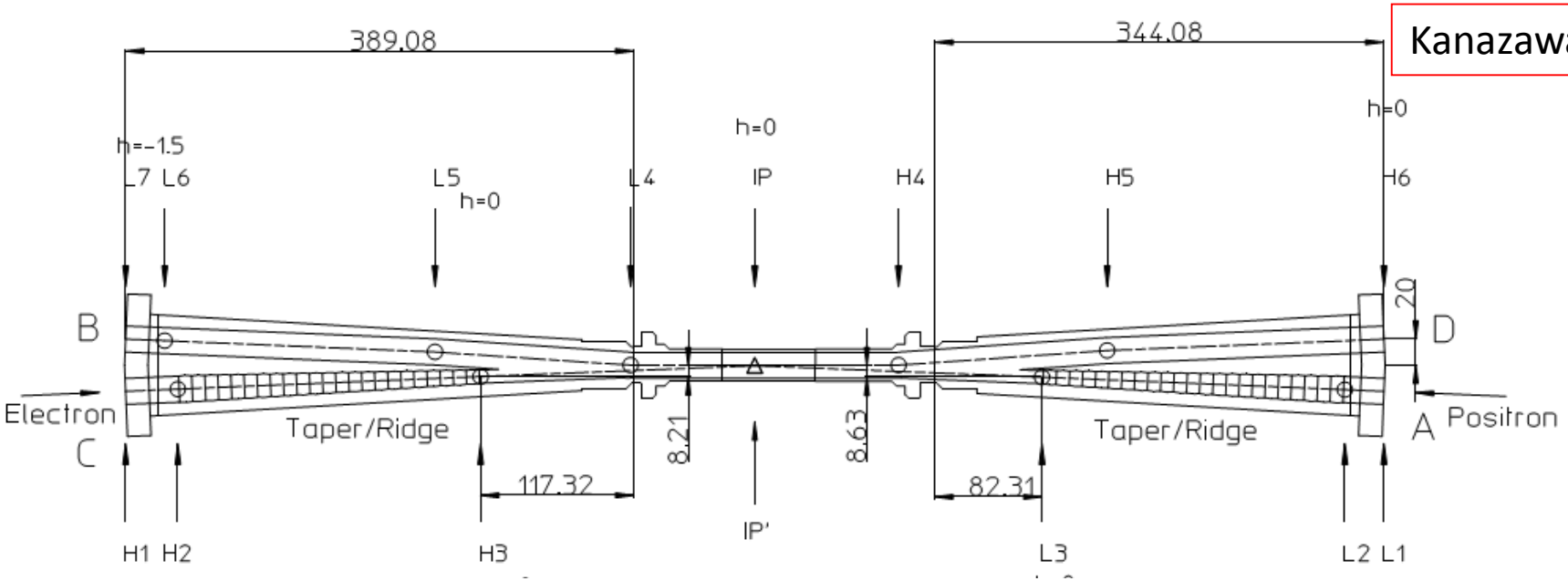


0.062 degrees

0.07 degree

390mm (crotch part length)

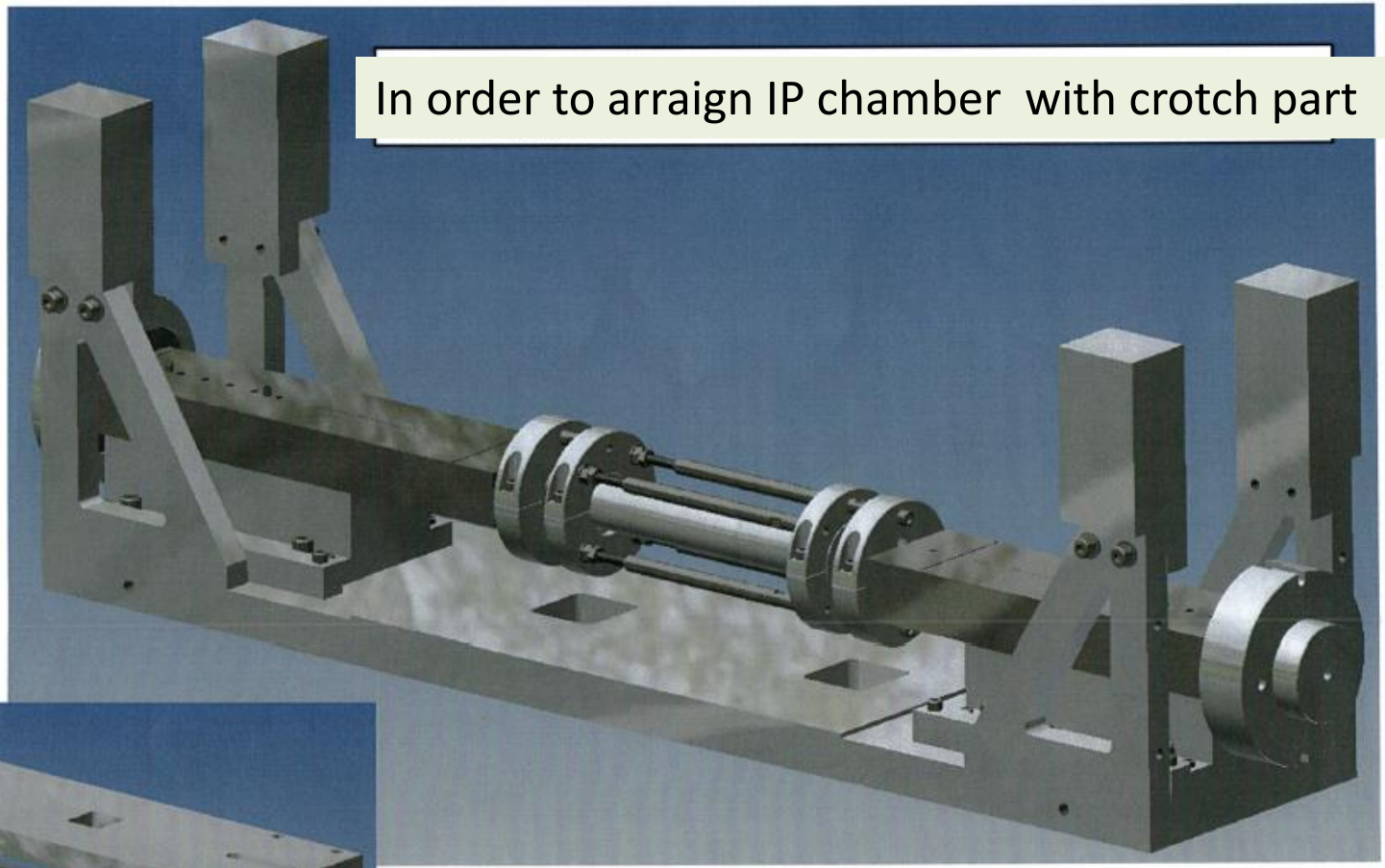
Kanazawa

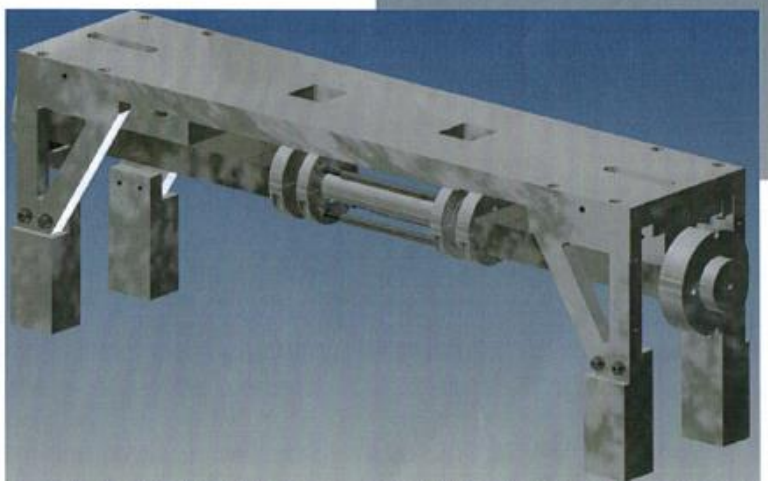


	mrad	A(p in)	D(e out)	L3	O	H3	B(p out)	C(e in)
equal twist	18.2561	0.365122	−0.36512	0.166678	0	−0.15901	0.365122	−0.36512
bent	1.295	−0.44558	−0.44558	−0.10659	0			
	1.0978					−0.12879	−0.42713	−0.42713
sum		−0.08046	−0.81071	0.060087	0	−0.2878	−0.06201	−0.79225
add 0.4		0.319538	−0.41071	0.460087	0.4	0.112195	0.33799	−0.39225
add 0.1		0.019538	−0.71071	0.160087	0.1	−0.1878	0.03799	−0.69225

