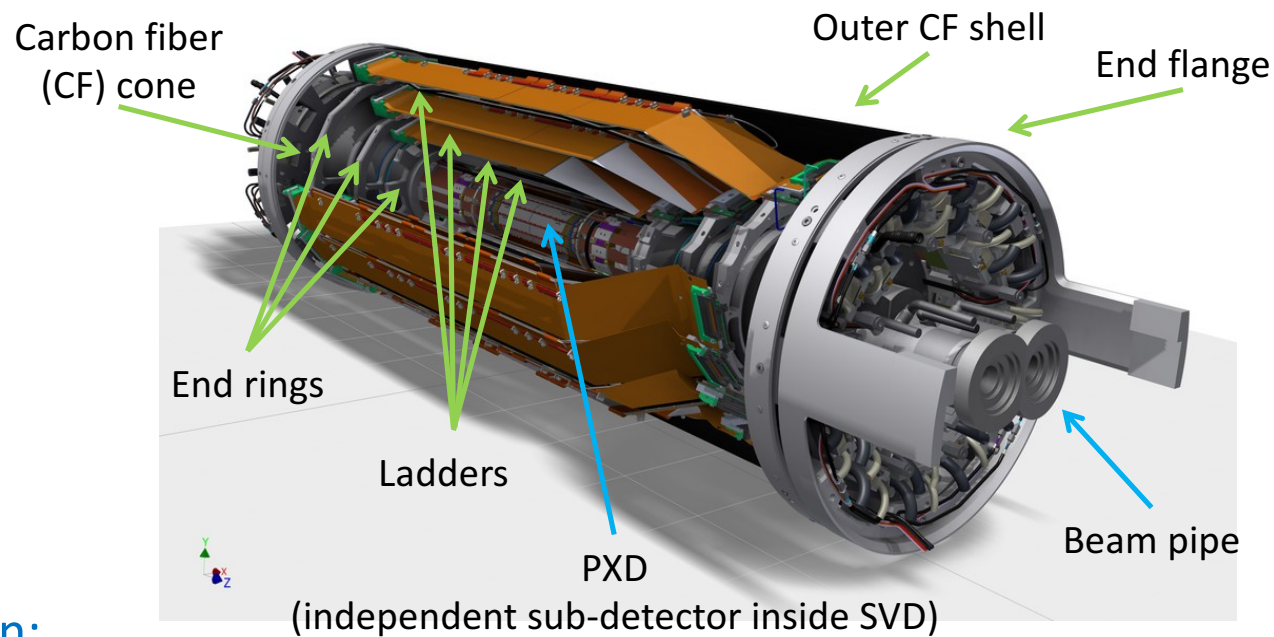


SVD Introduction & Ladder mount status



S. Bettarini
on behalf of the
Italian-SVD-Group

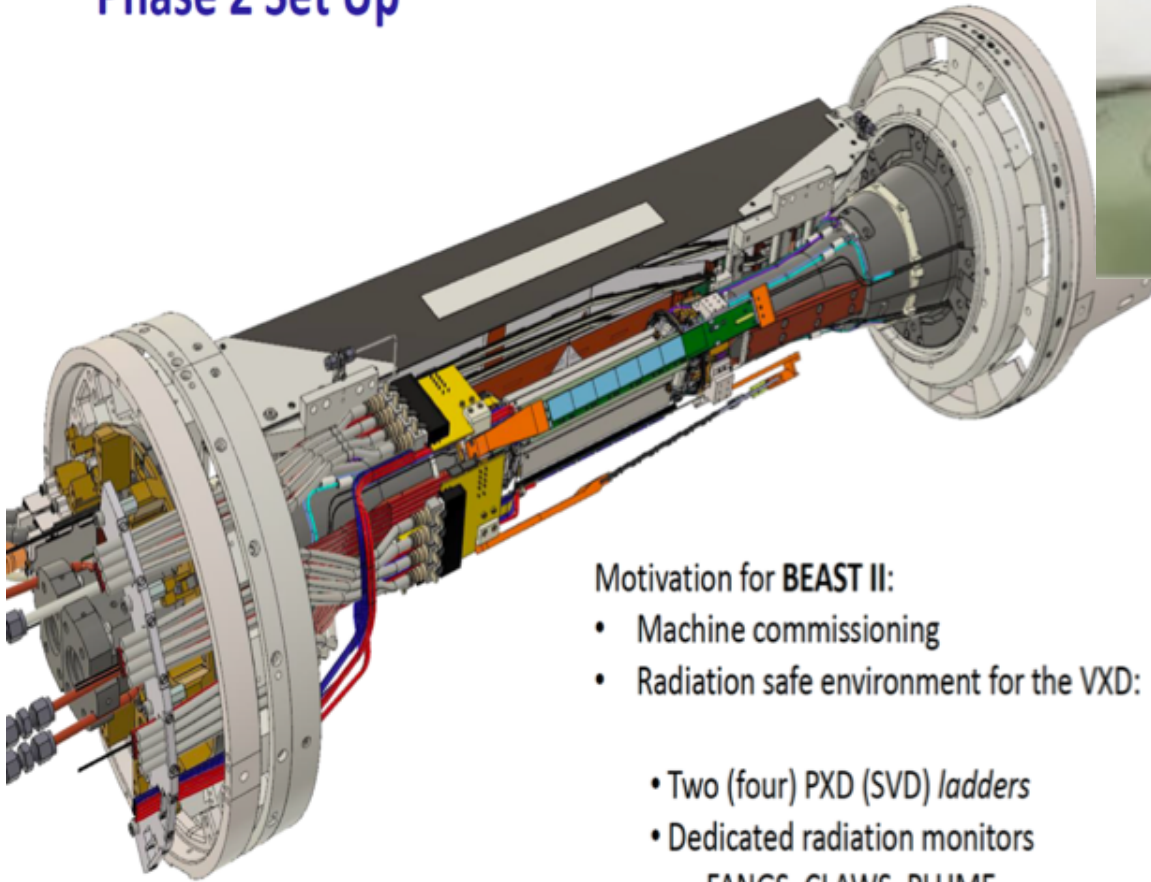
SVD session:

- 11:45 **Introduzione & assemblaggio dei ladders di SVD 10'**
Speaker: Stefano Bettarini (PI)
- 11:55 **Stato della produzione, installazione e test diamanti, e monitoring di SVD 20'**
Speaker: Chiara La Licata (TS)
- 12:15 **SVD offline SW update 15'**
Speaker: Michael De Nuccio (PI)

Belle II Italy Meeting – Nov. 21st Pisa

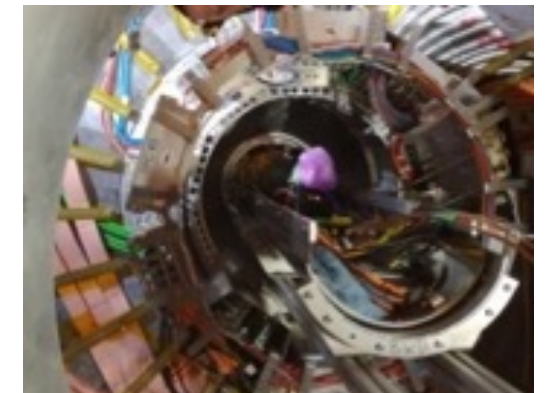
On Nov. 18th the phase-2 VXD/BEAST detector installed into Belle II

Phase 2 Set Up



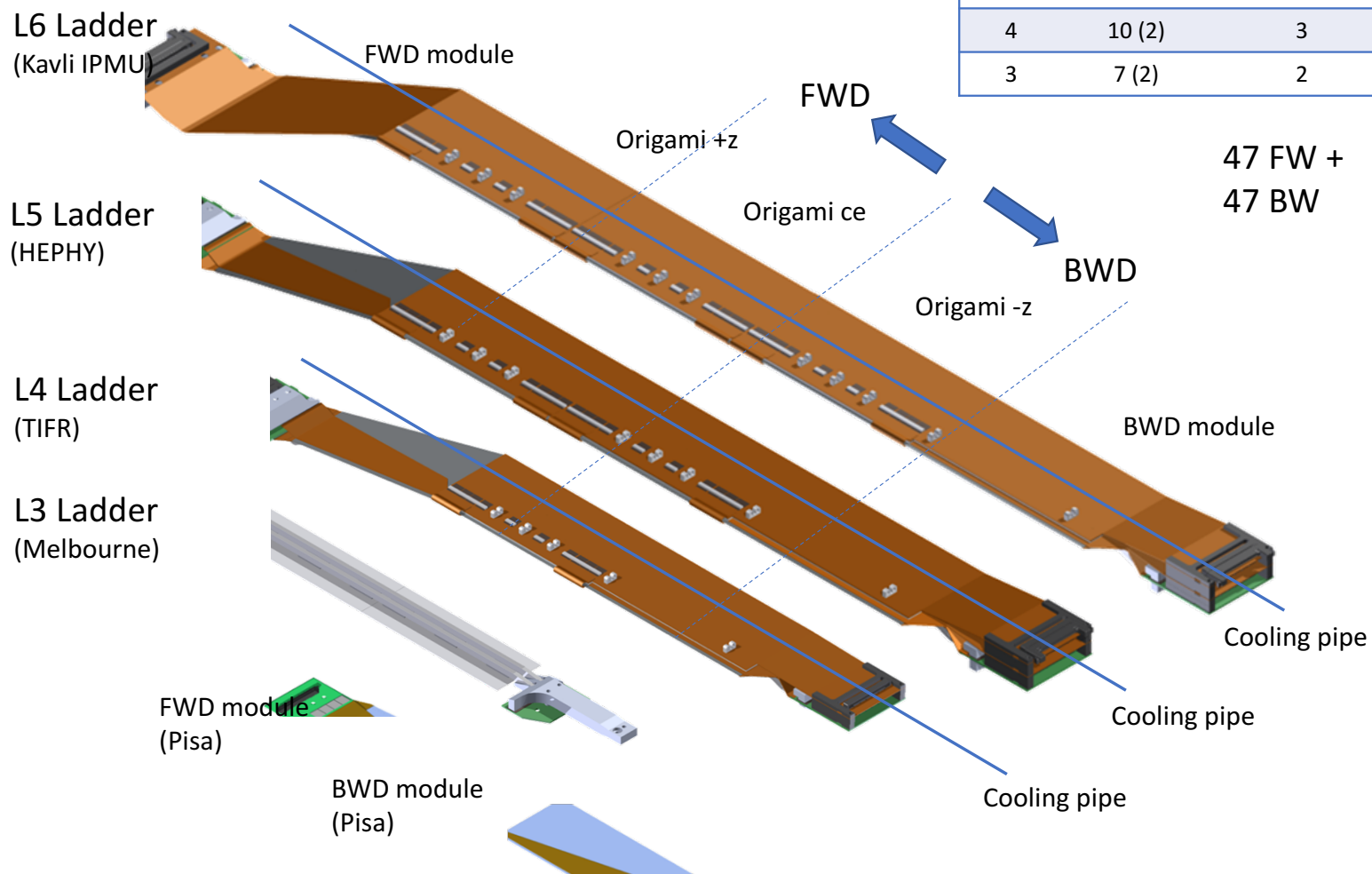
Motivation for BEAST II:

- Machine commissioning
- Radiation safe environment for the VXD:
 - Two (four) PXD (SVD) ladders
 - Dedicated radiation monitors
FANGS, CLAWS, PLUME



Ladder assembly

Layer	Ladders (spares)	DSSDs / ladder
6	16 (4)	5
5	12 (3)	4
4	10 (2)	3
3	7 (2)	2

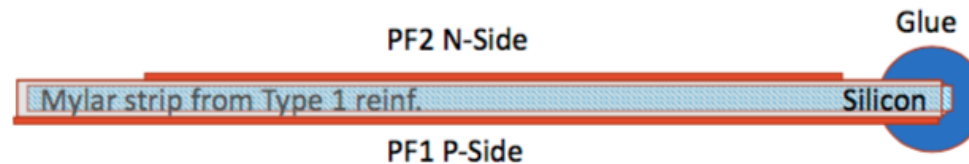


SVD ladder production status

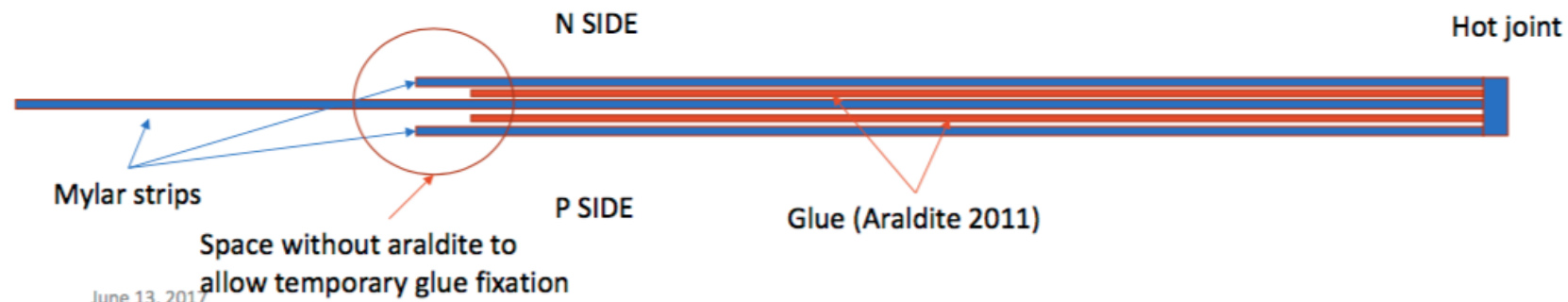
- Ladder assembly is in its final phase: 3 out of 5 sites have completed their production:
 - Pisa (FW/BW) Production completed – in total 60 class A FW and 55 BW subassemblies built
 - Melbourne (L3) Production completed – 11 good ladders available out of 7+2 ladders needed
 - TIFR (L4) 9 good ladders in hand, 3 more to build (expect to finish in Jan 2018)
 - HEPHY (L5) Production completed – 15 good ladders in hand
 - Kavli-IPMU (L6) 15 good ladders available, 5 more to go. Precisely on June 2017 B2GM schedule (end of production: second half of Feb 2018, consistent with the ladder mount schedule)
- PF1 peel off problems have been addressed by “type 3” reinforcement and have not reappeared

