

Status of Interaction region

S.Tanaka (KEK)

8th VXD workshop @Trieste

Twitter @belle2collab

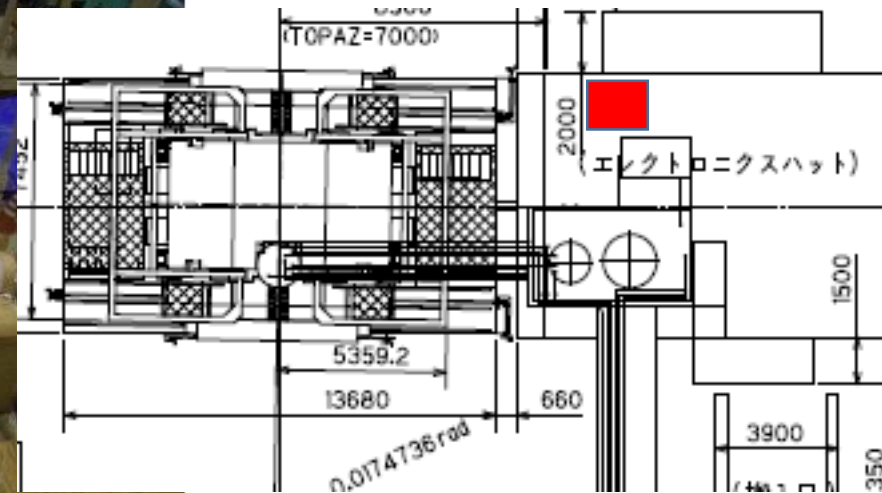
Recent Topics around IR

Space for SVD cooling chiller

TOP&SVD チラー場所



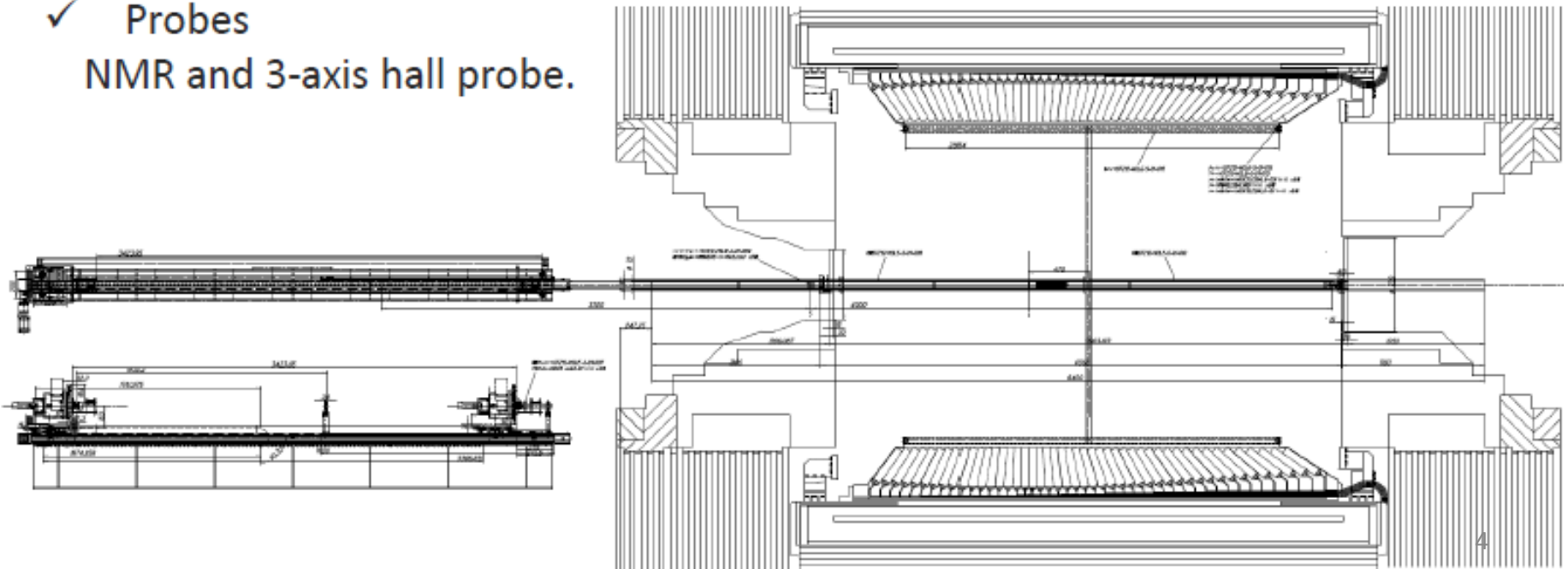
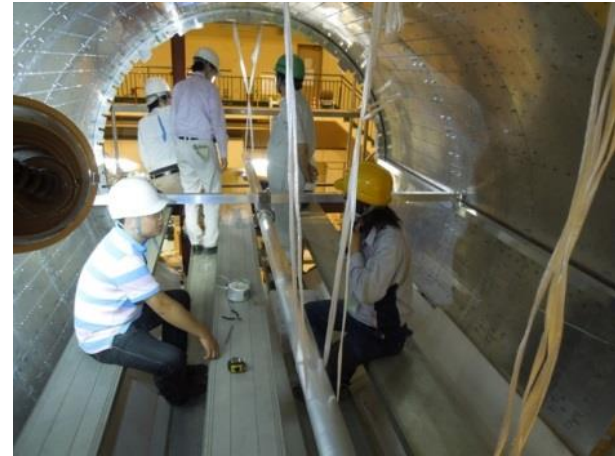
Water cooling for SVD docks
Place is the same as SVD2 case