This table shows displacement from design value (in vertical).
1st line: distributed symmetrically shifted by 1 degree to the left and right
2nd,3rd line: position displacement by bent
4th line: summing up of displacement
5th line: 0.4mm lifting up of whole BP
6th line: 0.1mm lifting up of whole BP

Beam pipe EBW tool modification

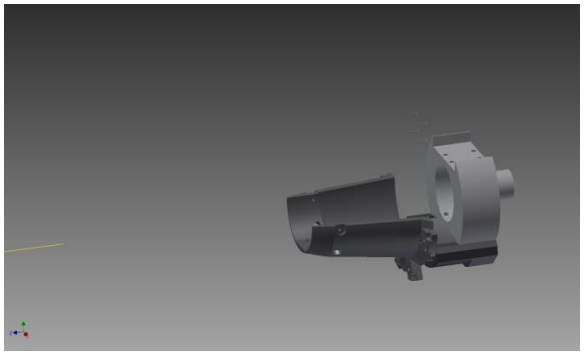
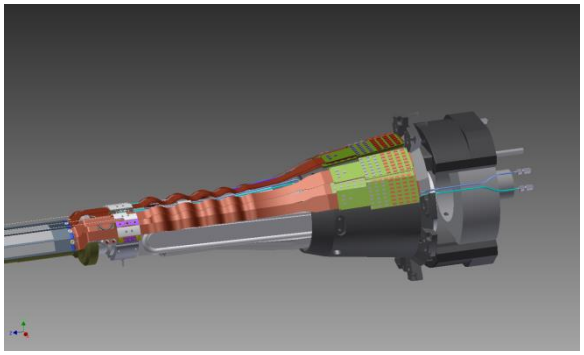
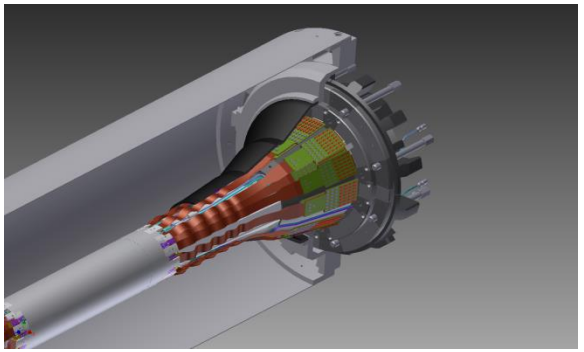


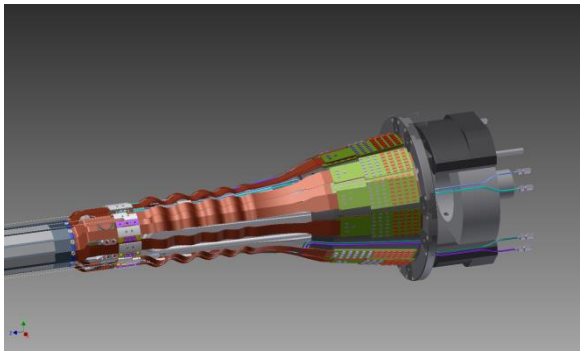
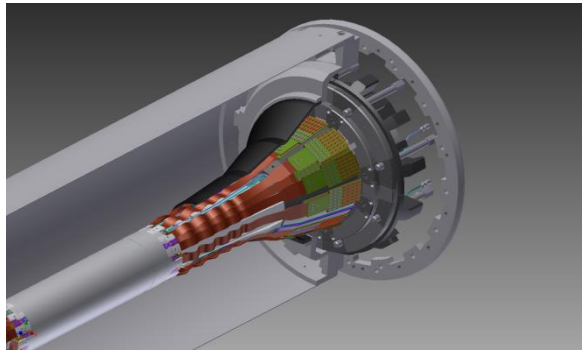
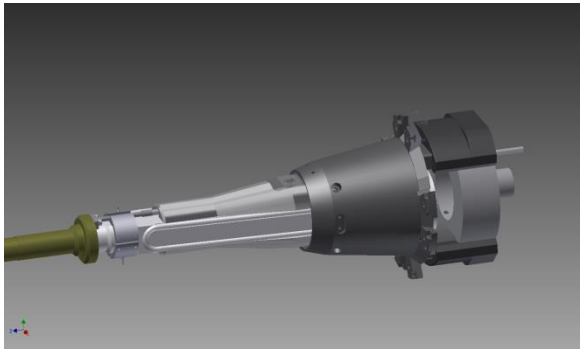
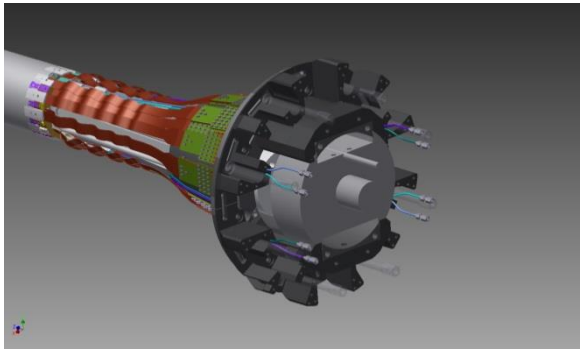
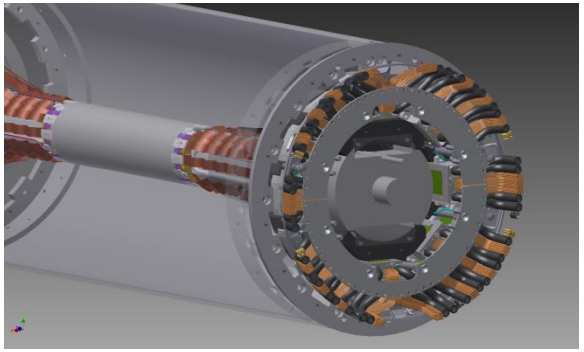


・仮止め治具ごと反転させて、そのまま本溶接の段取りを行う。(回転装置に取り付ける)

At first, spot EBW is applied

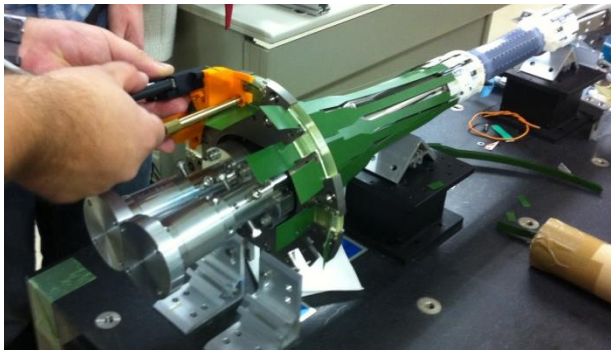
VXD assembly steps

Those procedure will be validated on BEAST assembly

VXD assembly



Tsukuba hall B1 room

SVD
(Ladder mount table)

First Practice done

- Outer cover gluing ✔
- Support cone gluing ✔
- Endring gluing ✔
- Mount SVD structure on ladder mount table ✔
- Ladder mount ✔
- Attaching to Division tool

BP+HM+PXD
(VXD assembly table)

- Alignment of Beam pipe position ✔
- Fixing Heavy metal on the table ✔
- Attaching BP onto heavy metal parts ✔
- Covering upper heavy metal parts ✔
- PXD assembly at MPI
- Attaching PXD system

Connection BP+PXD with SVD
(@VXD assembly table)

