



10th VXD Workshop

DEPFET – IB Meeting

Short Status of PXD Production

First Completed Item: CO2 System IBBelle

Fall installations, Belle II and Machine Schedule

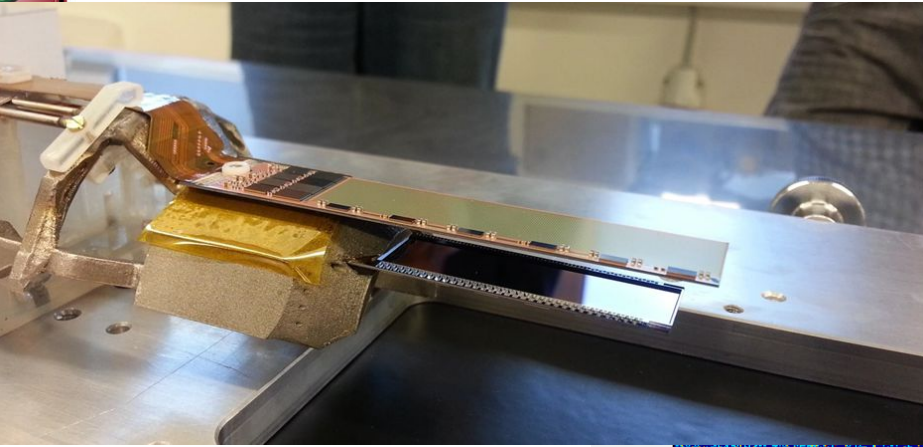
Items to be addressed

DEPFET Common Fund

AOB

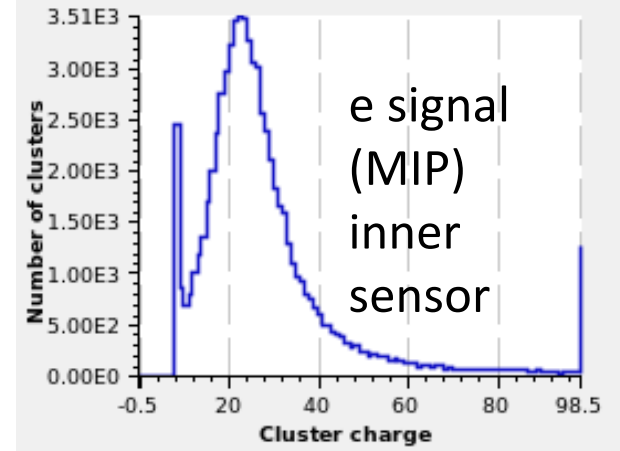


PXD Performance (Beam Test @ DESY, April 2016)



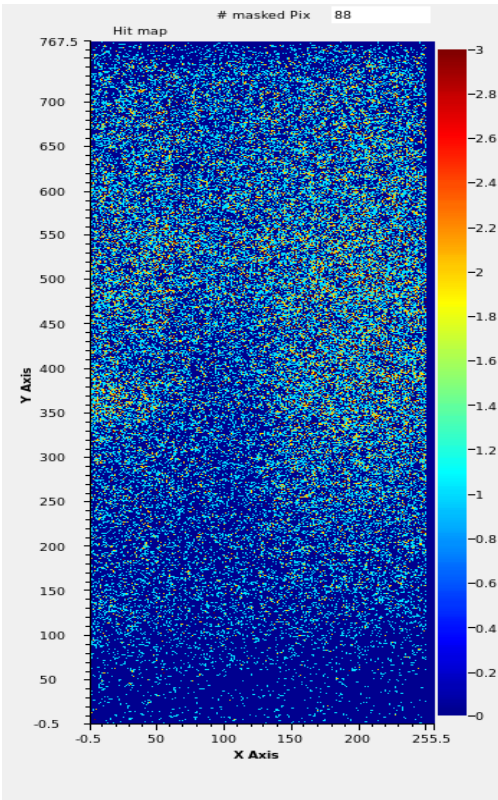
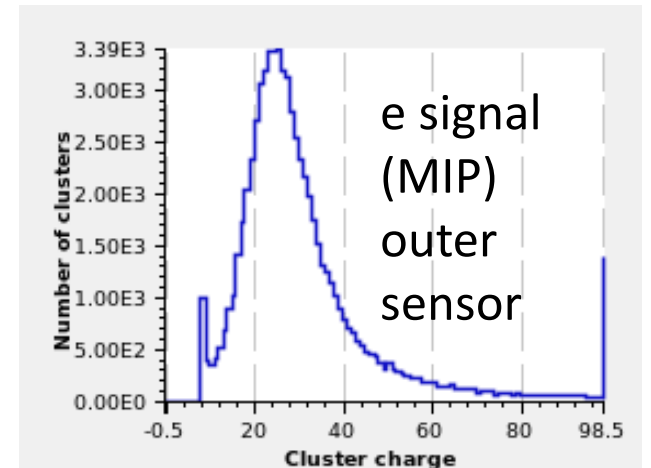
2 PXD modules with
ASICs, SMDs and
Kapton, fixed on SCB

2-6 GeV
electron
beam

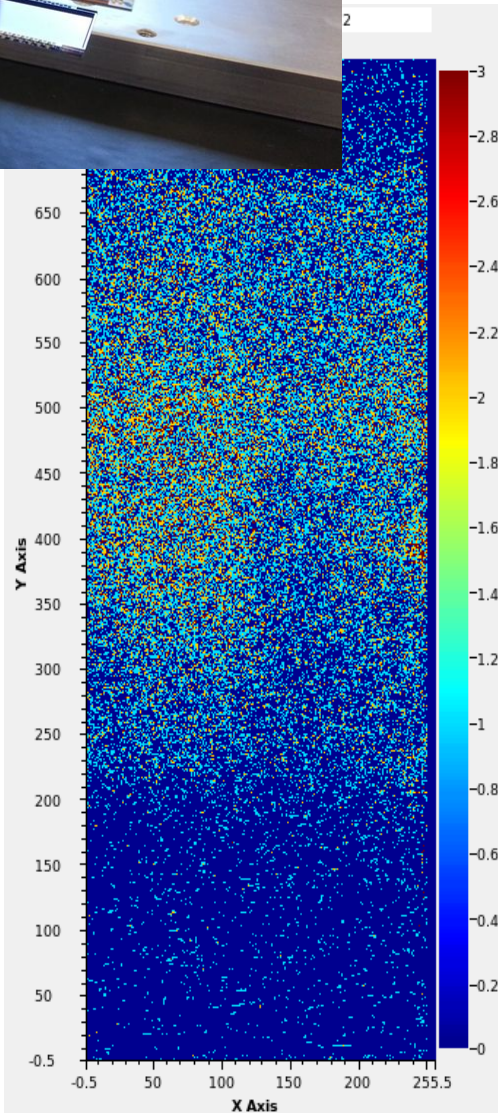


1T B-field

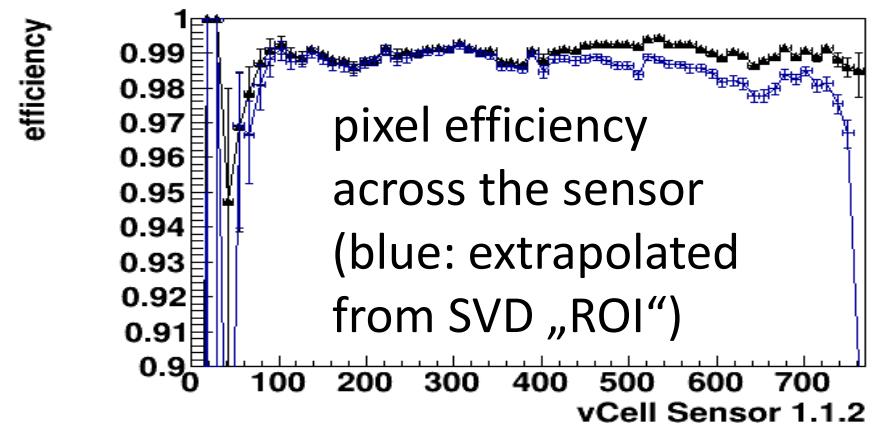
full DAQ
(together
with 4 SVD
ladders)



