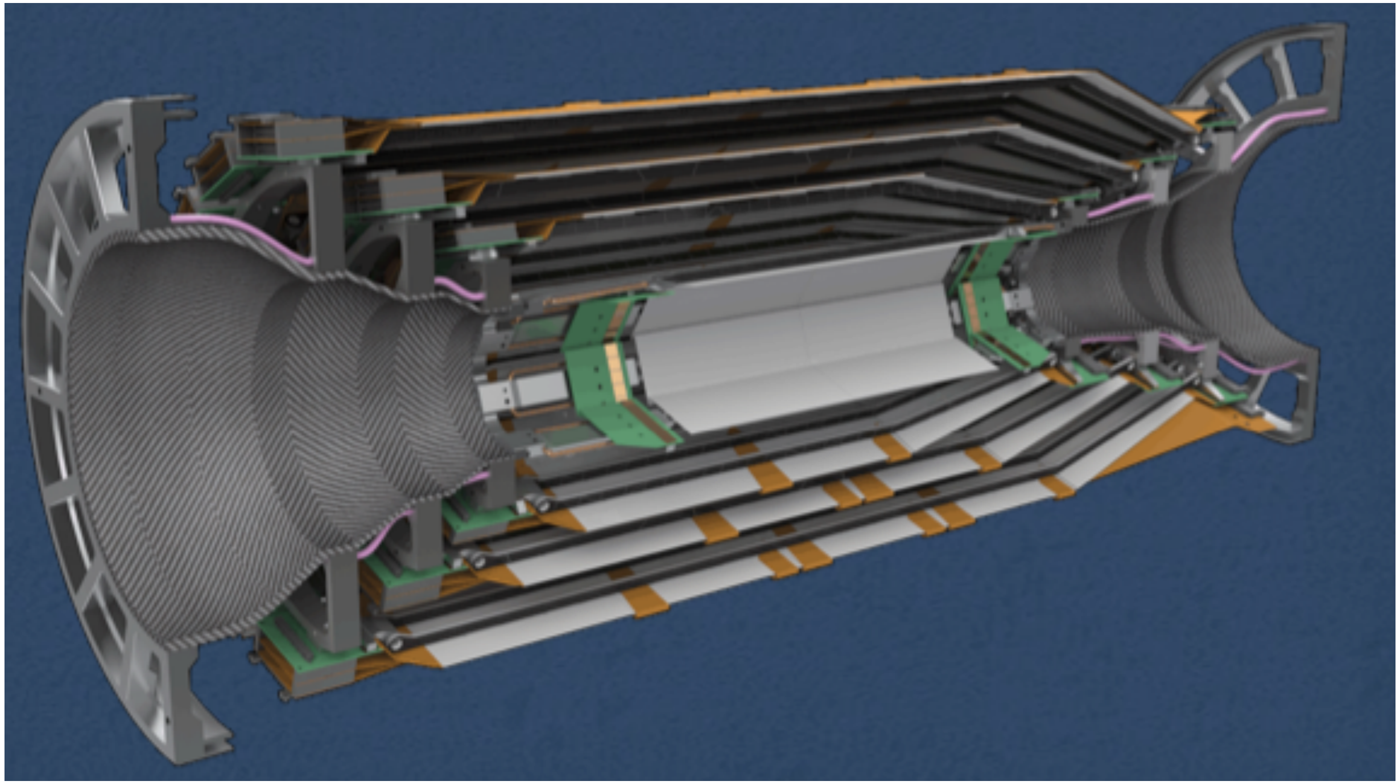
SVD Attivita' e Richieste 2015



Incontro con i Referees
11 Settembre 2014

S.Bettarini per SVD-Belle2

Belle2 SVD: OUTLINE

•Descrizione delle attivita' 2014 che si protrarranno nel 2015

•Identificate le attivita' 2015 e quantificate le spese.

•Inevitabili modifiche alla schedule generale potrebbero implicare un loro shift temporale (e.g. Beast1), dipendente dagli scenari.

Trieste:

- Test sensori
- Radiation monitoring (BEAST)
- Monitoring/ILK temperatura/hum.