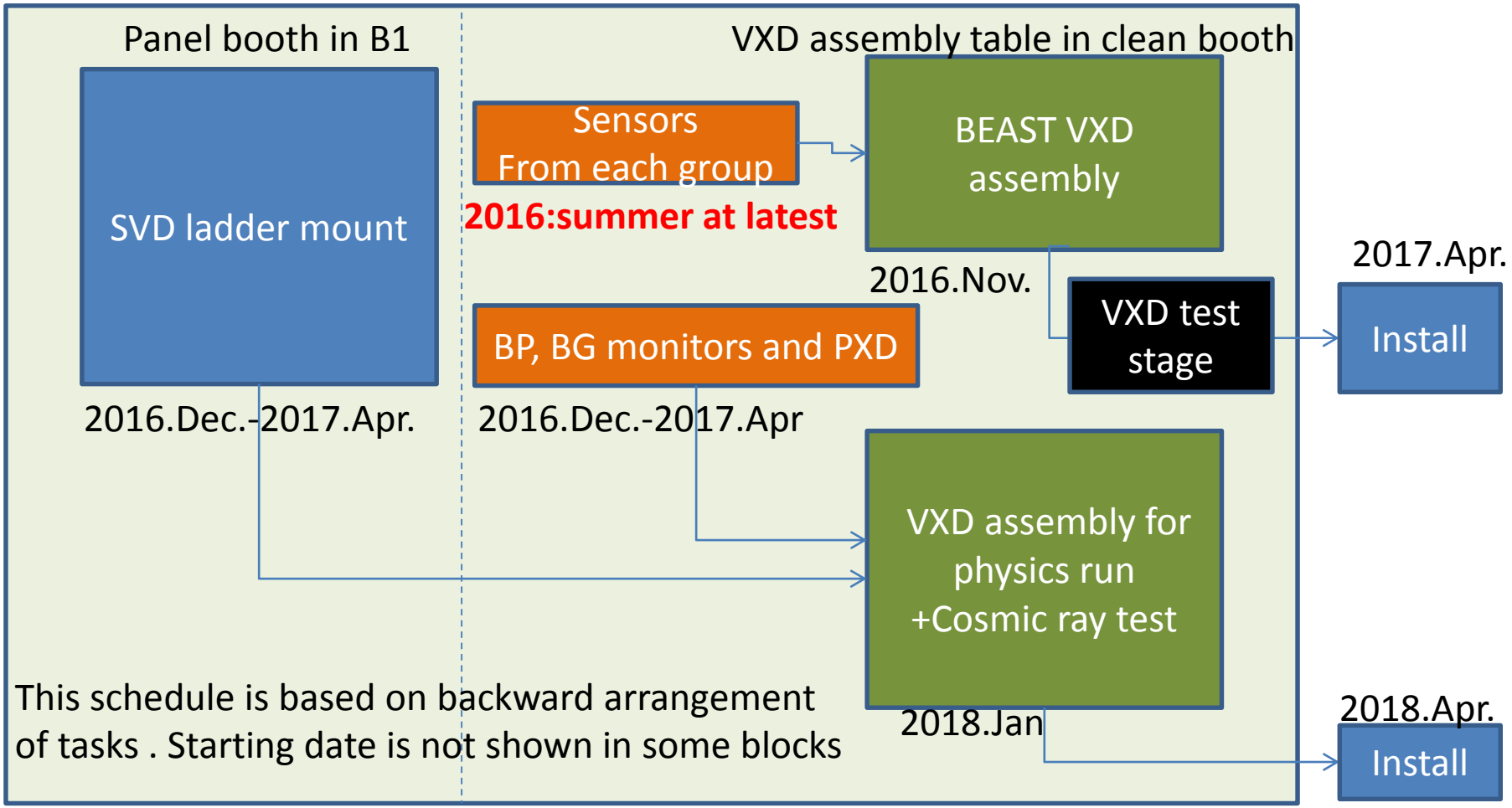
✔
VXD installation

Tsukuba hall B4

Assembly work management

- We will assemble two sets of VXD system
  - VXD for BEAST phase II
  - VXD for physics run

BEAST sensors and final system must be independent



Alignment work is ongoing

VXD mechanics parts preparation

- **Phase 2** (should be prepared before 2016 summer)
  - Outer cover with brackets: done
  - End-flange: done
    - Brackets connection for phase 2 sensors should be solved
  - *End-ring and CFRP support cone: not used in phase 2*
  - Heavy metal shields;
    - almost prepared but remaining parts are some small pieces and screws
  - Beam pipe: done
  - Beam pipe brackets: need to prepare in 2015
  - PXD mount block: need to prepare in 2015
  - VXD assembly table: parts delivered, alignment work is ongoing
  - VXD dock ring: need to prepare in this year (MPI)
  - VXD transport and installation tools (before 2016 summer)

IR installation + service work (tentative)

1、Endcap installation at Belle parking position

2, Closing End-yoke (EKLM structure)

3, Belle Roll-in

4, Opening End-yoke

5, Horizontal linear guide stage setup for Endcap opening

6、Scaffolding setup for VXD and Endcap(ECL/ARICH) service access

7、VXD installation tool setup

8、VXD installation

9、Opening Endcap for VXD/CDC service access

10、VXD service work (Dock, cable, pipe)

11、Endcap closing

(->ARICH/ECL cable/pipe connection)

12、ECL lead shield installation

13、Removing scaffolding for VXD/CDC service work

14、Disassembling Horizontal linear guide stage for Endcap

15、Scaffolding for QCS installation(different with 6)

16、QCS installation + connecting BPM cable, cooling pipe, gap sensor cable)

17、Dismantle of scaffoldings

18、Closing End-yoke

19、Piping and cabling around QCS

20、Moving concrete wall to operation position

Before phase 2, magnetic field measurement and RVC setup is happen before VXD installation
Please check pdf file (a tentative plan discussed with machine group)

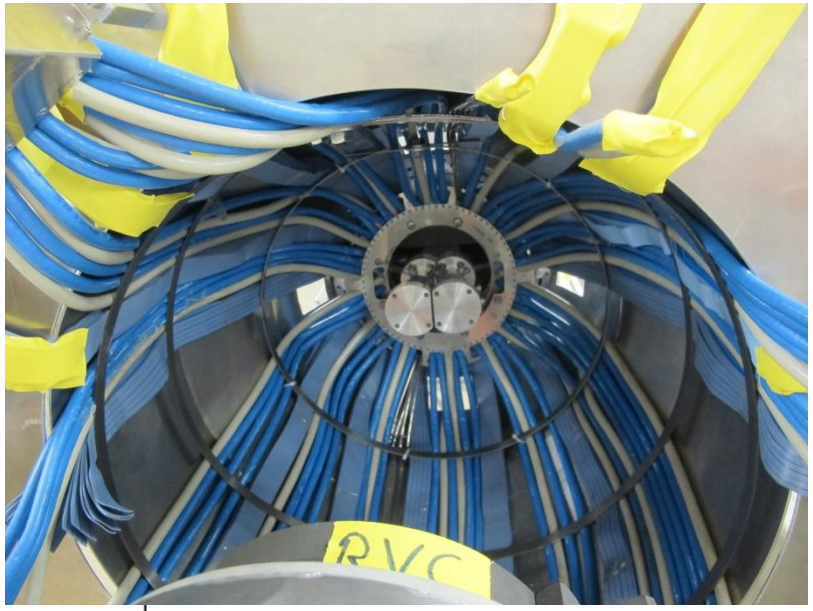
Ichiro, Isamu and I will take care of scaffolding and support structure setup