inner sensor

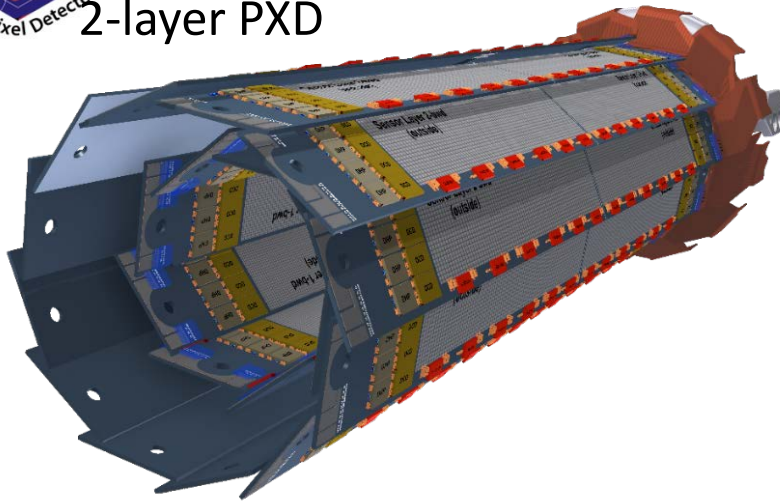


outer sensor



PXD Ladder Production

2-layer PXD



Main production 1: 9 wafers (finish in 4 weeks)
Main production 2: 6 wafers (finish in 8 weeks)
entire prod. finished before Dec. 2016
Contingency: 7 wafers
[11 wafers needed @ ~ 75 % yield]

gluing tests ongoing

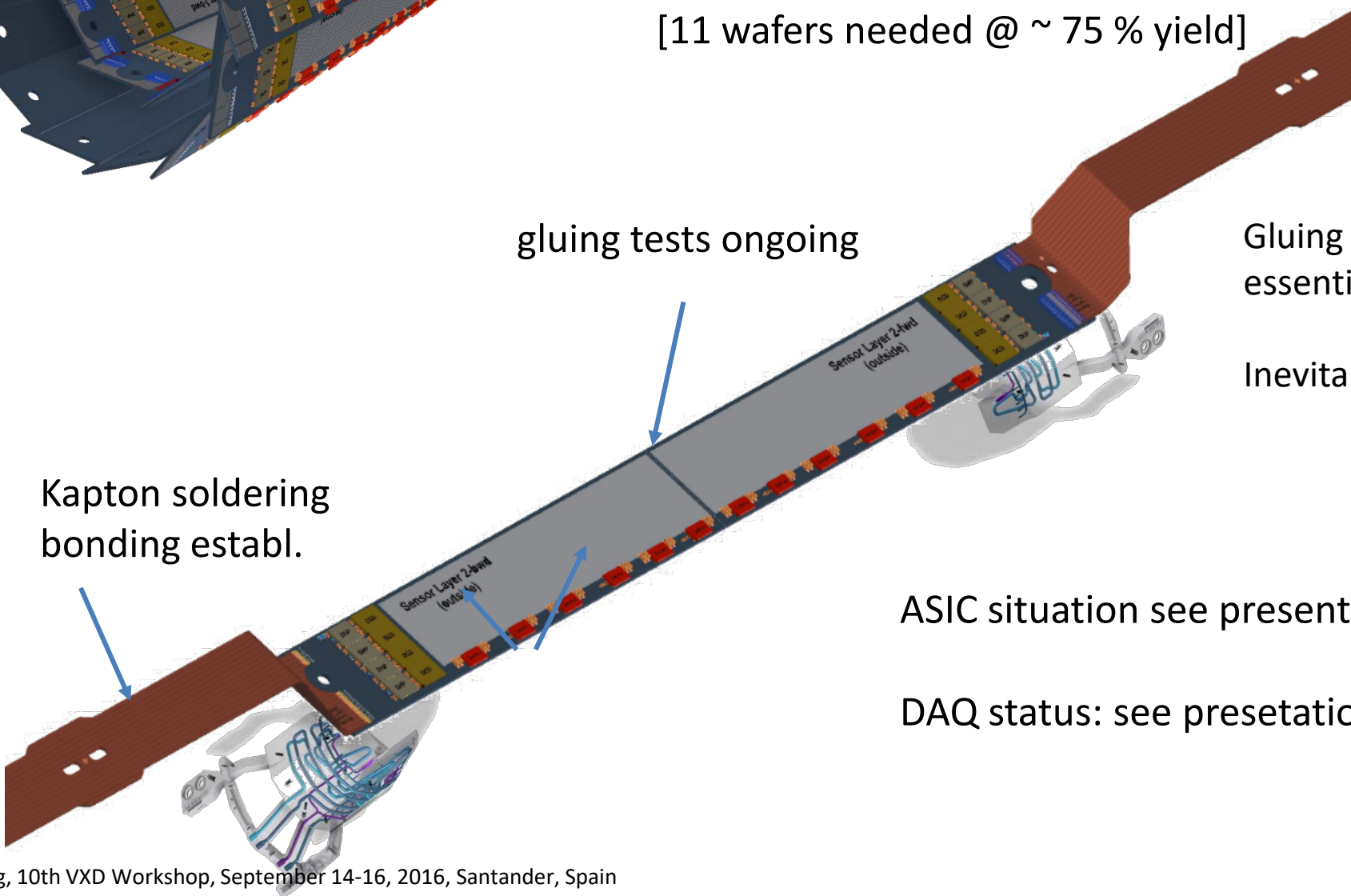
Gluing for DESY test not essential, but desirable

Inevitable for BEAST 2

Kapton soldering bonding establ.

ASIC situation see presentations today

DAQ status: see presentations of today



	PXD9-6 3 wafer Pilot	PXD9-7 4 wafer		PXD9-8** 9 wafer		Total up to now	
Type		>99%*	>98%*	>99%*	>98%*	>99%*	>98%*
8 + 1 IF	2	2	4	8	8	10	12
8 + 1 IB	2	4	4	8	8	12	12
12 OF	6	4	5	13	14	17	19
12 x OB	4	5	7	10	10	15	17

- Pixel yield: estimation from identified bad rows and columns dominated by Gate to ClearGate shorts

** PXD9-8 production not yet finished: yield results only from the matrix
but according to experiences from PXD9-6 and PXD9-7 yield on balcony and EOS
is very good (measured after copper)



VXD (= PXD + SVD) Subprojects

2-phase CO₂ cooling unit („IBBelle“)



built at MPI in collaboration with
CERN / Nikhef (same as ATLAS unit)