Threefold PF1 peel off mitigation strategy implemented by L4/L6 in June 2017

1. Staged assembly: FW sensor is glued first, assembly continues after 1 week wait (to minimize loss of sensors if peel-off happens)
2. Glue brace reinforcement: to secure the weakest corner (sacrificing one alignment mark)

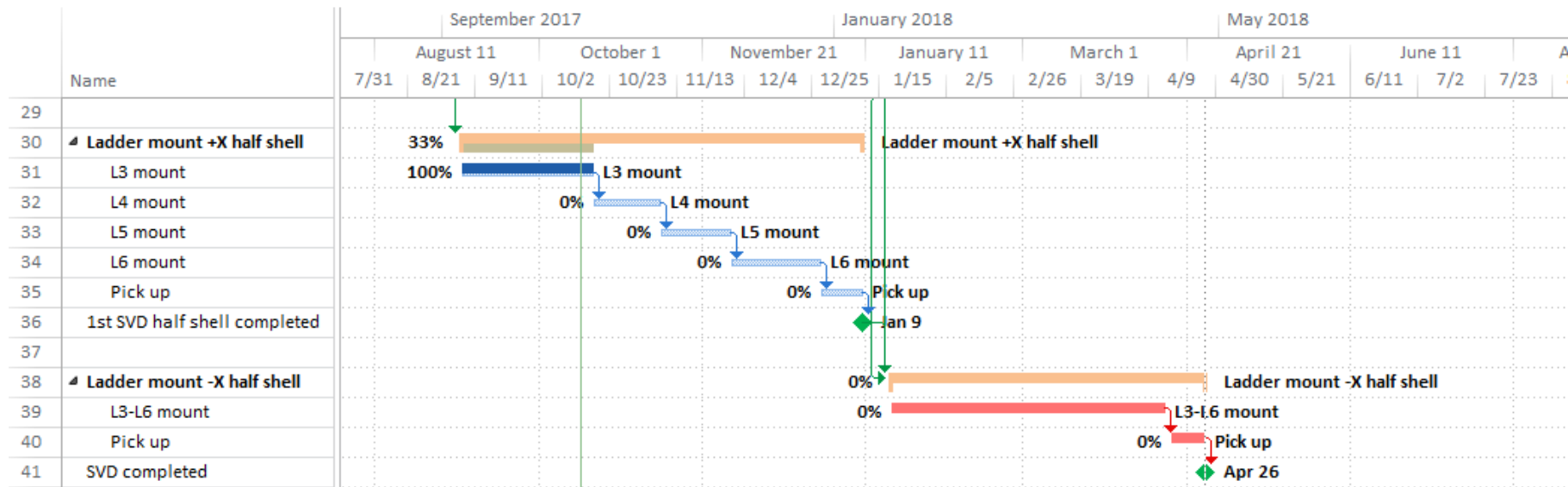
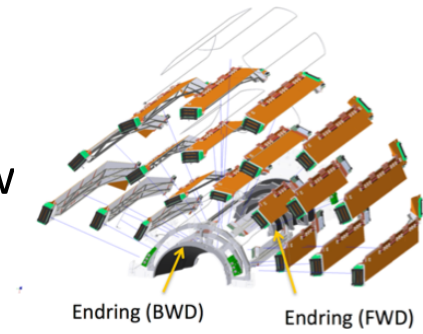