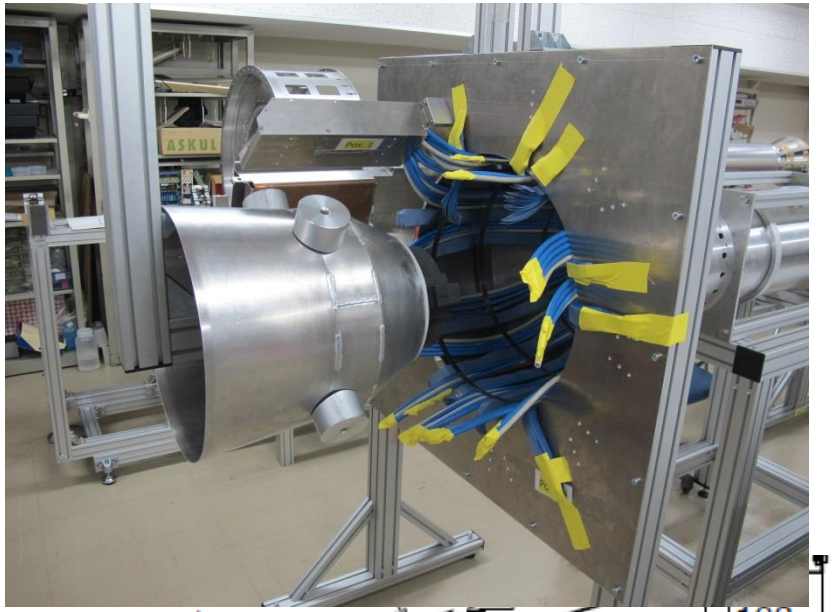
Milestone in 2015 JFY

- VXD mechanics meeting @ DESY in May
  - VXD thermal mock discussion
    - Clearance check for each component.
    - SVD ladder mount discussion
    - Warm/cold dry volume
    - CO2 pipe bending and mount (mainly for SVD)
- B2GM in Jun.
  - SVD ladder mount + cooling pipe mount
  - CO2 (IBBelle location +piping: creating fine tuned schedule)
- Service installation test@ MPI (connected to Trieste WS)
  - VXD dock area service assembly
  - Clearance check between VXD and QCS (also IDS and endcap)
  - Brackets mount
- *B2GM in Oct.+ VXD/IR review*
  - *VXD assembly demonstration(by BEAST structure) without services*
    - *BP+HM+PXD(@VXD table) + SVD halves from SVD ladder mount table (in order to debug each procedure)*
    - *Phase 2 BEAST sensor mount test*
- *B2GM in Feb. 2016*
  - *VXD assembly demonstration with partial services (+PXD mount mechanics)*
  - *VXD transport tool demonstration (B1-> B4?)*
- *BEAST VXD assembly starting 2016 summer*