Magnetic field measurement

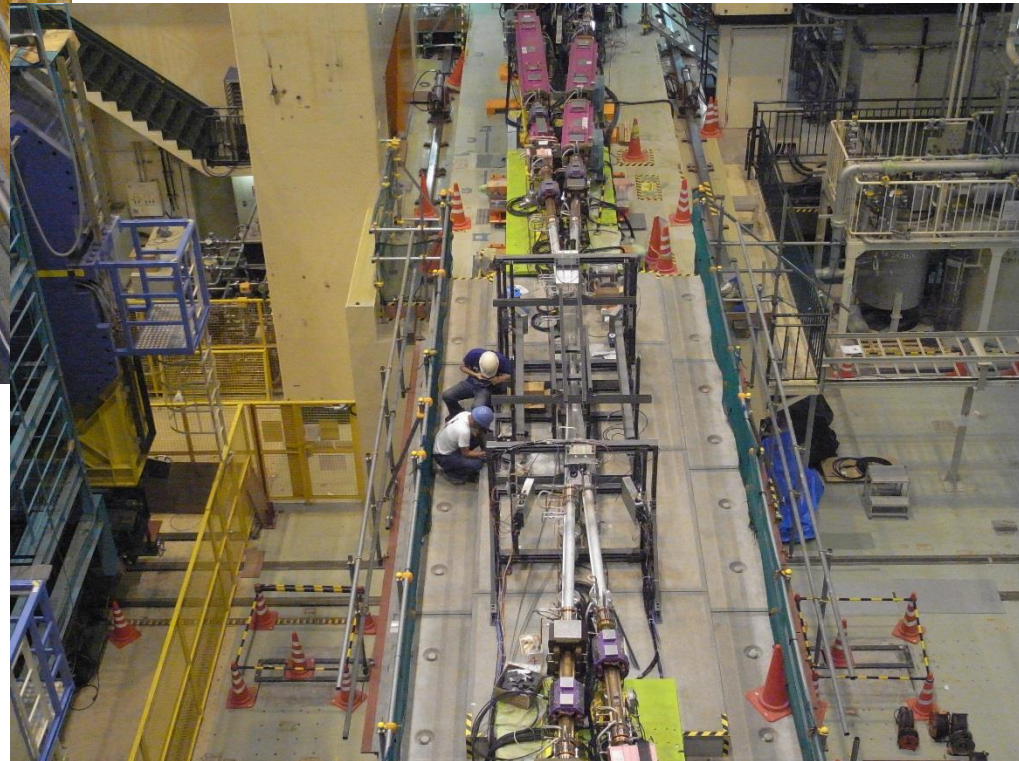
NMR position is controlled by linear stage

- ✓ Measuring point
The center axis ($\pm 3\text{m}$) of Belle II (B_x , B_y , B_z).
- ✓ Probes
NMR and 3-axis hall probe.

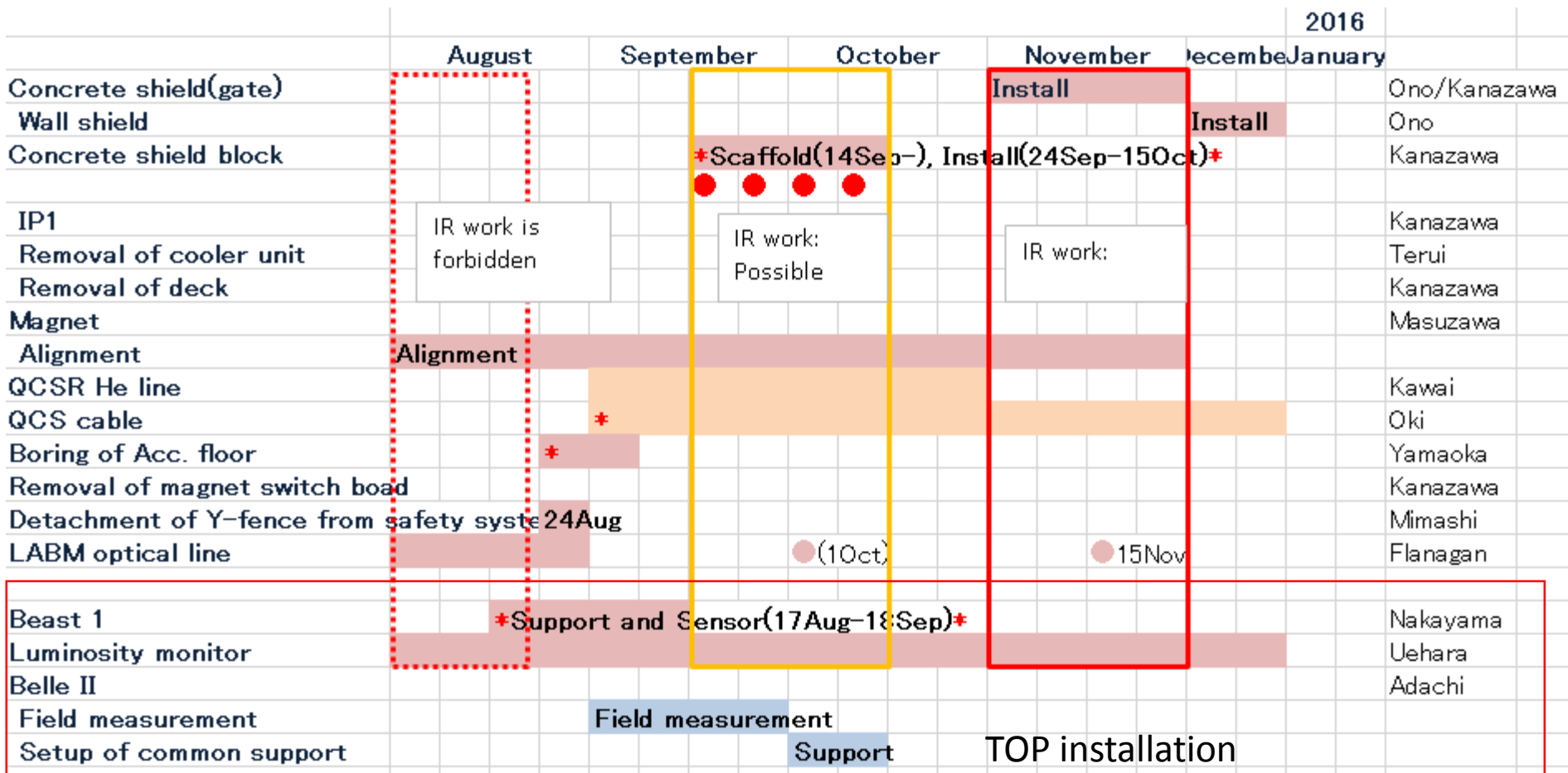


BEAST preparation is ongoing

Pictures in last week



IR schedule



Belle II activities

QCSL has delivered, but..