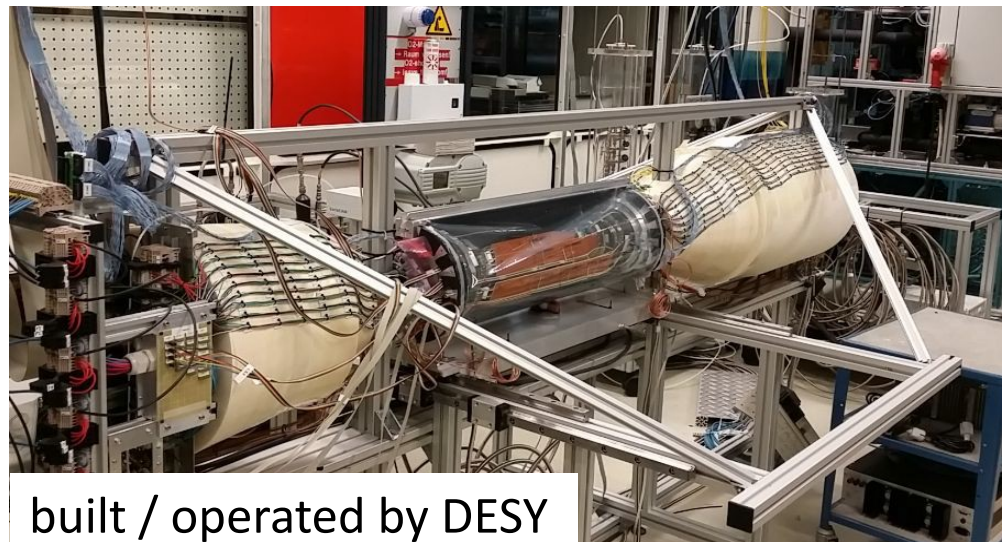


Cooling power
> 2 kW
fully commissioned
at MPI

PXD/SVD : 360/750 W

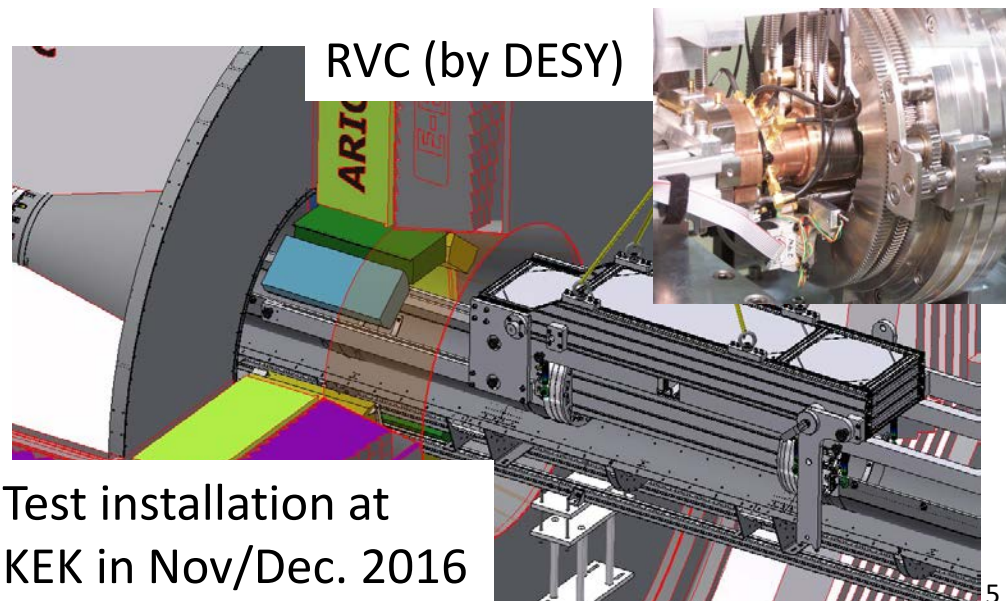
IBBelle on its way to
KEK (Aug. 24, 2016)

VXD thermal management mockup for CO₂
cooling studies: original sizes and materials



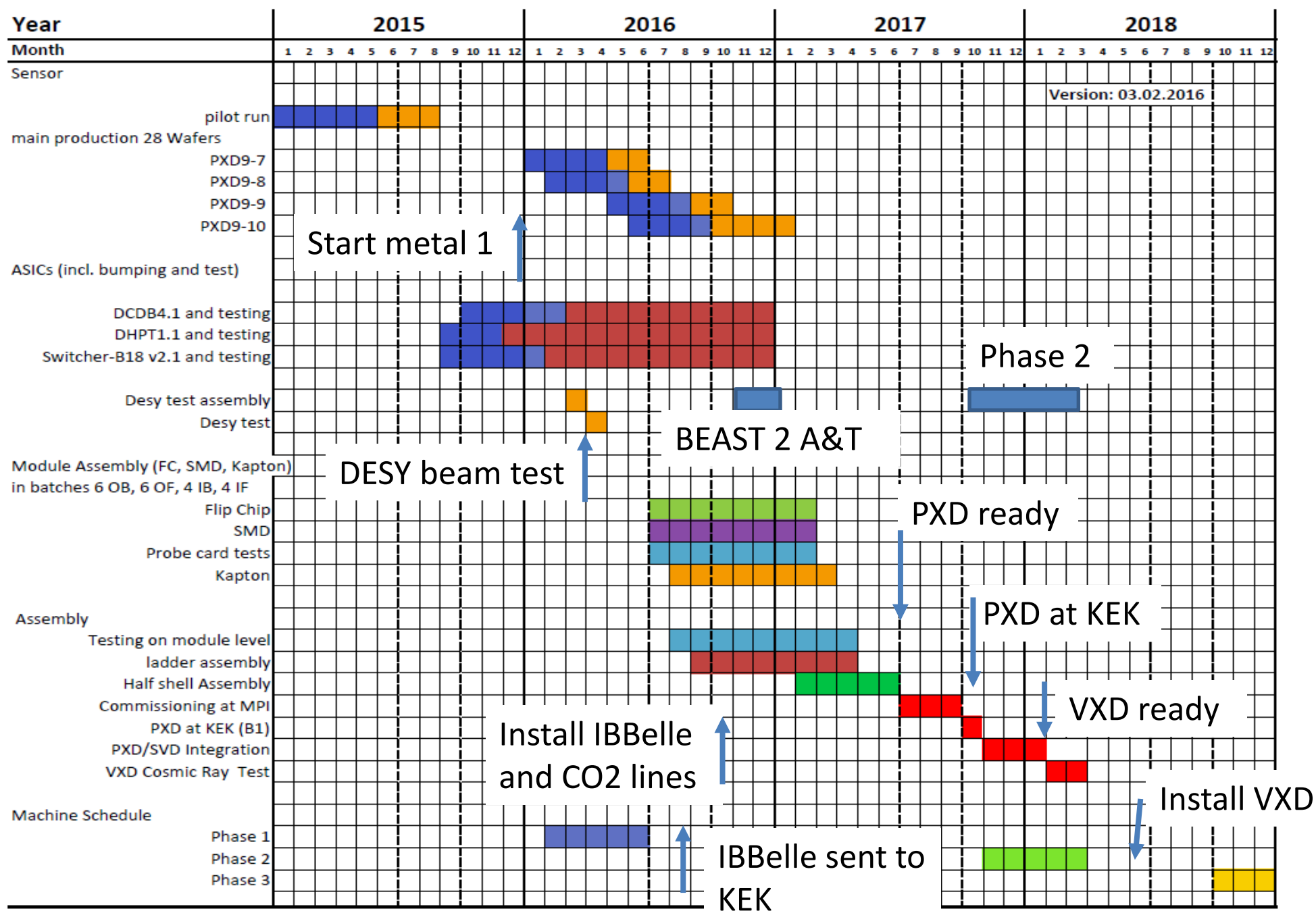
built / operated by DESY

VXD installation into Belle (design by MPI)



Test installation at
KEK in Nov/Dec. 2016

Schedule and Milestones for PXD



IBBelle's Journey to KEK



Pictures from
S. Vogt and
H.-G. Moser

IBBelle ready for shipping (after commissioning and test of full functionality)
to the right: the 3 wooden boxes with junction box, manifolds, spares and tools

IBBelle's Journey to KEK

IBBelle lifted up (to be put on the palette)
A similar H-shaped crane tool will be needed for lifting at KEK