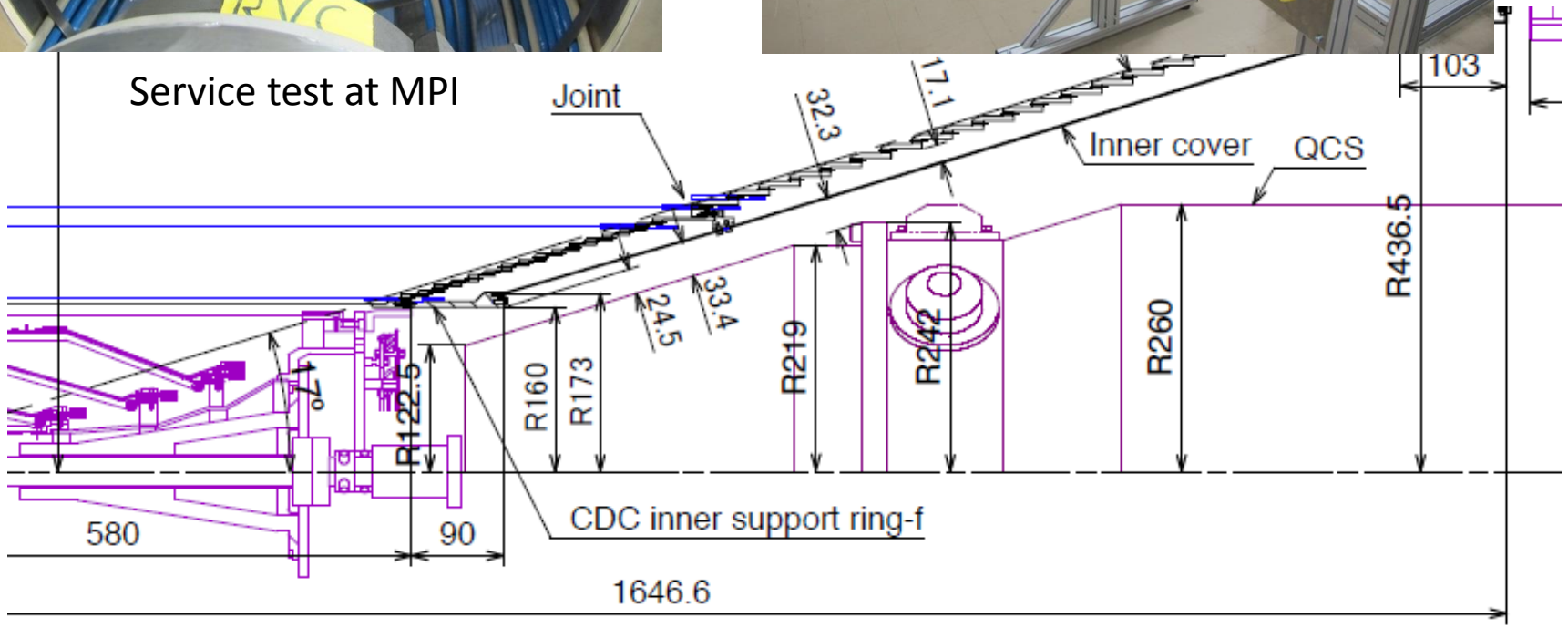
SVD endring gluing

Service space



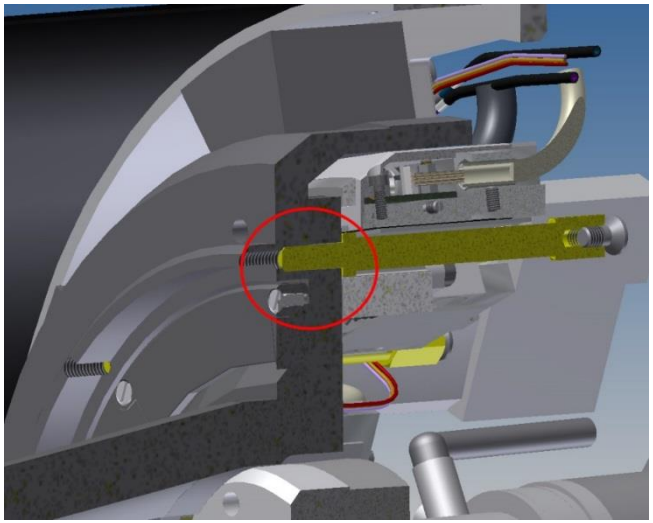


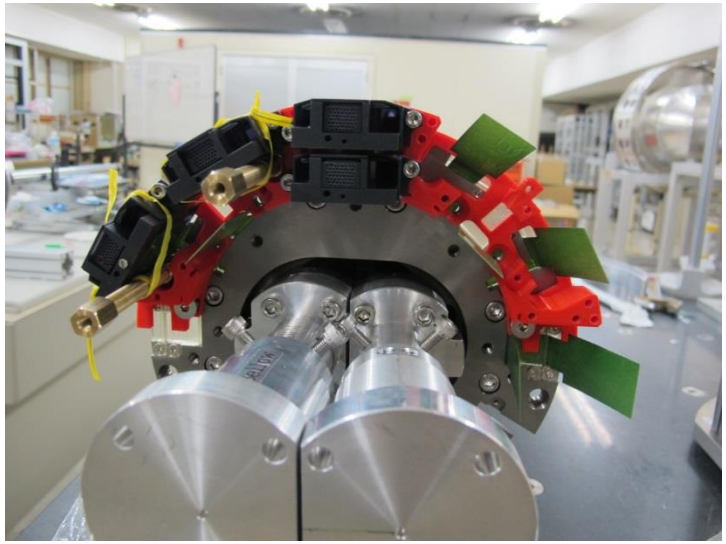
Service test at MPI

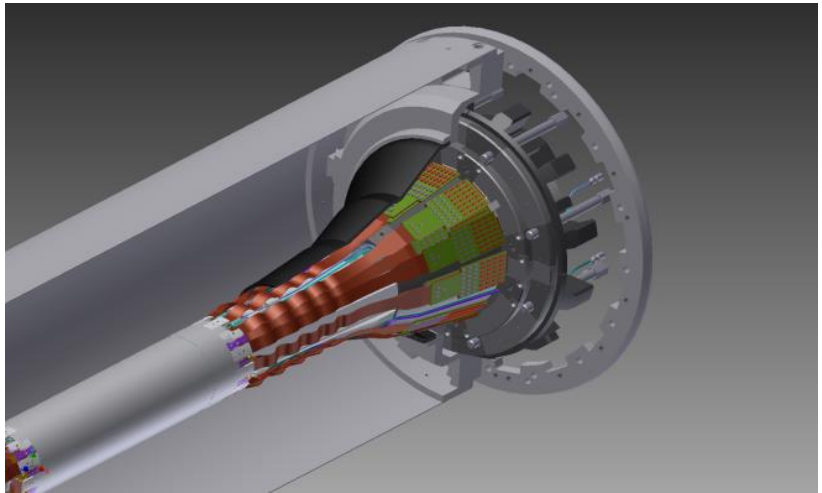


Screws position of SVD end-flange

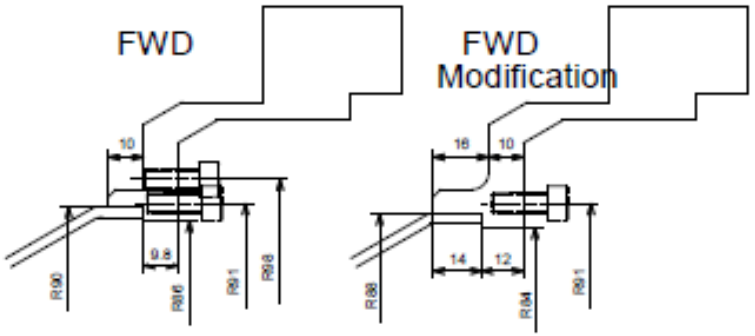
- To avoid confliction with PXD PP
- This modification is only for physics one



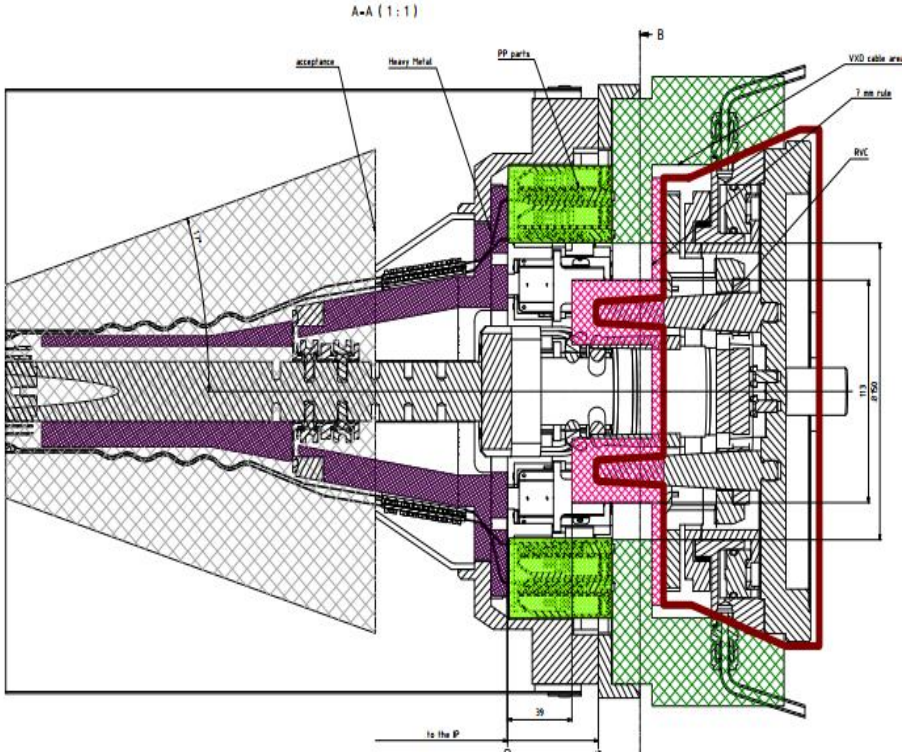




Agreed in last B2GM



VXD services (between VXD and QCS)



- Cooling pipe and BPM cable should be green hatch area.
- Red area is movable, then such component should not be located

7mm clearance is agreed between VXD and RVC

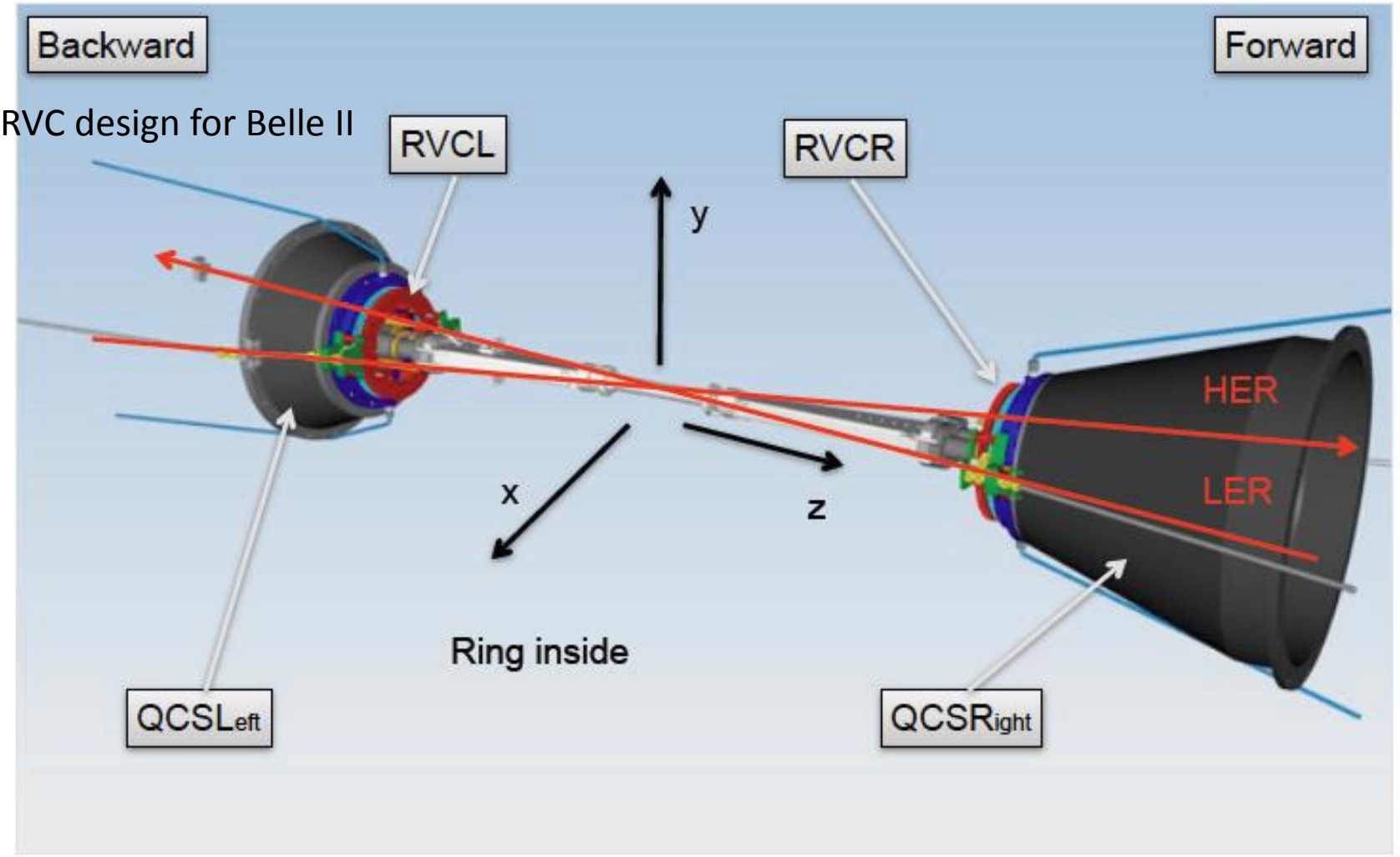
Service list has updated in mechanics meeting.
Service design will be updated.

Mockup test have to be finished in this year.