QCSL

- Problem on withstand voltage test

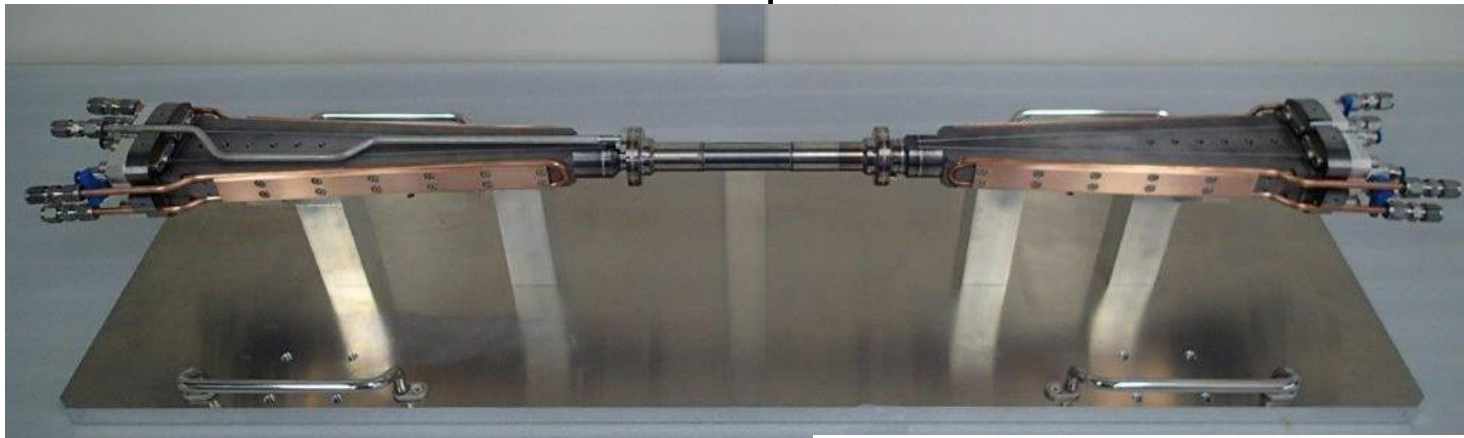
2 month for repairing work

Discharge seems to be happen

Inside of vacuum vessel

Beam pipe for BEAST 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

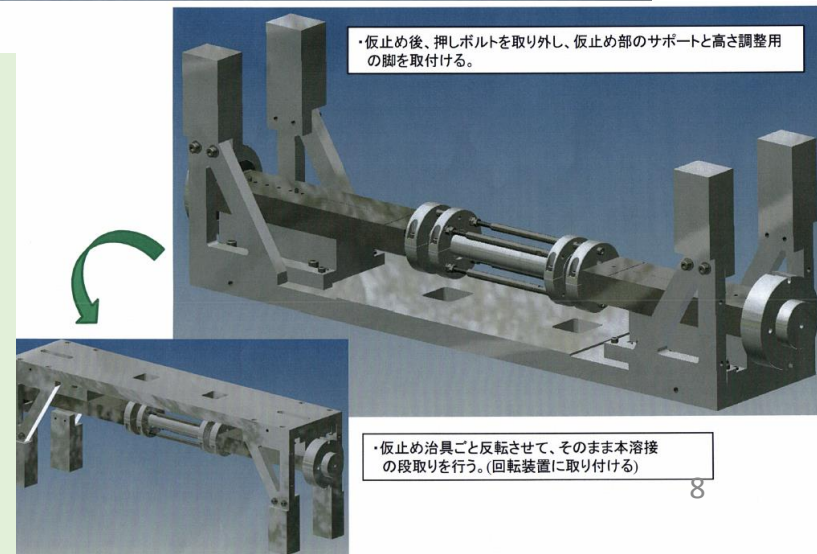


- In order to avoid deformation on the EBW connection of IP chamber with crotch part.

1, Each side of crotch part is aligned on the support frame.

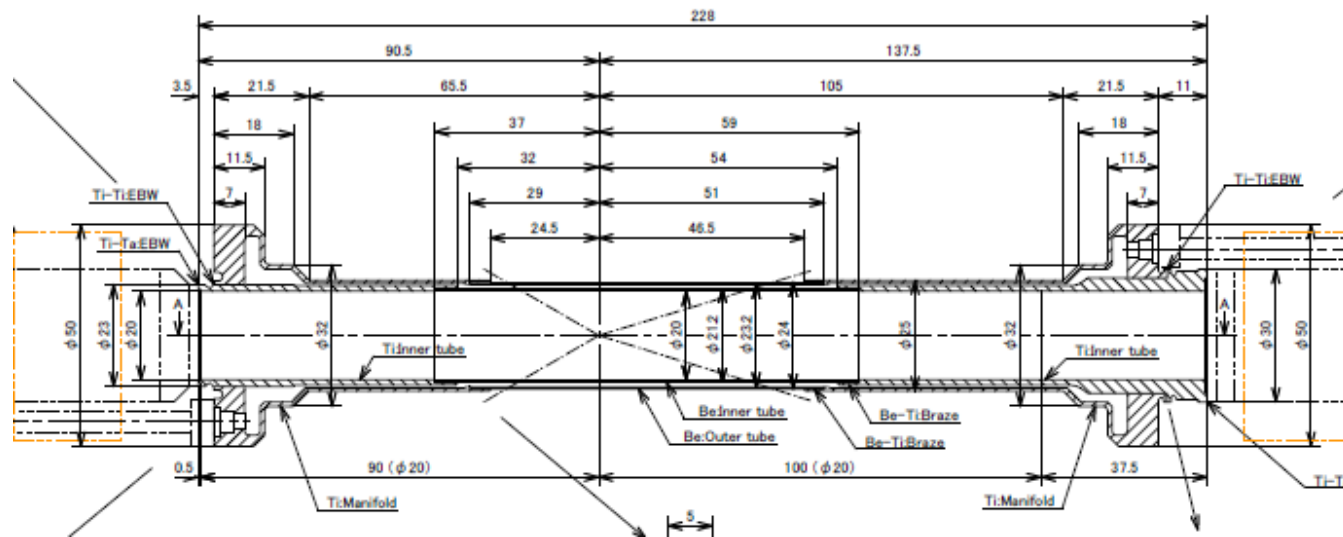
2, The spot EBW is applied to fix position

3, EBW is applied for all connection area.