3. Mylar strip with flaps (type 3): to mechanically push PF1/PF2 onto the sensor

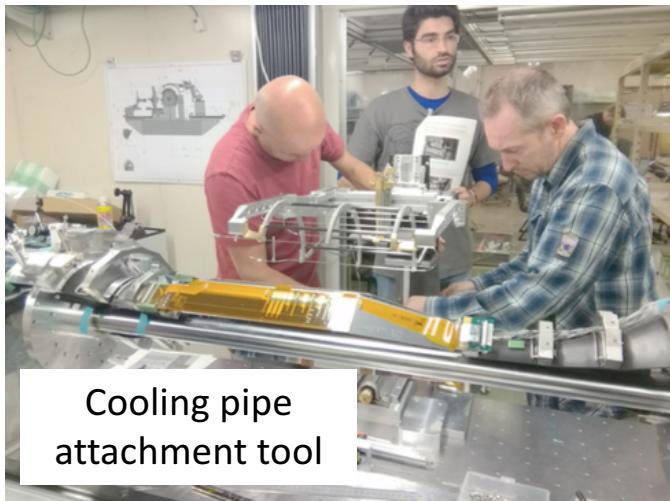
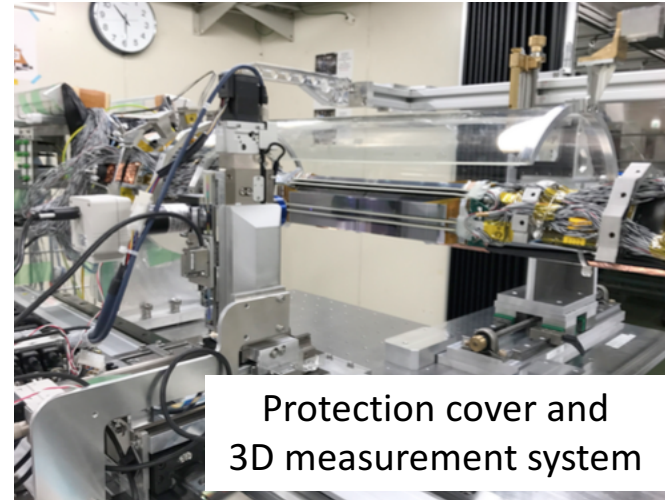
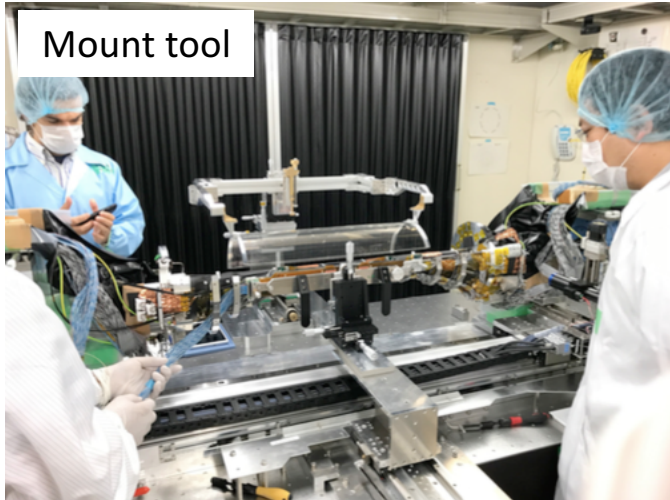


Ladder mount

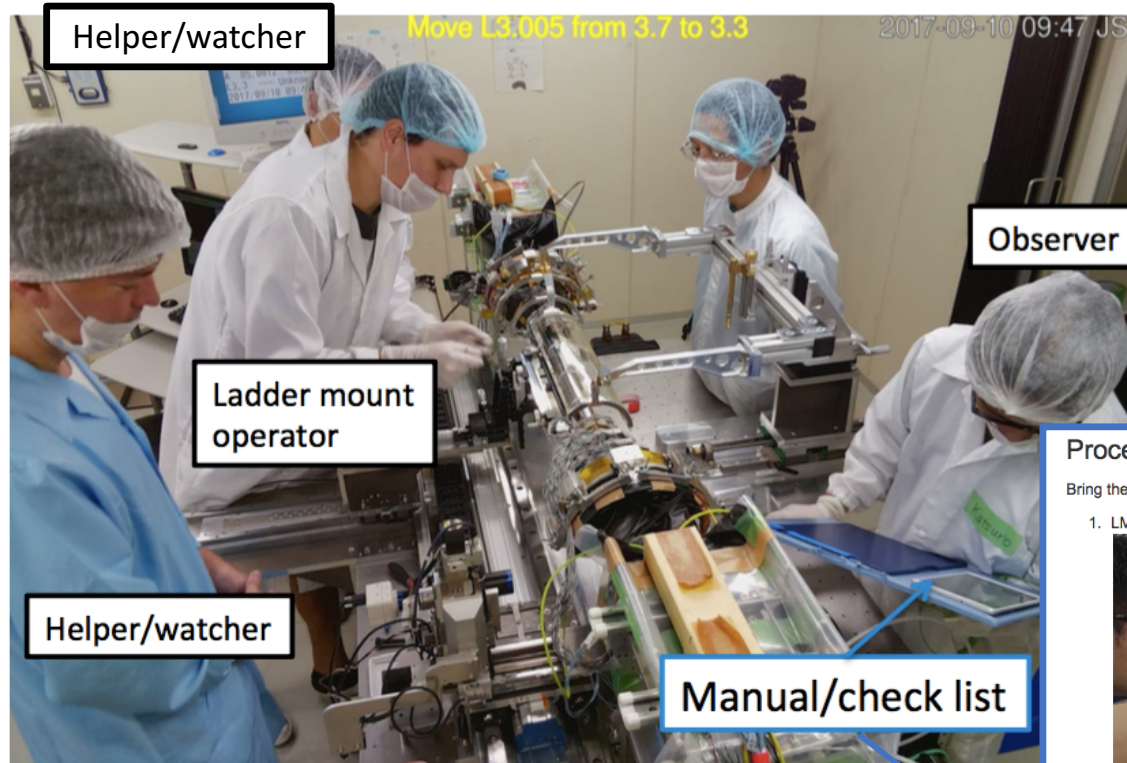
- Tools and procedures have undergone a series of technical review and were finally approved on Sep 5, 2017
- LM has started; progress is behind the original schedule due to a number of issues on the L3
- ladders; no issues are seen in the LM tools/procedures itself
- +X (-X) half-shell is expected to be mounted by Jan (Apr) 2018