Remote Vacuum Connection overview

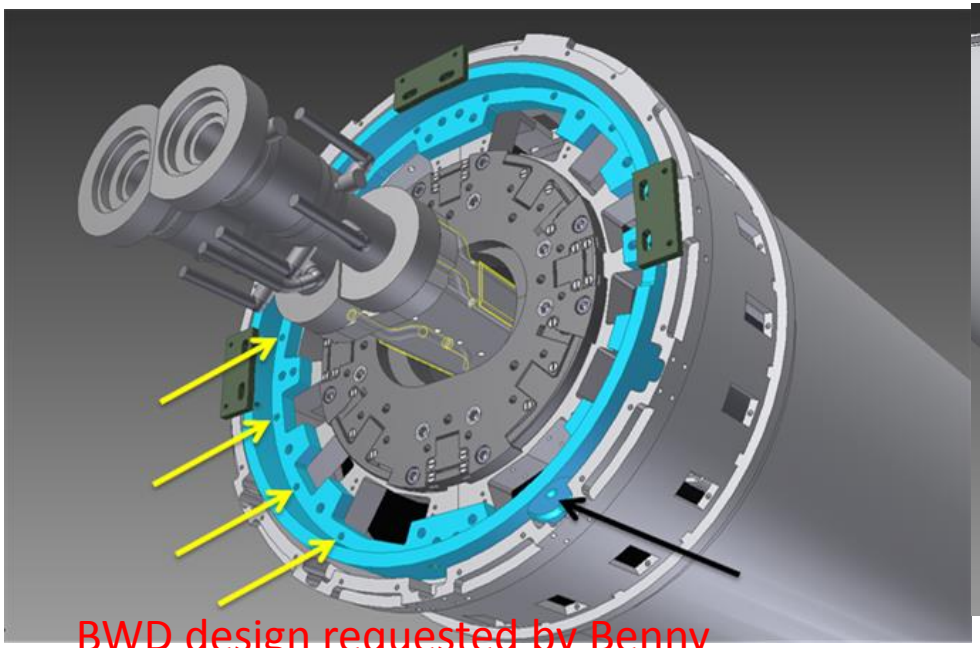
K. Gadow

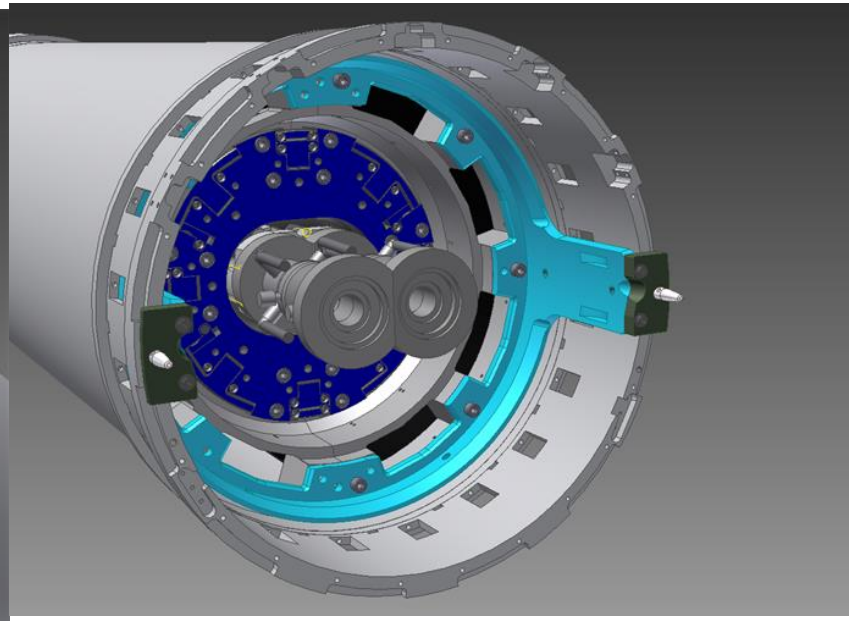
RVC design for Belle II



RVC meeting in Apr. at KEK (K.Gadow, K.Kanazawa)

Connection of VXD with CDC



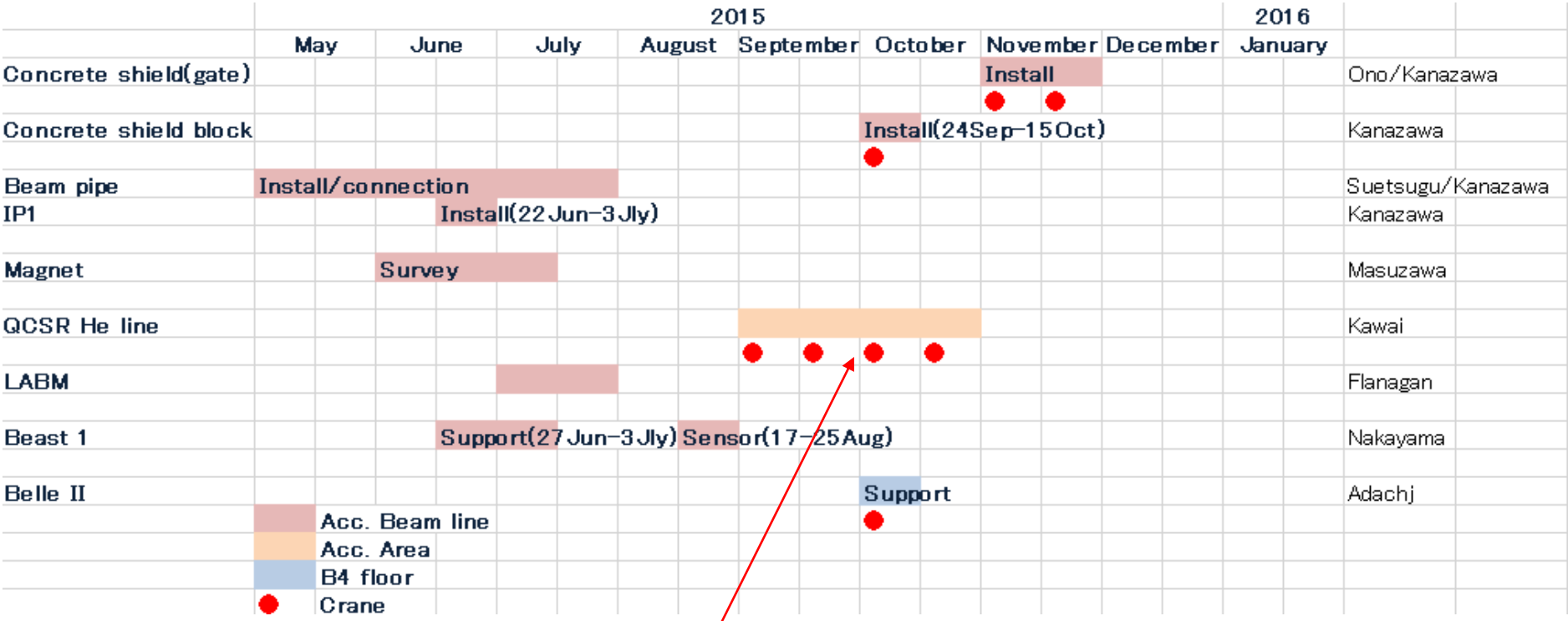


BWD design requested by Benny

VXD Mockup

Design by
FWD: MPI
BWD: KEK

IR schedule (other than VXD) in 2015



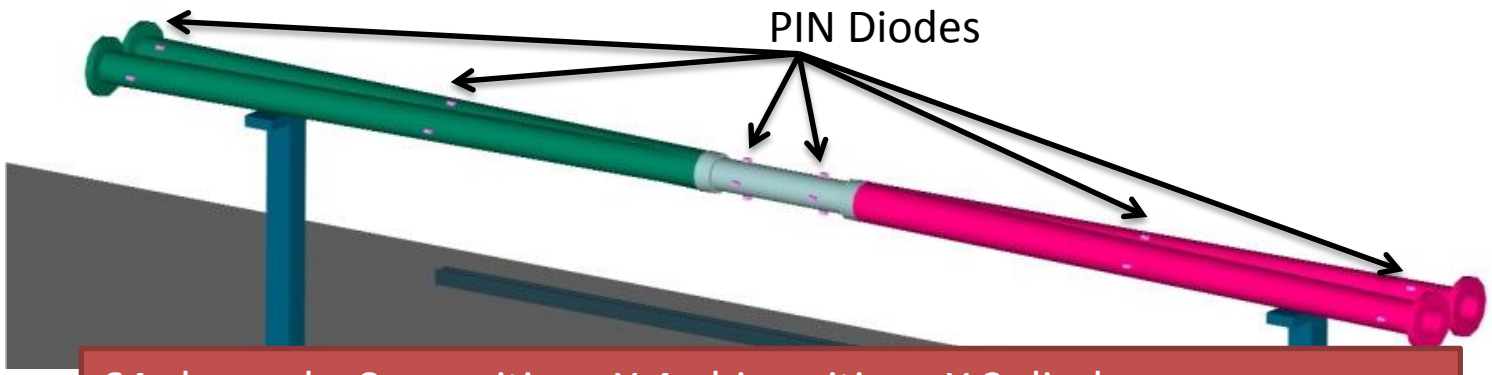
CO2 piping + N-gas piping if possible

Slides introduced in SuperKEKB commissioning meeting.