Pisa:

- Produzione FW/BW assemblies
- Commissioning Power Supply
- Montaggio moduli

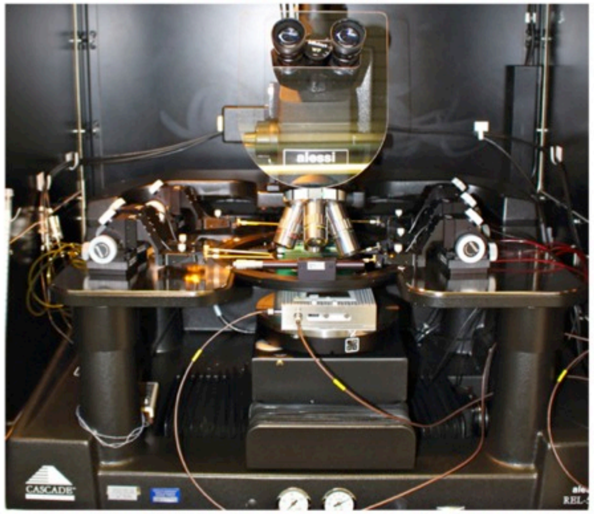
TRIESTE: Test dei DSSD Micron e HPK (2014)

Micron: tutti i test a Trieste e Vienna
- Trieste: test eseguito finora su 3 sensori pre-serie e 25 di serie; solo 2 rigettati

HPK (solo test parziali alla produzione)
- Trieste: test dettagliati su un campione di sensori

Qualità complessivamente buona in entrambi i casi; nel 2015 prevedibili alcuni ulteriori test a campione

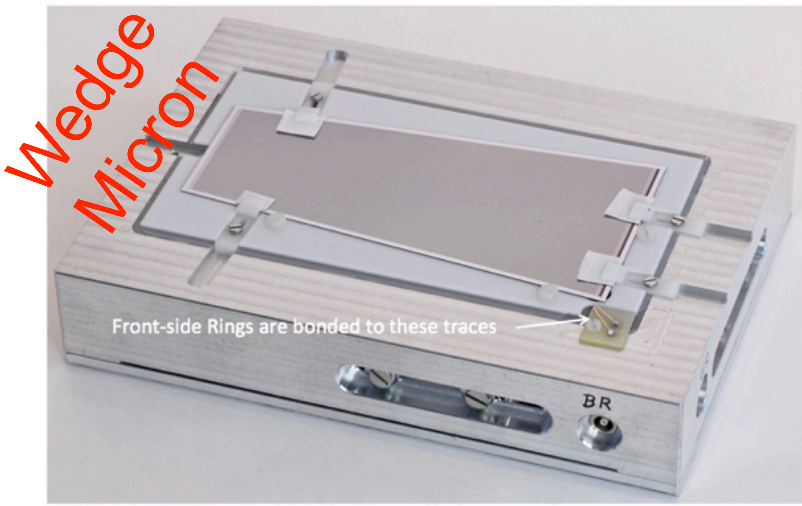
Sensor testing set-up



- Front and Back-side Rings are connected through cables
- Strips are contacted by a 40-needle Probe Card

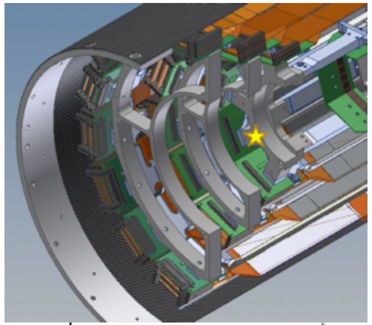
5th Belle II PXD/SVD Workshop 23-01-2014 -- L. Bosisio - Test of Micron Trapezoidal Sensors

Sensor testing Jig (top)



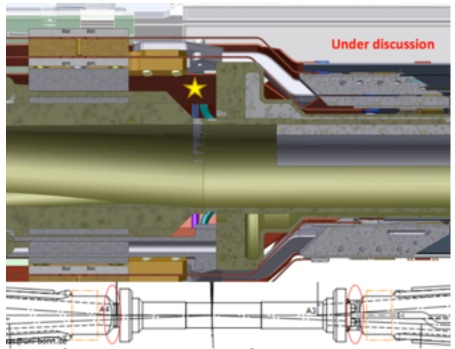
5th Belle II PXD/SVD Workshop 23-01-2014 -- L. Bosisio - Test of Micron Trapezoidal Sensors 3