Status of the beam pipe for phase 3

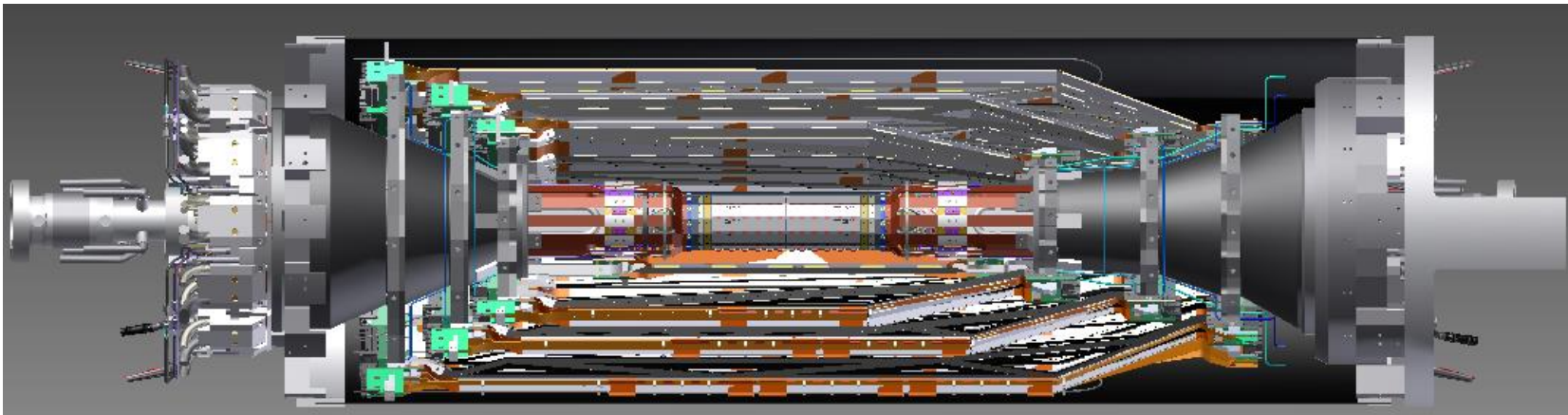
- The production of Inner tube and outer tube have started.
 - No gold sputtering
 - In this JFY, the connection of inner tube and outer tube is scheduled.
- Crotch part production is suspended in this JFY
- Remaining process is
 - EBW connection of crotch part (3 months)
 - Au sputtering in the IP chamber(a week)
 - Final EBW connection (IP chamber with crotch part(1~2months)
- Au thickness is not decided yet.



VXD mechanics Status

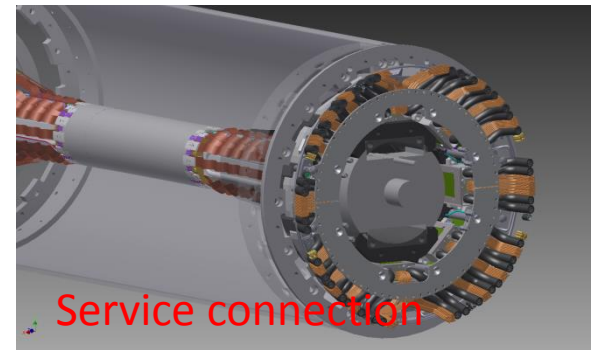
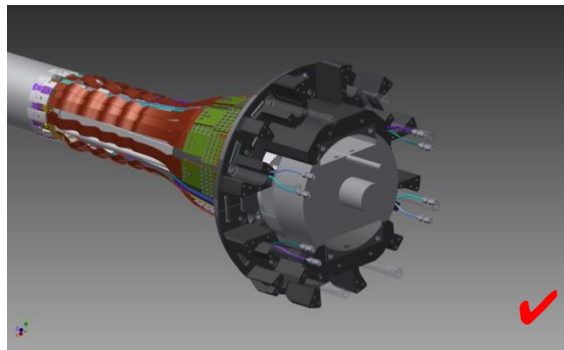
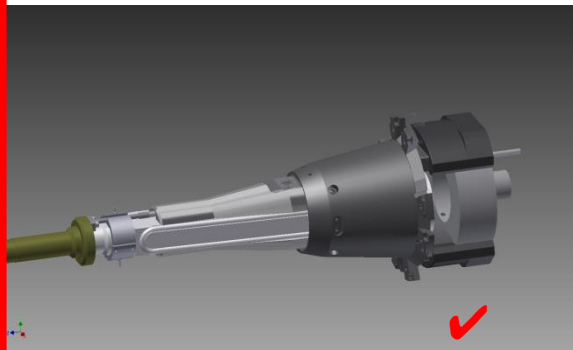
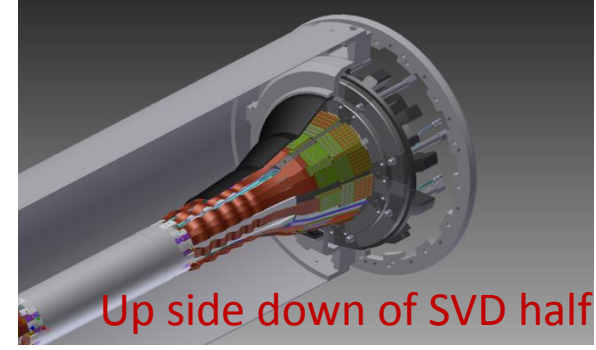
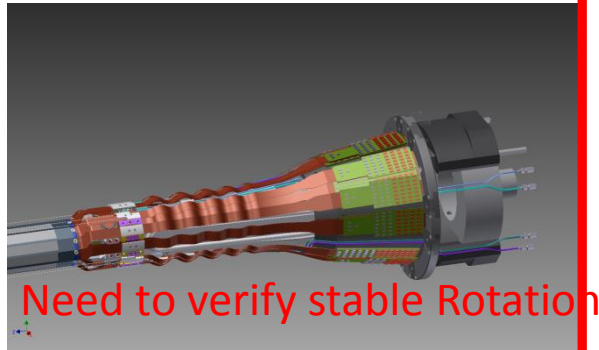
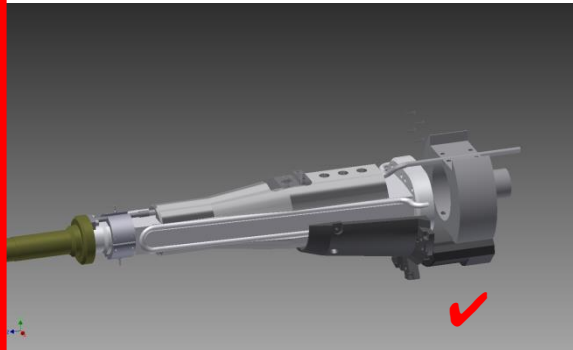
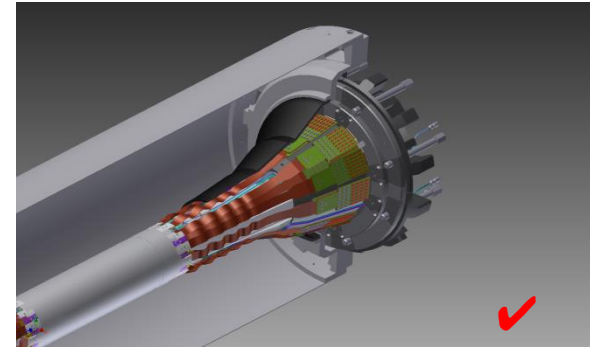
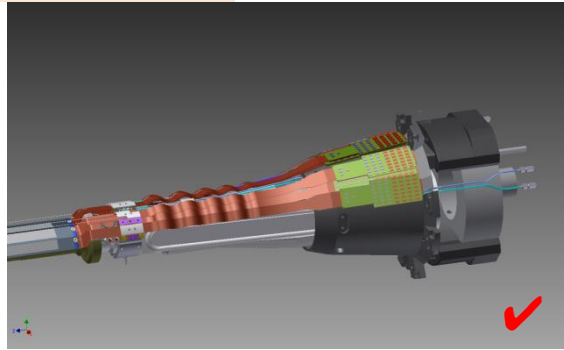
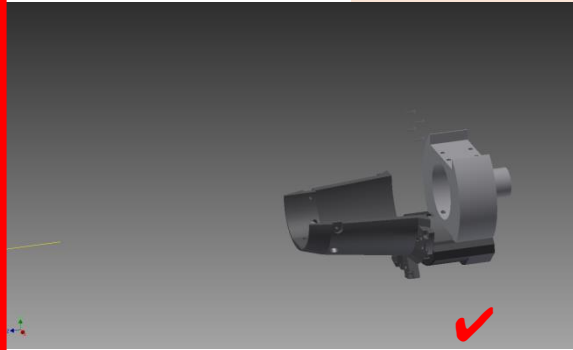
- Mechanical design: Done (still minor updates will be happen)
- A tentative assembly procedure: Yes
 - Some study to check the feasibility is necessary
- VXD installation procedure: Yes
 - AIM tool by MPI
 - Supports/Scaffoldings will prepared by KEK
- Service list: : almost summarized, but not finished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