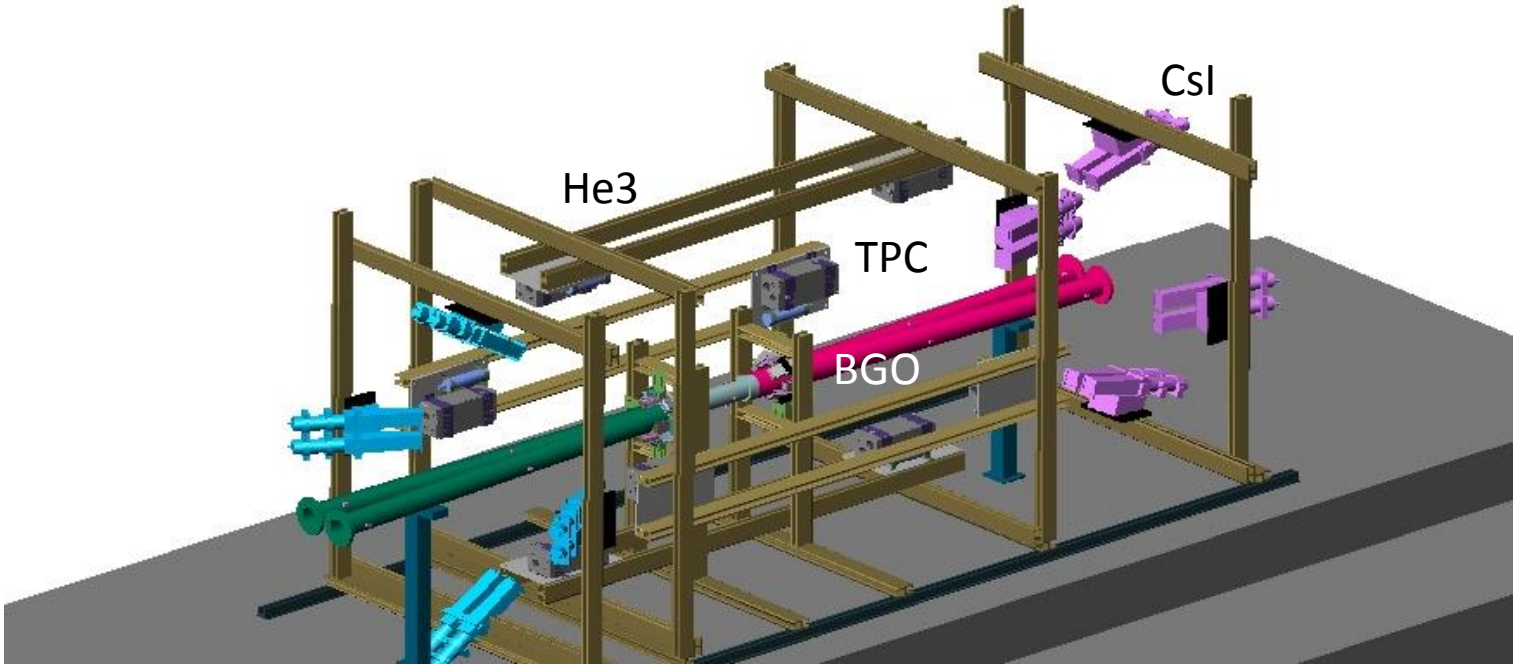
Request to accelerator group for Beast phase1

H. Nakayama (KEK)
on behalf of Beast group

Phase 1 Design



64 channels: 8 z-positions X 4 phi positions X 2 diodes



MiniBEAST integration test ongoing in Hawaii. Disassemble and ship to KEK in August.

Requests to accelerator group

- For Touschek study (Also in phase II, III)
  - Relevant people: Funakoshi-san, Masuzawa-san, Iida-san
- For beam-gas study (Also in phase II, III)
  - Relevant people: vacuum group
- For VXD abort module (Also in phase II, III)
  - abort signal lines(LER/HER) from VXD abort module to SuperKEKB (B7 rack in Ehut)
  - "abort timing reference signal" from SuperKEKB(EH) to VXD abort can this be ready during phase1? (Button signal available at EH)
  - “SuperKEKB status” register, set via EPICS (for thresholds selection)
  - timing signals (SuperKEKB revolution period (10μs))
  - Relevant people: M. Iwasaki-san

- For injection BG measurement (CsI) (Also in phase II, III)
  - Need injection timing signal from injector
  - Y. Iwasaki's FPGA receives Event Data, will be ready before phase1
  - Use remaining cable btw FPGA (E-hut) to CsI DAQ(Beast DAQ room)
  - Relevant people: Kaji-san(Control), Y.Iwasaki-san(TRG)

The strategy to decide Veto gate timing and width is not clear on Phase II,III.
This gate information should be control by PXD, but there is no clear strategy.
Trigger system provides functionality of bunch-by-bunch veto gate control.
Injection BG situation will/may change time-to-time. On that case, how to optimize it?

- For timing synchronization (Also in phase II, III)
  - BEAST DAQ (except for CsI) and accelerator
  - based on KEK NTP server (no special request to accelerator)

Please join/follow-up those activities for smooth phase II commissioning

Conclusion

- VXD mechanics design and assembly procedure has agreed and defined
- Service list is updated , but still other update may be happen
- Major milestone in coming a year.
  - Service installation test at MPI in Sep.
    - Between VXD and RVC
    - From Dock to ECL
  - VXD assembly work check
    - In Oct B2GM w/o services
    - In Feb. 2016 B2GM, with services
  - 2016 summer
    - Starting phase II VXD assembly
- BEAST phase 1 is scheduled in Jan. 2016
  - Some studies and functionality checks are also concern with PXD

21th B2GM

- 20th-21st : BEAST mini workshop
- 22nd afternoon : Gemba discussion, *DAQ*
  - VXD assembly
  - VXD installation
  - Service space (piping, cabling, docks)
  - Rack space
- 23rd 9:00-16:00: PXD, *SL+Monitor+Abort*
- 16:20- VXD/IR:
- 24th : day for dedicated small meetings, BG

  (Visit by Envoy of German Embassy in Tokyo)
  - CO2 piping, IBBelle location,
  - VXD installation (David, Kanazawa, Adachi, Tanaka)
- 25-26th: Plenary

Thank you!