IBBelle's Journey to KEK



The palette is pushed under IBBelle



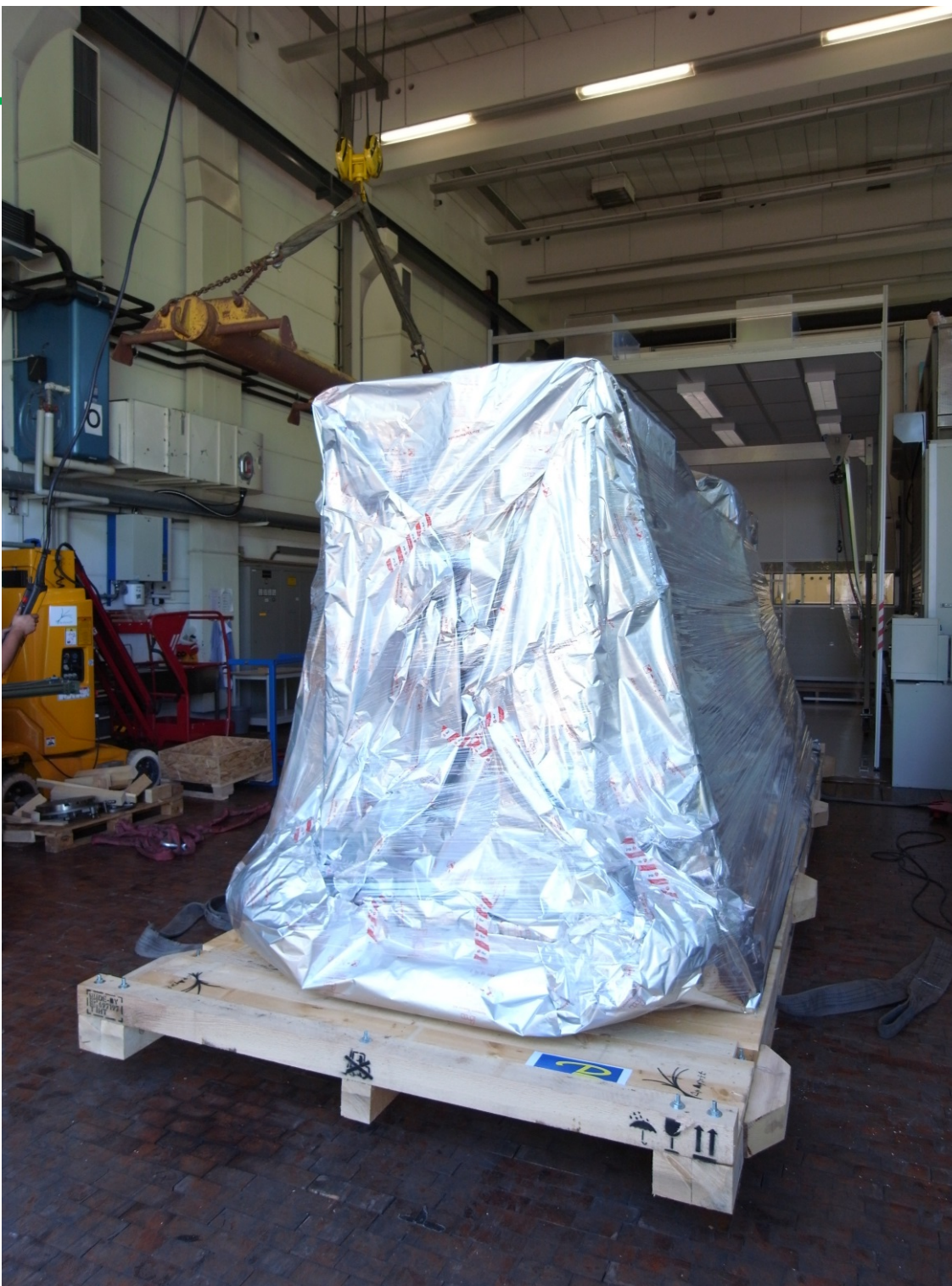
IBBelle on the pallet, secured by belts and screws. Note the water proof foil under IBBelle



Details of the fixations. The screws were drilled by a driver operated with compressed air. An equally strong tool will be needed at KEK to remove them.



IBBelle is covered with the protective foil. Not visible are the desiccant bags which are added before the foil is sealed



The foil is sealed and evacuated



The container (40 feet, high cube) arrived on a truck. The boxes with spares etc are stored first (the content of the boxes is protected with foil and desiccant as well)



The palette is lifted with the crane and pushed into the container with the fork lift



The crane is removed and shifting in continues. Clearances need to be controlled



Using a wooden beam IBBelle is pushed deep into the container



IBBelle in the final position in the container



Departure on August 24

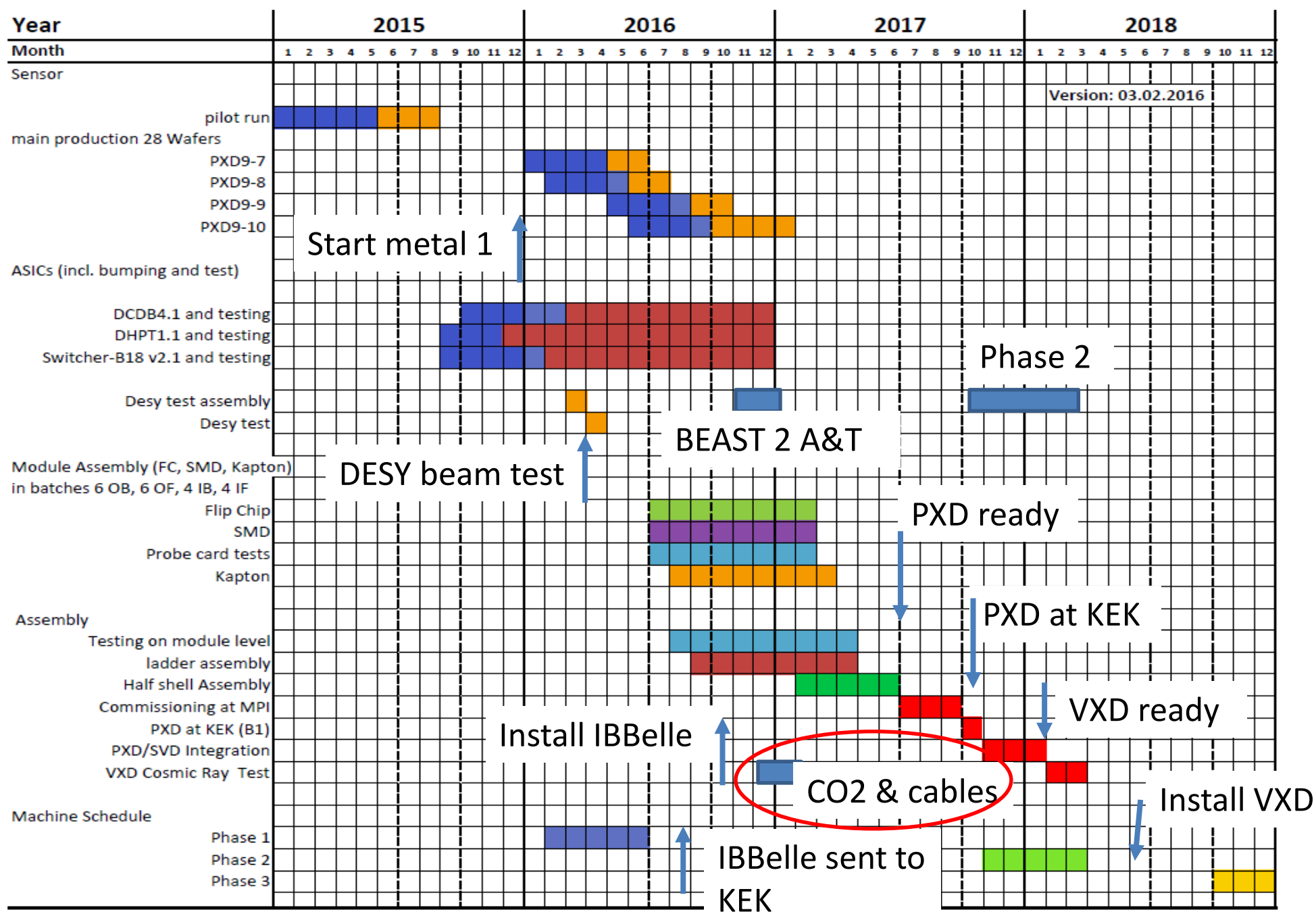
Container ship:
MOL Brightness
(350 m, 155 000 BRT)

Expected arrival in Tokyo
harbor: Sept. 12

Arrival at KEK:
Oct. 18

At last the palette is secured with a wooden frame. The bars in front are screwed into the floor of the container. Container doors are then locked and sealed