➔ 21st B2GM gembra



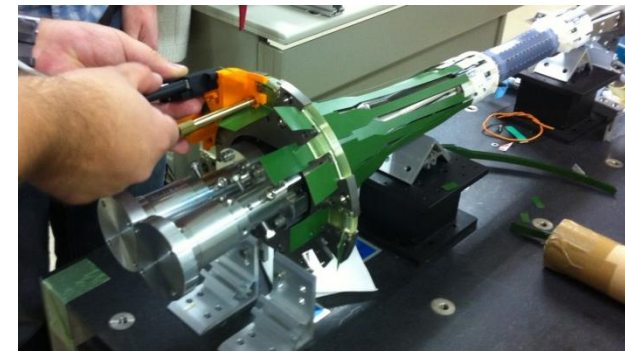
VXD assembly steps

BP+HM+PXD assembly



Each step has verified individually

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

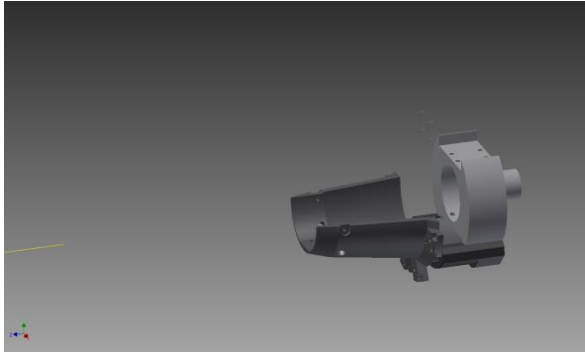
Attaching PXD system

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

VXD installation ✓

Tsukuba hall B4

Beam pipe + heavy metal + PXD assembly



Heavy metal alignment
(VXD design position)



BP position is controlled by
bracket which connected to
heavy metal

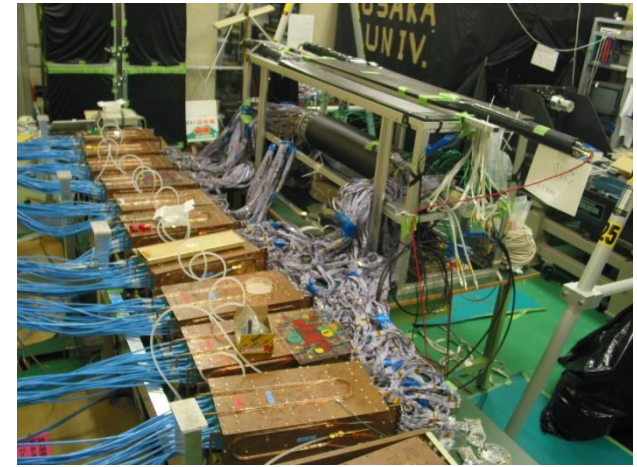


The alignment procedure has verified by beam
pipe mockup and heavy metal shields.

**We can control the beam pipe position.
(0.4mm lift-up)**

In addition, the rotation work for PXD mount
has verified.