Ladder mount tools



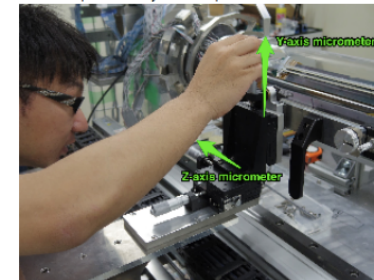
Ladder mount procedures



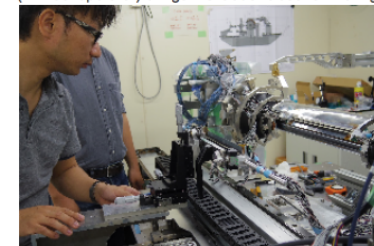
Procedure

Bring the ladder close to Endring

1. LM tool operator adjusts the position with Y-axis and Z-axis micrometers into $Y=20.4\text{mm}$ and $Z=6.0\text{mm}$.

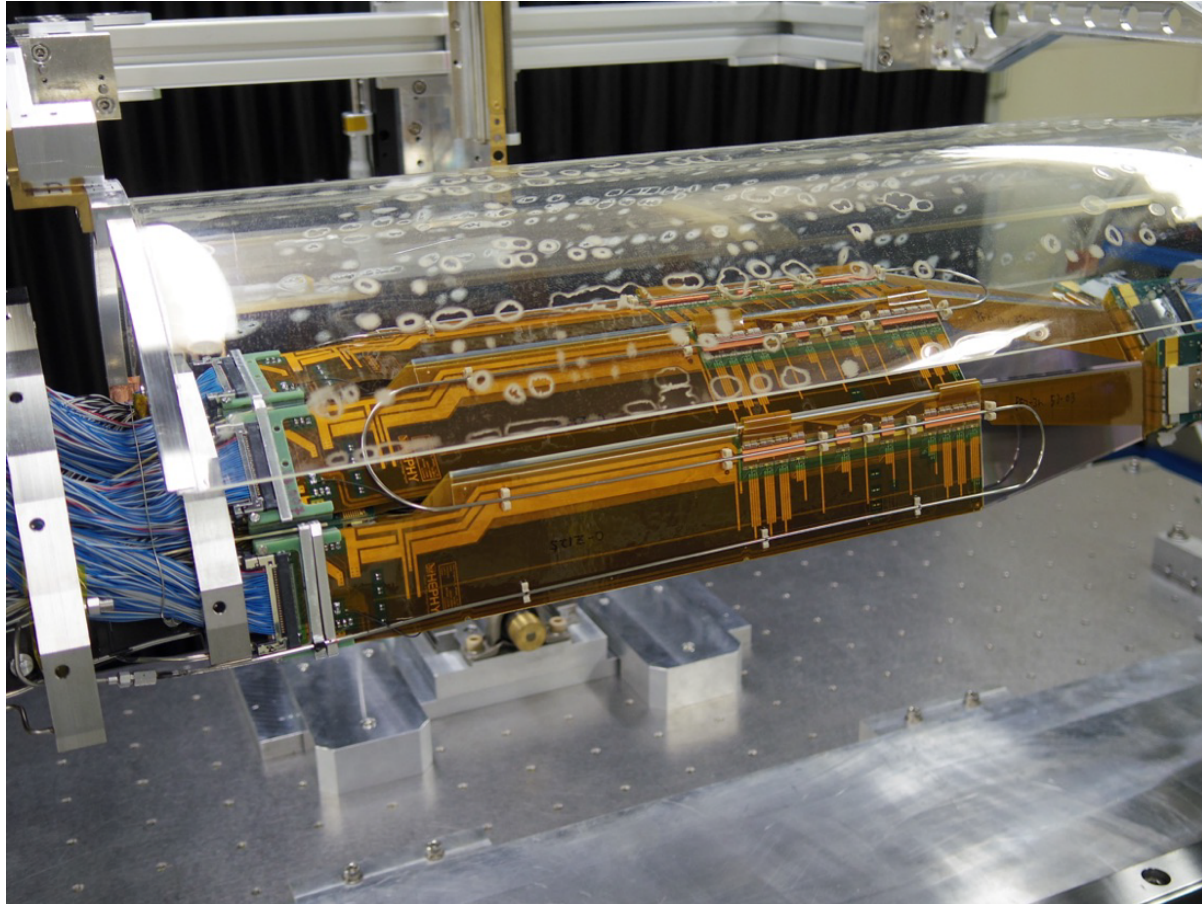


2. (LM tool operator) brings the ladder close to Endrings until (1) $L=300\text{mm}$, (2) $L=200\text{mm}$, (3) $L=100\text{mm}$.



<https://confluence.desy.de/display/BI/Process+Flow>

End of October: L4 completed!