Schedule and Milestones for PXD



Plan for Installation towards Phase 2

Sequence of events (before Roll-in):
 Finish TOP
 Install CDC
 VXD Test installation / CO2 Flexlines
 Installation BWD ECL

CDC:
 Installation : 1 week
 Cabling and piping : 3 weeks
 Cosmic ray test : 2 weeks
 Contingency : 2 weeks

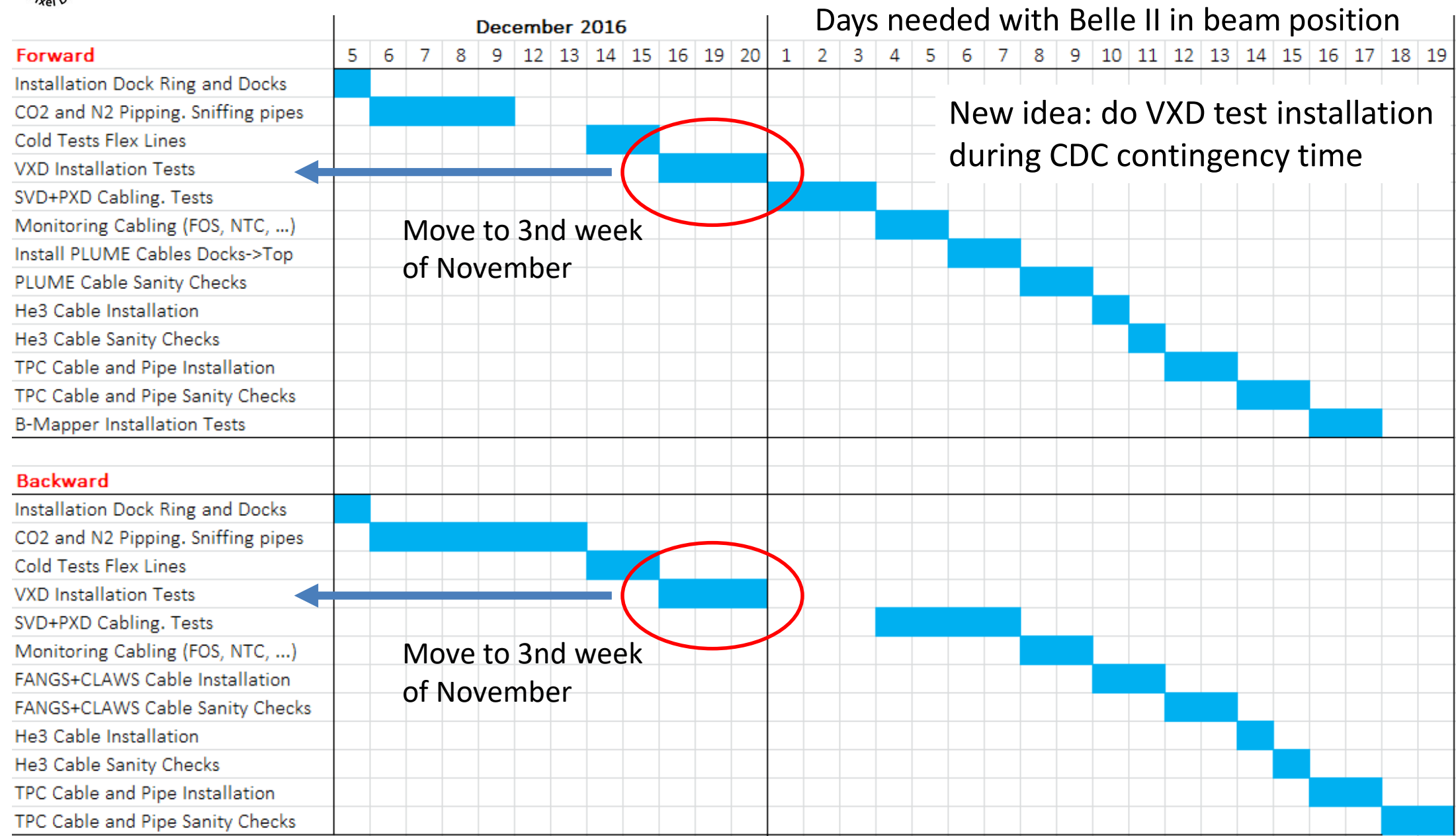
After Roll-in: Phase 2 cables

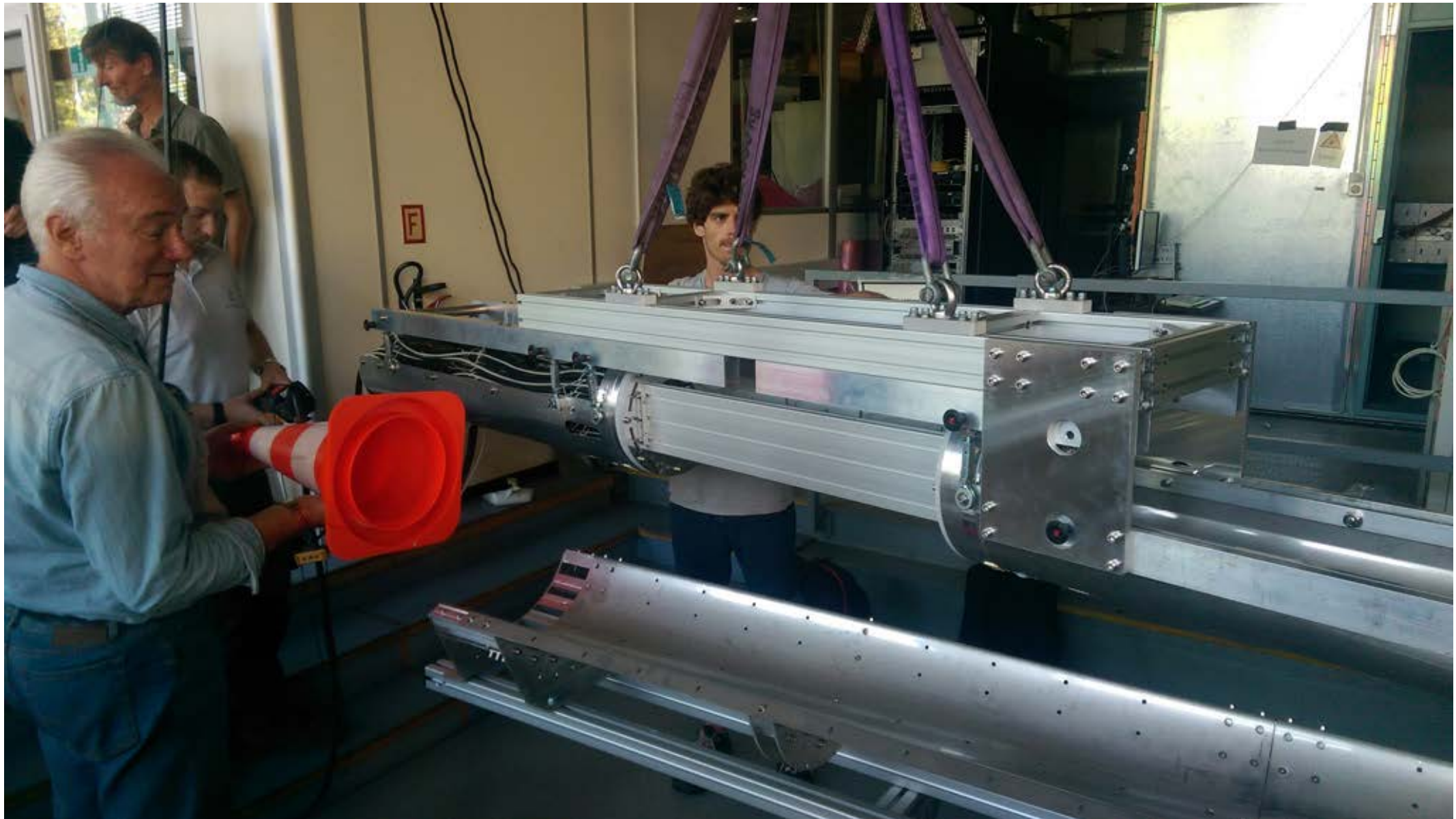
CDC Installation Schedule	Week	1-A	1-B	2-A	2-B	3-A	3-B	4-A	4-B	5	6	7	8
Installation : 1 week	Days												
Setting Jigs	2												
Instillation	1												
Alignment & Suvery	2												
Cabling and piping : 3 weeks													
1/8 LV cables EH - Distributor	3												
150 LV cables Distributor - FE 15/day	10												
600 CAT7 cables 600 60/day	10												
300 DAQ fiber cables 30/day	10												
300 Trigger fiber cables EH -FE 20/day	15												
230 HV cables 50/day	5												
10 Monitor cables	2												
30 Pipes for gas, dry air, cooling water and monitor	5												
Cosmic ray test : 2 weeks													
Data taking & Replacing bad FE boards	14												
Contingency : 2 weeks	14												