Current situation of VXD mechanics assembly



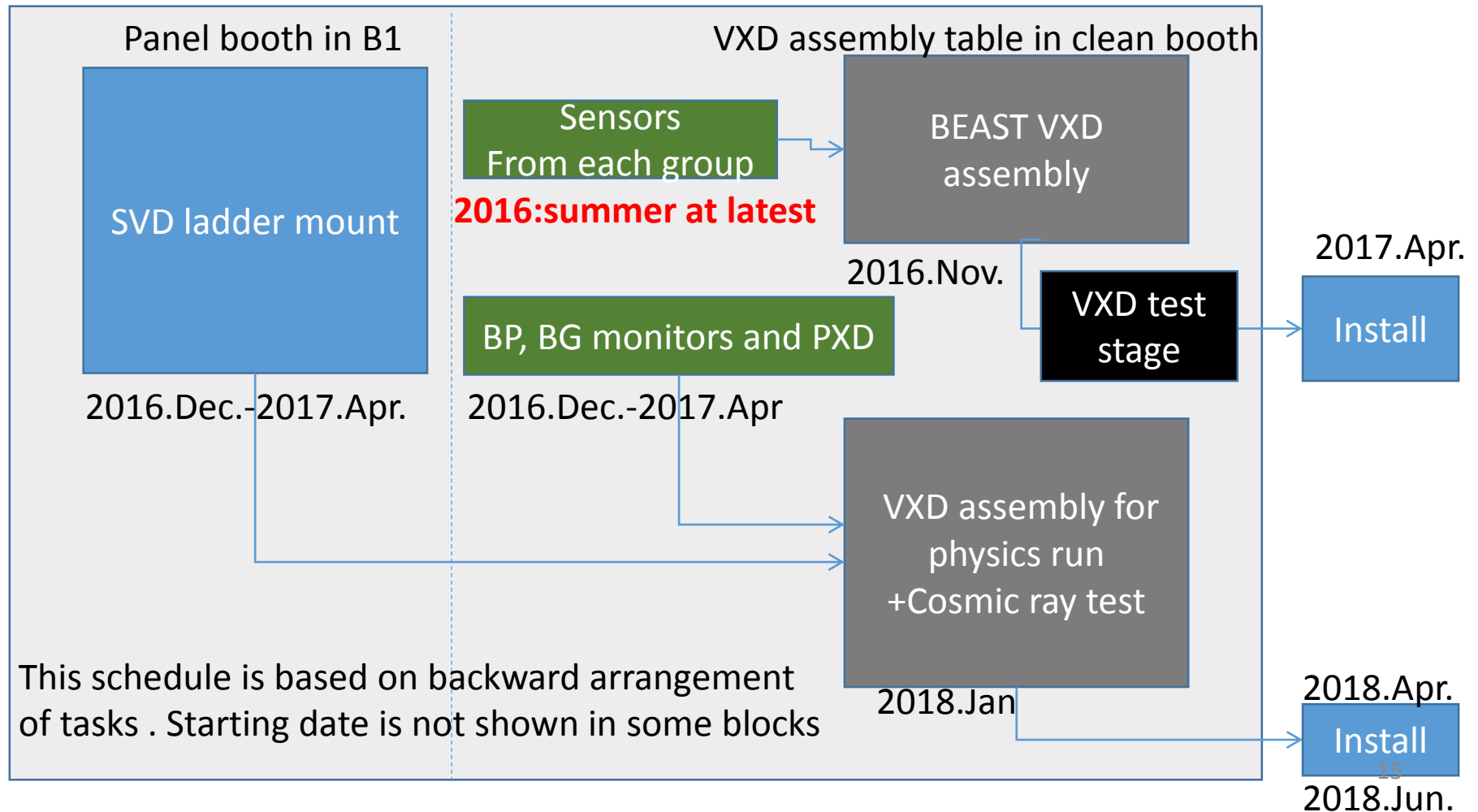
Belle1 system test

- The feasibility check of each mechanical step is ongoing
 - SVD structure gluing, ladder mount table: first study finished
 - BP+HM+PXD assembly on VXD table :First test finished
- Missing points on VXD integration are mainly transportation + logistics and system tests (electrical/mechanical) on each setup.
 - Transportation from SVD table to VXD table
 - Transportation from VXD table to B4 area
 - BEAST VXD test setup after mechanical assembly
 - DAQ racks, cabling
 - VXD system test setup after phase 3 VXD completion
 - DAQ /trigger for system test in parallel with Belle2 DAQ integration
 - SVD system test after finishing ladder mount
 - What kind of mechanical data on each step should be measured?

Taking into account of many of cables and pipes

Assembly work management

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



Detailed plan (KEK VXD mechanics)

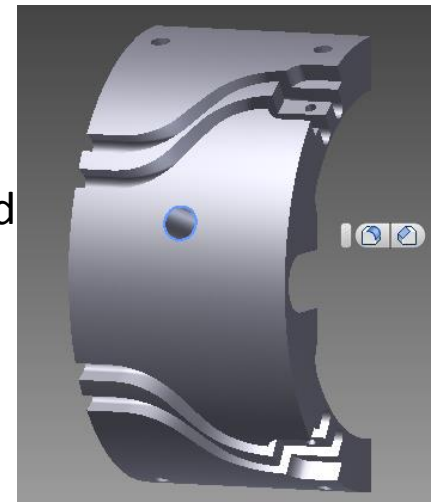
- In the 22th B2GM,
 - Finalizing Heavy metal and End-flange design
 - Conflickion test of SVD each layer by Class C
 - Origami pipe mount procedure
 - Finalizing BEAST setup (Mount block design + SVD mount method)
- After B2GM
 - Starting Endring + pipe brazing (KEK SVD)
 - Should delivered in Jan, 2016
 - Service adoption test on SVD ladders (KEK SVD)
 - Second gluing test of Endring with support cone(KEK SVD)
 - (Second Outer cover gluing test)
 - VXD Clean booth space expansion (S.Tanaka)
 - Service management test(ladder mount table + VXD table)
 - SVD BEAST setup preparation
- 23th B2GM (Feb. 2016)
 - VXD assembly and transportation test with services
- After 23th B2GM
 - Starting SVD assembly from Feb. 2016
 - (Outer cover gluing)
 - Support cone + End-flange
 - Support cone + endrings
 - First ladder mount test +service test in March 2015
 - Optimizing each procedure (2016 summer ladder mount start)