Brazing Issue

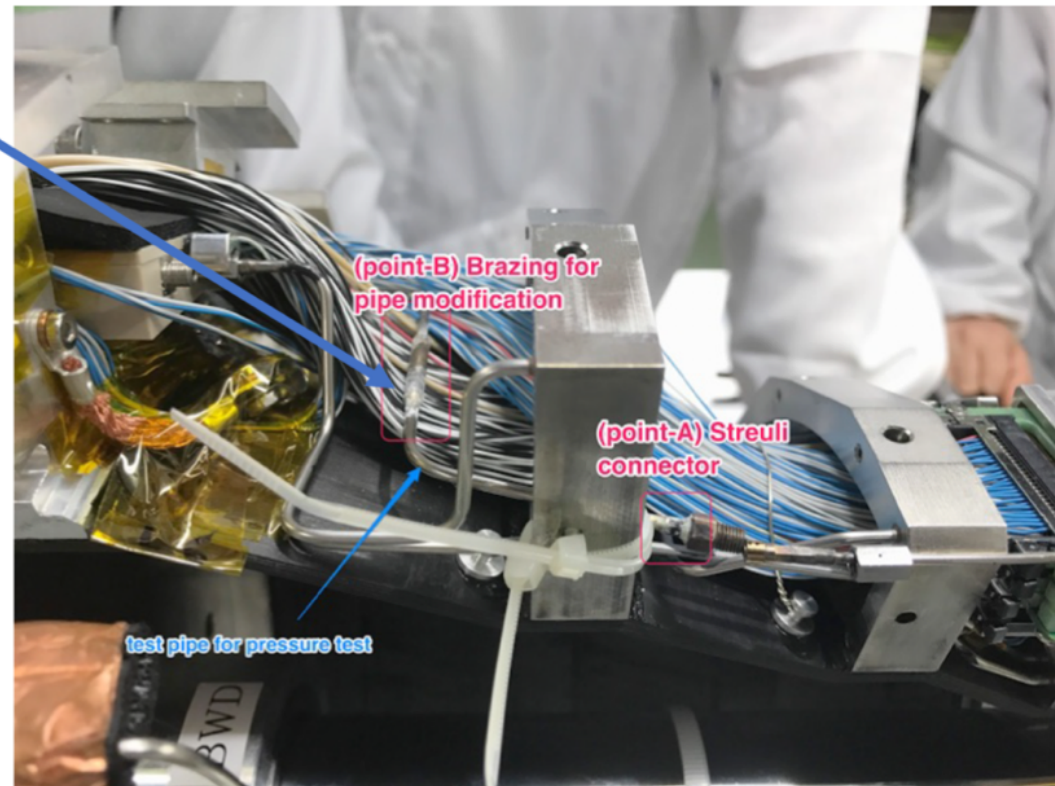
The whistle-blower

Clogged temporary pipe
This was done with a quick and dirty
brazing procedure

Inspection on temporary pipe showed
black residues and possibly indication
of corrosion

Question: are the final origami
pipes brazing joints at risk of
corrosion ?

<https://confluence.desy.de/display/BI/Origami+Cooling+pipe%3A+Photos>

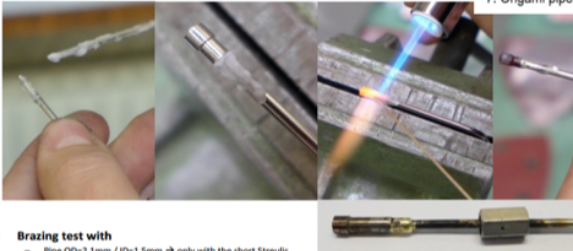


Procedures

Our brazing procedure

0. Increase Streuli diameter to 1.65mm (to insert OD=1.6mm pipe)
1. Pipe and Streuli were cleaned with isopropanol and dried by blowing air
2. Mostly Streuli, but also pipe (both stainless steel) were heated up to red glow with a torch
3. "Solder" (actually: silver) was applied to the joint
4. The newly formed joint was immediately immersed in water (to remove excessive flux)
5. A drill (same size as the inner diameter of the Streuli/pipes - ID=1.4mm - was inserted to make sure there is no flux or "solder" remaining inside the junction
6. The Origami pipe was closed at one end and, attached to a gas bottle on the other end, completely immersed in water and 200bar nitrogen applied to it for at least 15 minutes. No pressure drop was seen anywhere
7. Origami pipe was taken out of the water, disconnected and left for drying before closing the packages for dispatch to KEK

Brazing With Real Streuli



- Pipes are good now.
- Question: is this technique adequate to guarantee >10years operation ?