CDC schedule



Cabling and Piping Work





Monday, Sept. 12, 2016

VXD Installation Test @ MPI



VXD „installed“

VXD cables being
prepared for November



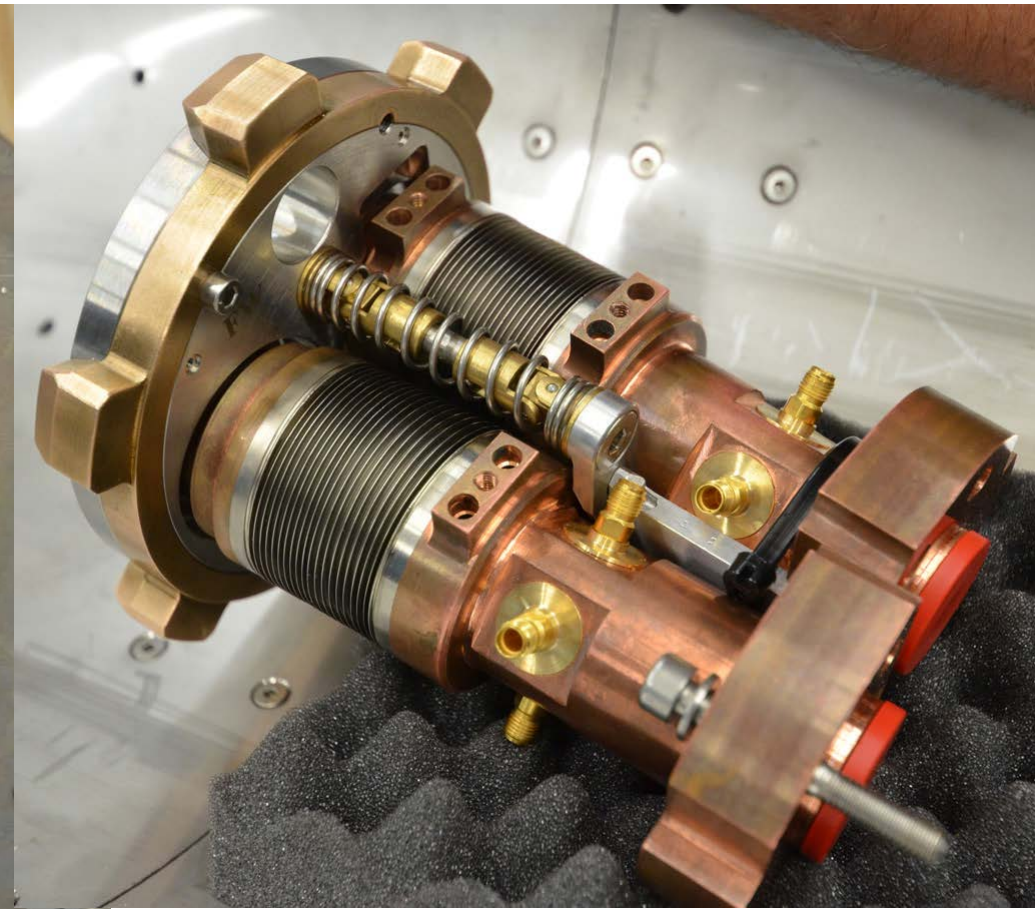


Emergency action: Install and connect bellows „installed“

VXD Installation Test @ MPI

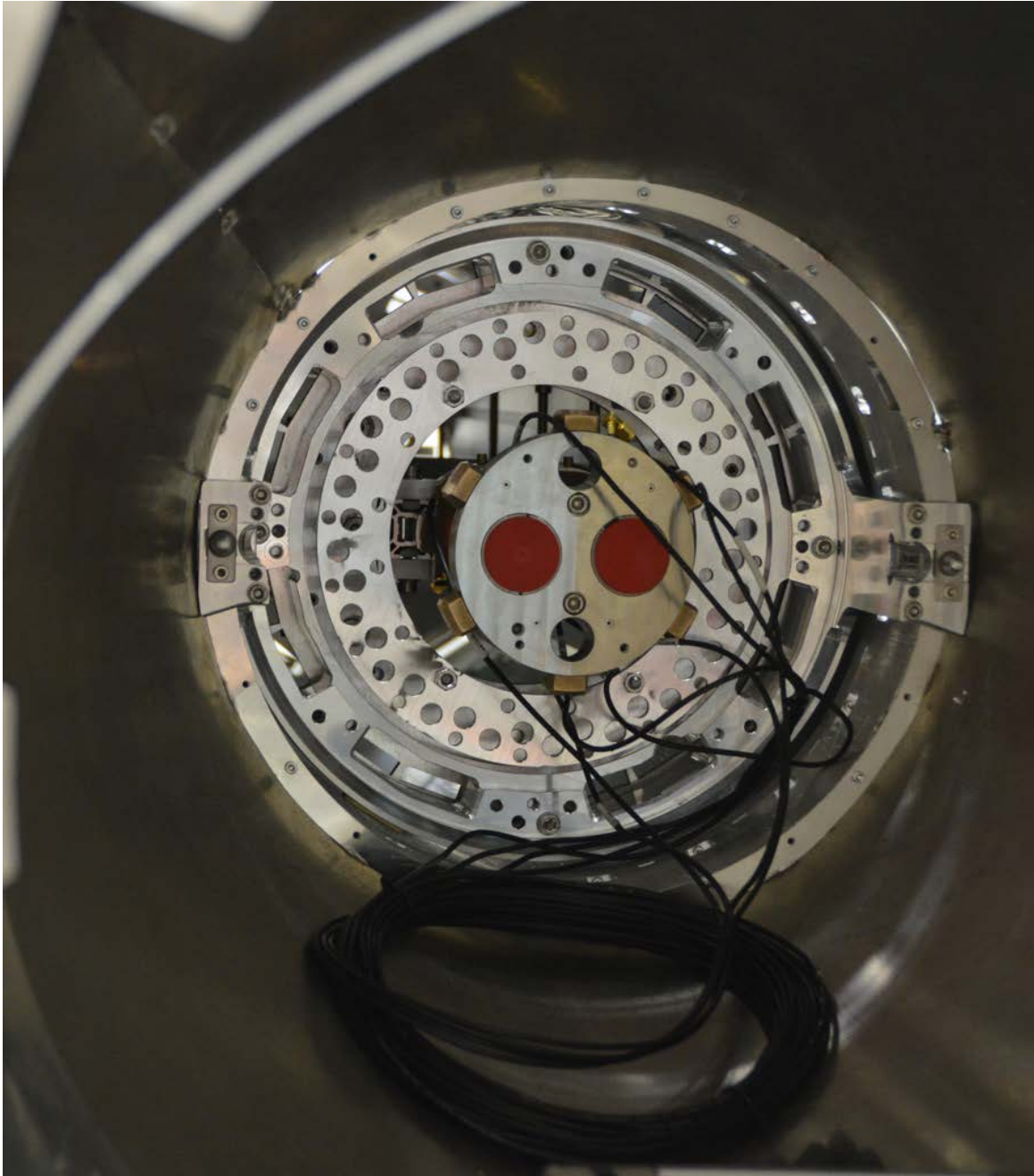


Emergency action: Superman on his way in



Installation of the bellows and connection of beam position monitors

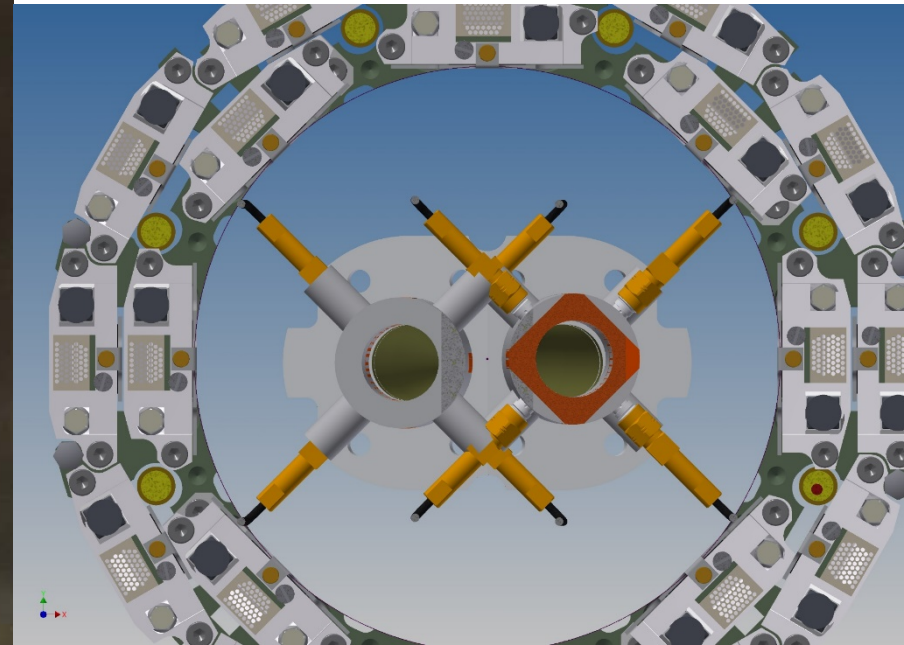
Emergency action: Superman at work



Bellows installed,
BPM connected

Emergency action was successfully
carried out

Problem: BPM with 90° connector
does not work. Have to come back to
straight connector



Straight BPM connectors (just) work

...

Despite several issues there are very good news from the „DEPFET system“

- Immediate goal: prepare 2 full ladders for BEAST 2 (by the end of November) (Sensor part seems under control)
- ASIC situation:
 - > Switcher bumping issue (see Lac's presentation)
 - > Switcher and DCDB 4.2 testing (see Ivan's presentation)