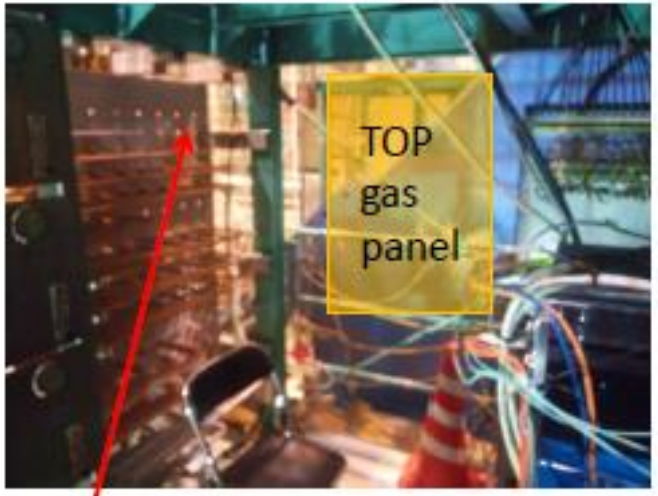
bkup

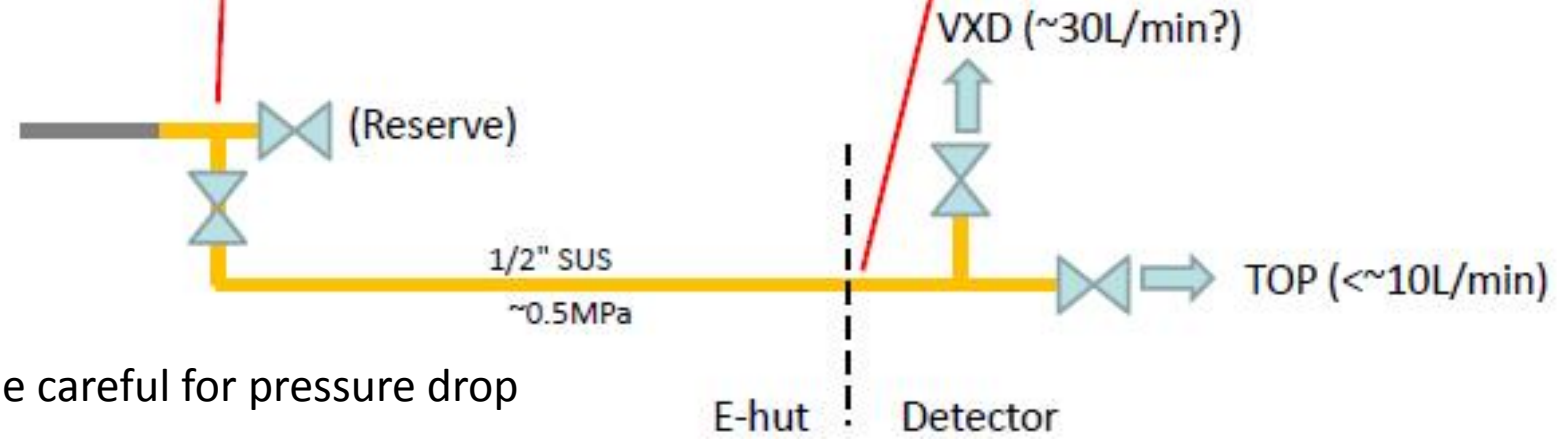
Mechanics topics (at Gemba)

- Nitrogen gas

TOP group is starting discussion with company for piping.
If VXD group can prepare requests soon, I can ask to do it
On the same timing.
(Connection place and connector type)

Pure N2 gas outlet
(on top of electronics hut)





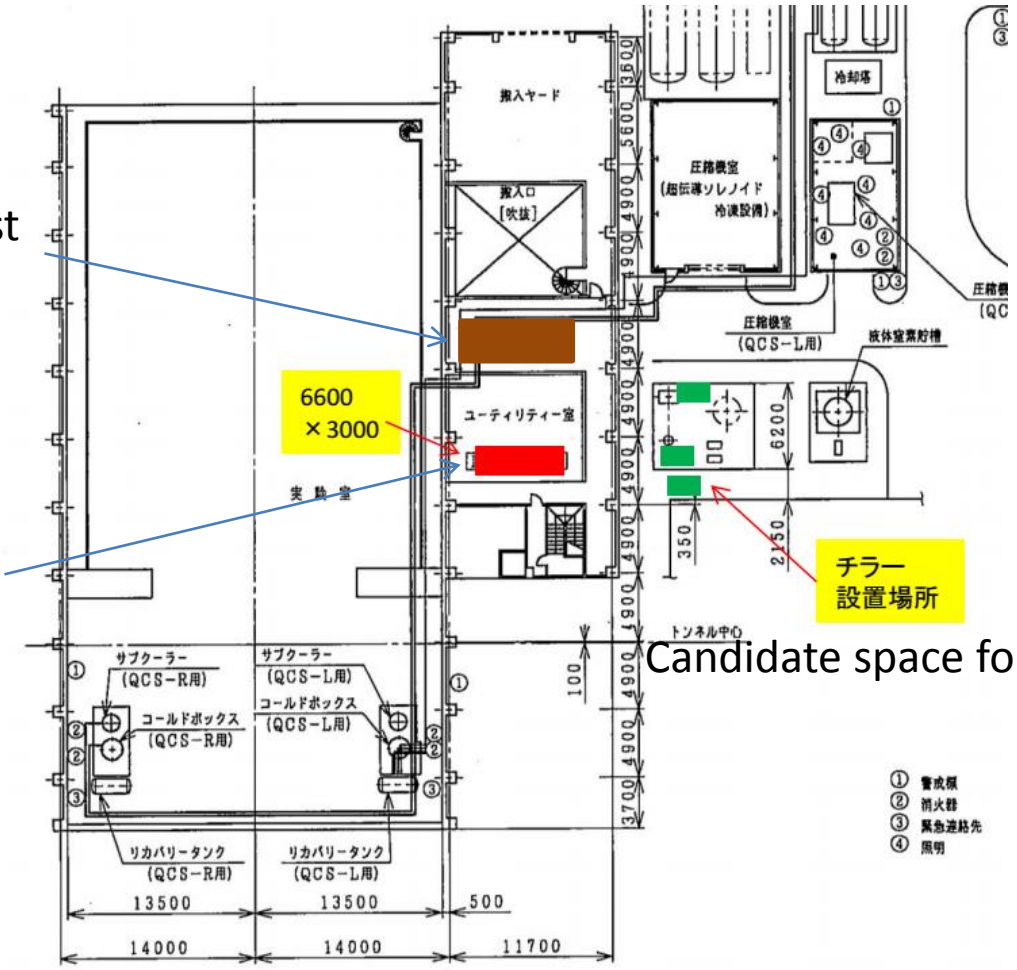
Be careful for pressure drop

CO2 piping (Gemba)

I want to start discussion about CO2 piping from IBBelle to Patch panel on E-hut
Please prepare requests.
Also Power supply, water piping (what kind of connection?)

Location proposal in last B2GM

New location proposal



Candidate space for cooling chiller

CO2 piping is almost similar path with Liquid Helium for solenoid

Mechanics action list in KEK

- First priority (since SVD ladder mount start from 2016)
  - SVD gluing test
    - Endring with CFRP support cone (first try finished)
    - Outer cover with brackets (enough parts for the test)
  - SVD ladder mount table
    - Calibration of measurement tool (ongoing)
    - Rehearsal of mount procedure and their measurement
    - Cooling pipe mount tool is still missing
- Second priority
  - Beam pipe (phase 3) production
    - Tool development for final EBW process
  - Production of end flange for phase 3, Beam pipe brackets, PXD mount block and heavy metal pieces for phase 2
  - VXD assembly table preparation
  - VXD transport tool design and scaffoldings (not started yet)
  - CO2 piping and safety interlock

Parts from KEK to other activities

- KEK have a few set of CFRP product and End-flanges to study gluing method. We only want to know the reproducibility of parts positioning for the gluing product.
  - End-flanges
    - Gluing test at KEK
    - ->MPI for VXD service test in Sep. (Tscharlie)
    - ->DESY for VXD beam test. (K.Gadow)
  - Outer cover
    - After gluing test, parts will be sent to MPI for AIM test in order to check deformation by mechanical stress in Installation. (K. David)

VXD mechanics parts preparation

- **Phase 3** (should be prepared before the end of 2017: SVD parts are before the end of 2016 for starting ladder mount)
  - Outer cover with brackets: done
  - End-flange: start production in this year (by PXD PP issue)
  - End-ring and CFRP support cone: done
  - Heavy metal shields;
    - The production will start this year (budget issue remaining)
  - Beam pipe: on production
  - Beam pipe brackets: need to prepare in 2016
  - PXD mount block: need to prepare in 2016
  - Support structure for PXD PP and VXD outer service(by MPI group)
  - VXD dock ring: need to prepare in 2017 (MPI)