SVD part will be introduced by Markus's talk

2016 Apr.-

- BEAST phase 2 structure assembly on VXD table
- 24th B2GM (June 2016)
 - PXD mount test by BEAST BP+HM
 - BEAST sensor + services mount (mount timing should be discussed)
 - Mount block(real or mock) should be prepared

Mount block Designed
by Tscharlie

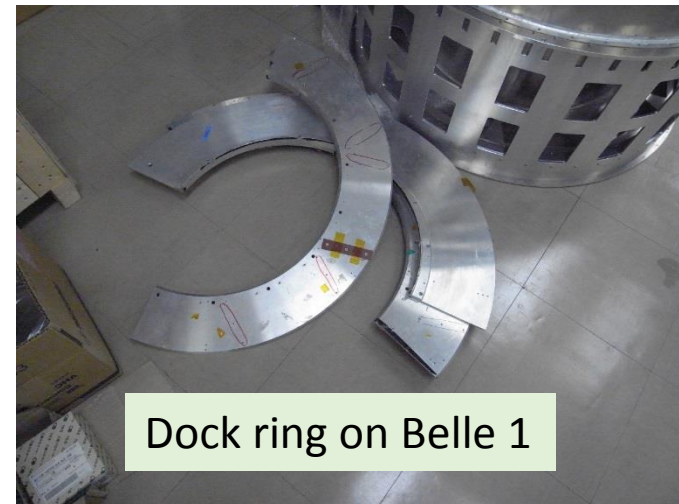


Each assembly step should be verified by mock or partial practice before
Real assembly

Issues :

When VXD dock ring + VXD dock can be
delivered ? (for final service installation test)

When PXD mount arm will be delivered?



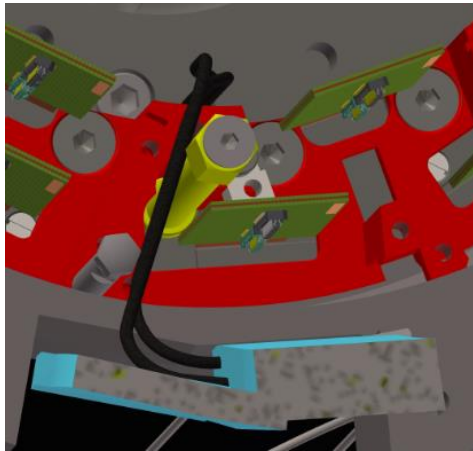
VXD mechanics parts preparation

2015 Sep.

- **Phase 2** (should be prepared before 2016 summer)
 - **Outer cover with brackets: First gluing test finished**
 - AL-myler sheet will be glued inside of the cover)
 - AL Thickness should be decided (shielding v.s. material budget)
 - End-flange: OK
 - End-ring and CFRP support cone: not used in phase 2
 - Heavy metal shields; **(Meeting with company in next week)**
 - Beam pipe: done
 - Parylene coating will be taken to Be area
 - Support jig design for coating process is on going
 - Beam pipe brackets: (a tentative design)
 - **Jig design of transportation tool “SVD division-> VXD table” is ongoing**
 - PXD mount block: a tentative design has introduced
 - **VXD assembly table: prepared**
 - VXD dock ring: need to prepare in JFY 2015 (MPI)
 - VXD transport and installation tools (before 2016 summer)

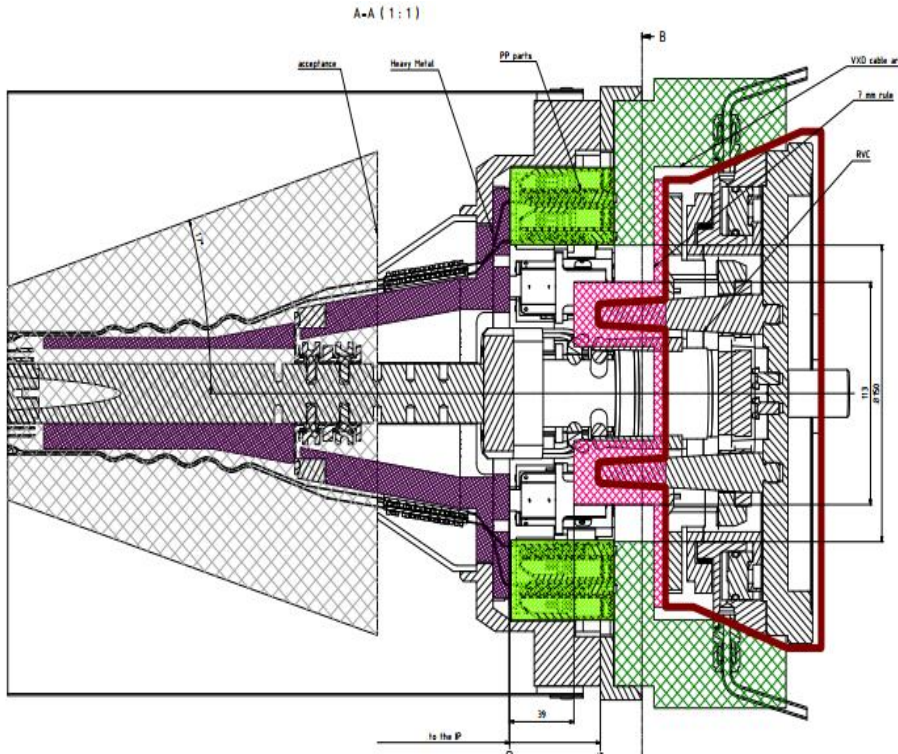
VXD mechanics parts preparation

- **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: OK
 - End-flange: production design will be shown in next VXD meeting
 - End-ring and CFRP support cone: OK
 - Heavy metal shields; (Quotation is done)
 - Beam pipe: on production (inner/outer tube will be delivered in Oct.)
 - Beam pipe brackets : the same as phase2
 - PXD mount block: (a tentative design has prepared)
 - Support structure for PXD PP and VXD outer service(by MPI group)
 - VXD dock ring: need to prepare in 2017 (MPI)



Space issue between PXD PP and screw should be Solved in next B2GM

VXD services (between VXD and QCS)