- Brazing test with
 - Pipe OD=2.1mm / ID=1.5mm → only with the short Streulis
 - Pipe OD=1.6mm / ID=1.4mm (Origami pipes) → only with the long Streulis (because if possible we want to use them)
- If the brazing connection is not tight it is possible to "unbrazed" the Streuli and braze it again on the same pipe

29 November 2016

F. Buchsteiner

Mount Update @ TB



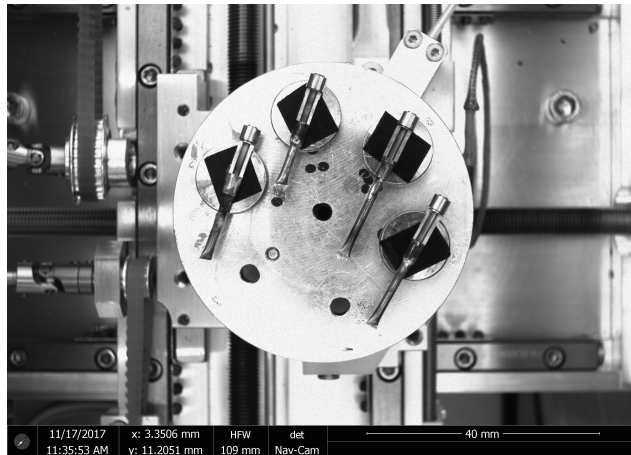
7

Outcome of today 8 am SVD meeting...

SEM Investigation On brazing samples @UNIPI

Concerns and options

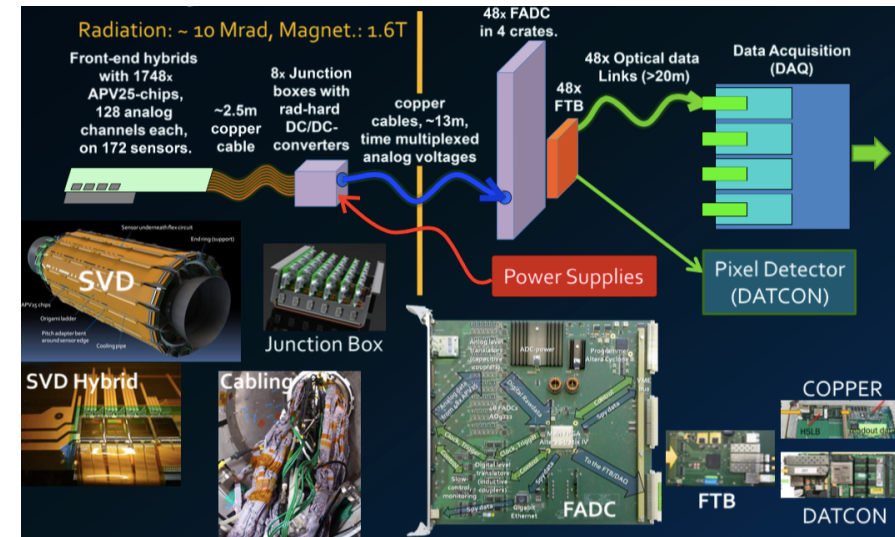
- Concern: possibility for the flux residue to cause corrosion to the joint and cause failure over time
 - Hold off further ladder mount activities
- Options:
 1. We can prove that the current pipes are durable – do nothing
 2. We find a suitable cleaning technique
 - Some form of acid cleaning is possible, mild or strong. Not straightforward with such thin material
 - Requires cleaning all the existing pipes
 - Requires unmounting the L4 pipe already installed (some risk involved)
 3. We convince ourselves that the current pipes are unsuitable
 - Need to reproduce all pipes with vacuum oven brazing
 - Need to resolve many issues: components (Streuli), holder for origami pipe, suitable company, money, ...



11/17/2017 11:35:53 AM x: 3.3506 mm y: 11.2051 mm HFW 109 mm det Nav-Cam 40 mm

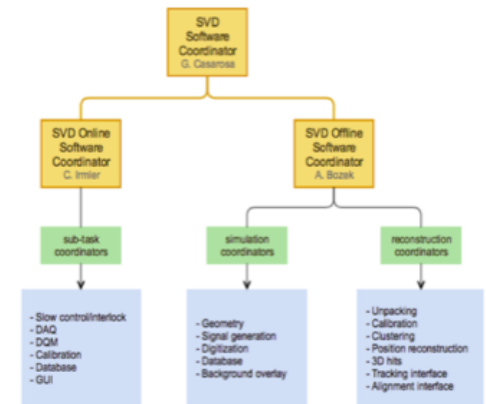
Readout electronics

- FADC v4 has been produced and evaluated in the real Belle II environment at KEK; significant improvement in the noise performance is observed
- Mass production has been started: half of the FADC system will be at KEK by end of Feb 2018; full system will arrive by mid Mar 2018



Reorganization of SVD Software

- SVD SW split into online and offline software
- SVD online software
 - Slow and run control
 - DQM
 - Calibration
 - Database
 - GUI



SVD Software

- Online software is well on track for phase 2
- Offline software is undergoing a refactoring to include important new features such as hit time determination; major effort is required to make it ready for phase 2