 - > DHPT 1.2 testing (see Hans' presentation).
- Fallback for BEAST2: DHPT1.1
- Gated Mode Operation: need test with PXD9-7
- New supplier (Kaupke) being qualified for Kapton: „better and cheaper“
- Module test procedure being developed (see talk by Felix)
- Last step (gluing 2 modules to a ladder) well advanced at MPI
- DAQ (Optical transmission + Synchronization with SVD)

DEPFET Common Fund Sub Accounts

		Expend (k€)	
Grounding project ITA	A	52,19	
KEK-PF	B	0,00	(in = out)
IBBelle (CO2)	C	172,67	
Personnel + travel	D	98,06	
Electronics (since 2016)	E	24,68	(Kapton +)
		350, 80	

Balance as of today: 332,10 k€

Proposed (new) expenses:

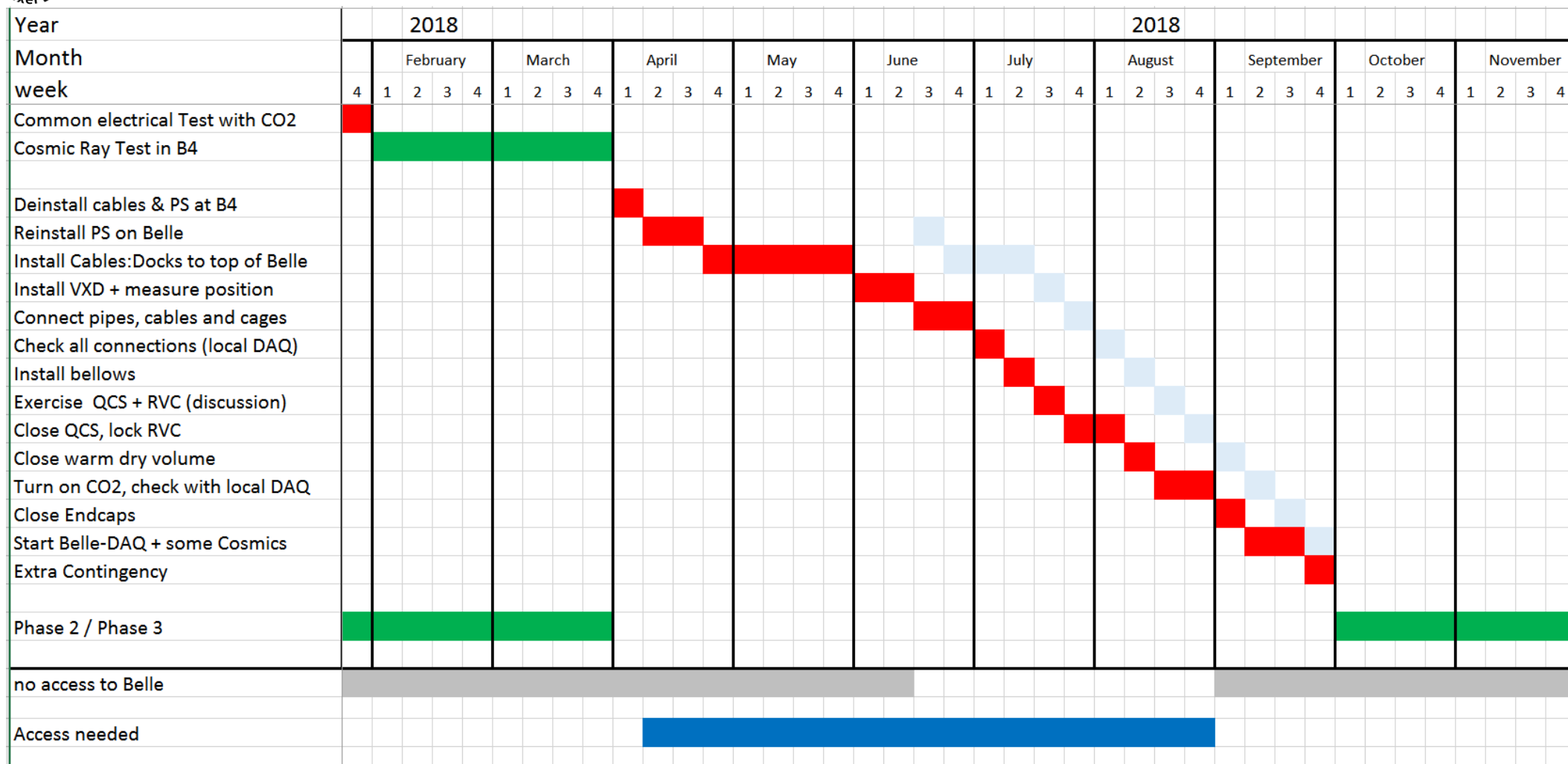
- Travel expenses for the Gießen crew (DESY test 2016/17) 5 k€ ✓
- additional Kaupke Cables (20 more cables without passives) 20 k€ ✓
- additional DHH Systems for tests (13 systems) 20 k€
- Transport of ONSSEN cards to Japan 13 k€
- ??

Next VXD Meeting typically in January (2017)

New „Twiki“: Confluence @ DESY: Status of PXD requested.