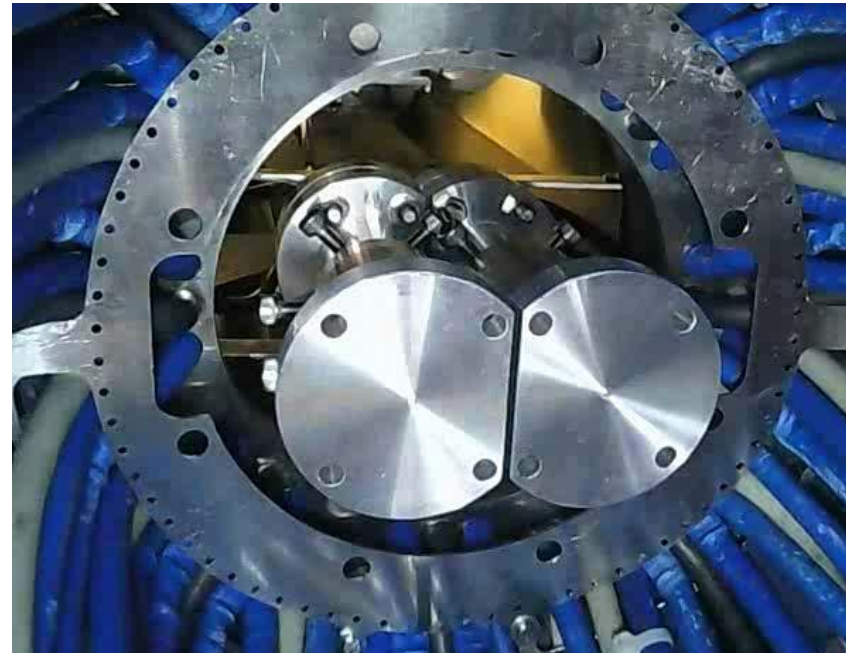


- Cooling pipe and BPM cable should be green hatch area.
- Red area is movable, then such component should not be located

7mm clearance is agreed between VXD and RVC

The design work should be finished before Next B2GM.

Service test will be taken in this year



Discussion topics in near term

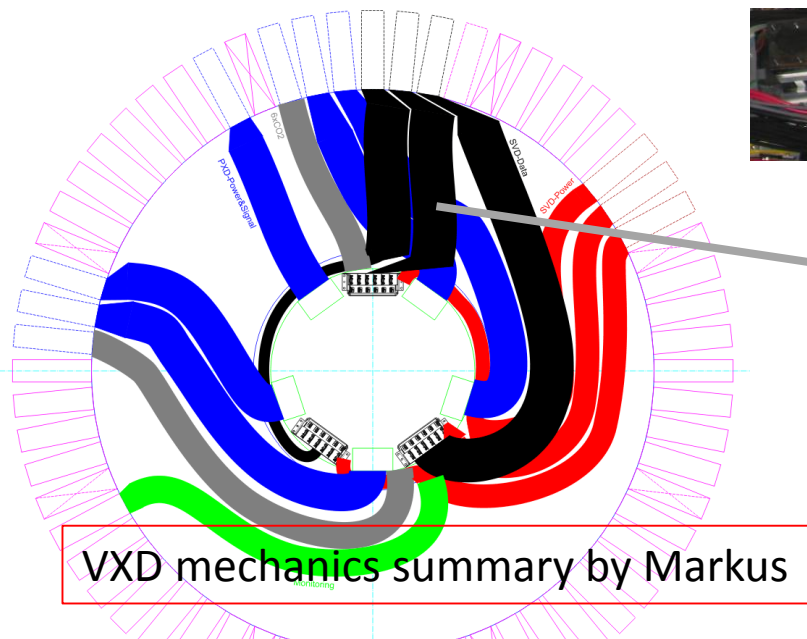
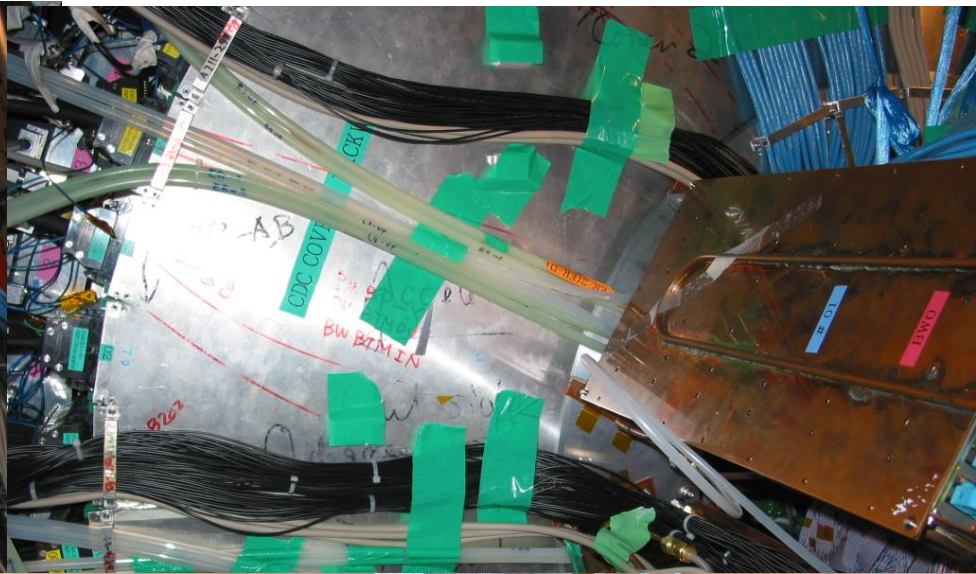
- B2GM satellite mechanics meeting (17th Oct. afternoon)
 - BP+HM+PXD(mock) connection
 - VXD service +monitor
 - SVD halve division-> VXD table
 - BP+HM+PXD+SVD
 - (discussion) how to handle VXD from B1 to B4
- 22nd B2GM(2015 Oct.)
 - Gemba:
 - SVD mount + service installation @ mount table
 - SVD service management@ mount table and VXD table
 - MARCO certification (with Kimura-san?)
 - PXD service mount procedure(from trans. Box until attachment)
 - Monitor attachment
 - BEAST phase2 setup
 - VXD system test setup (also trigger)
 - Summarizing VXD assembly procedure and pointing out missing items

Thank you

Service work around Docks

VXD and BEAST dock location have already defined.

A tentative service work procedure was shown in VXD mechanics meeting by Markus.



Milestone in 2015 JFY

- 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 in Sep.)
 - 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*