Update of Whitebook

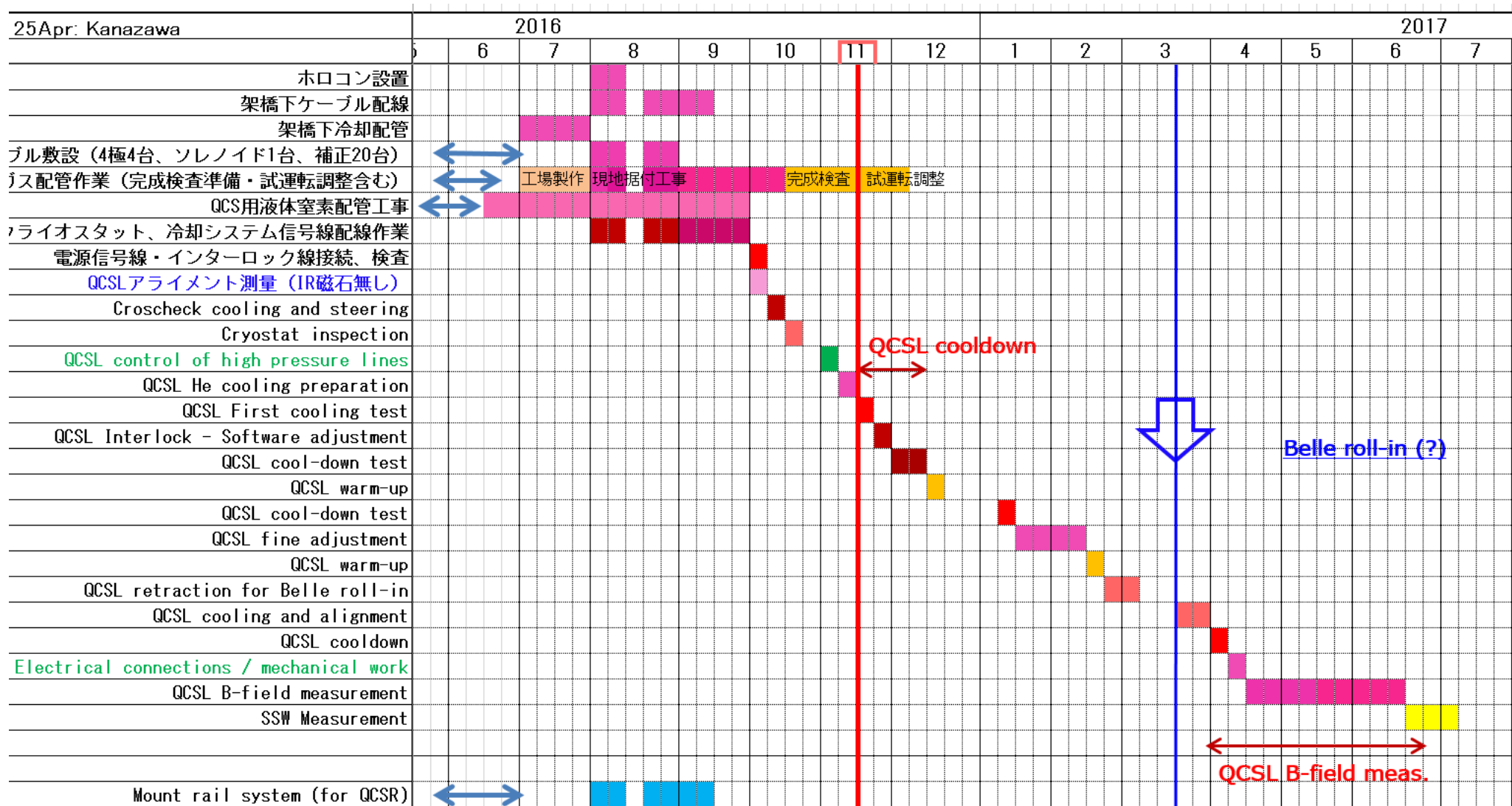
Place for next International Workshop on DEPFET Sensors:
May 2017, Ringberg Castle



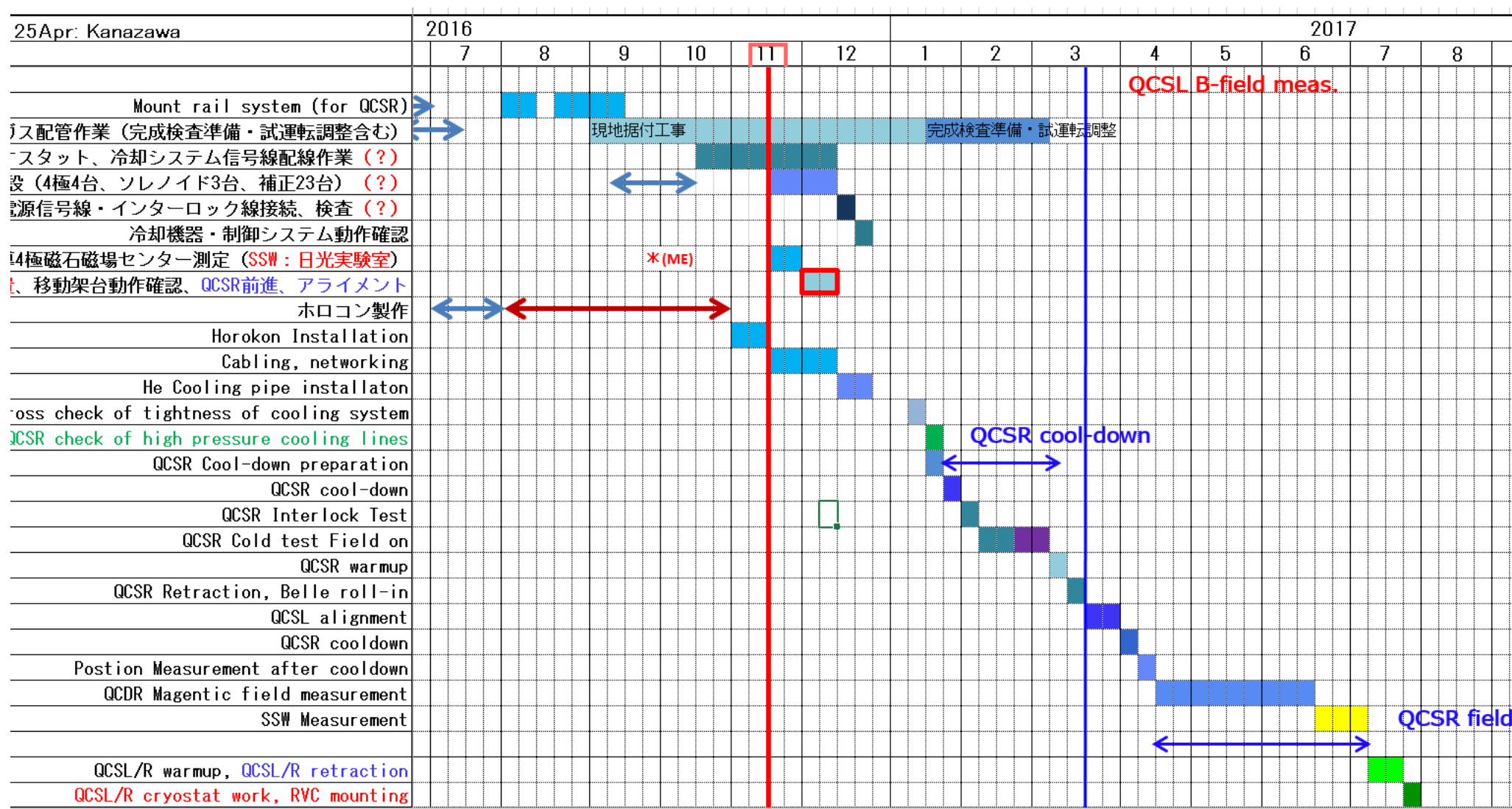
Very rough schedule presented at Feb. Meetings, is now substantiated with numbers:

We will need about 6 months from the end of Phase 2 to the start of Phase 3

Updated Machine Phase 2 Schedule (non-official)



Updated Machine Phase 2 Schedule (non-official)



Updated Machine Phase 2 Schedule (non-official)