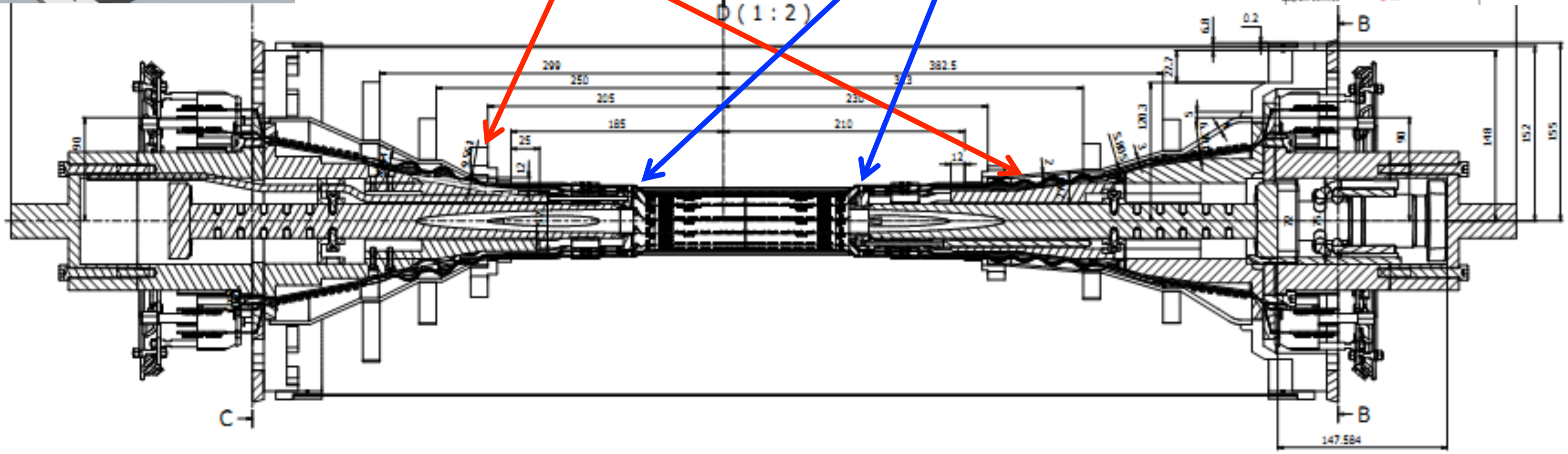
Monitor di Radiazione e Beam Abort



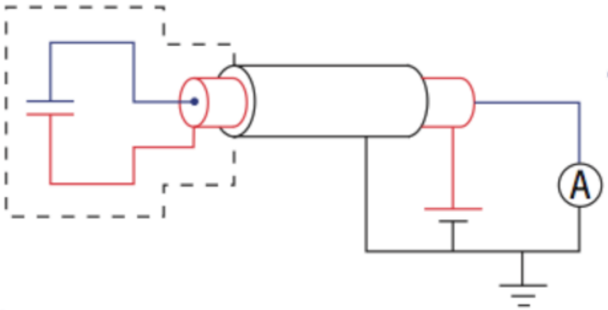
8 + 8 sensors
vicino a SVD L3
support rings

4 + 4 sensors
PXD-beam pipe





R&D, sensori in diamante, scCVD



Voltage sources
(150÷500V)
picoAmmeters

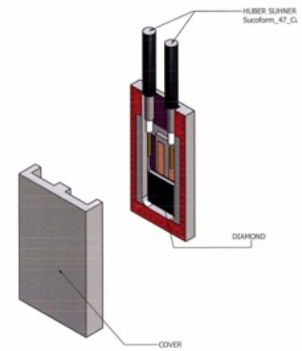
Elettronica di lettura e
Trigger di Beam Abort:
Collaborazione con
Elettra – Electronics Division

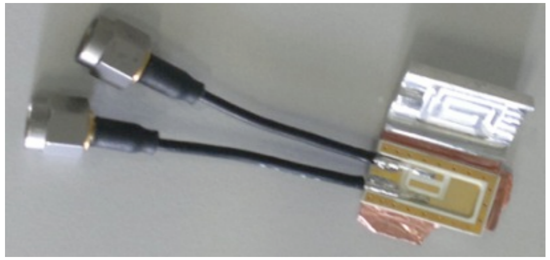
Meccanica, cablaggi, misure di rumore (2014)

Meccanica compatta

12 x 20 x 3.1 mm^3

multi-layer package, Rogers laminate

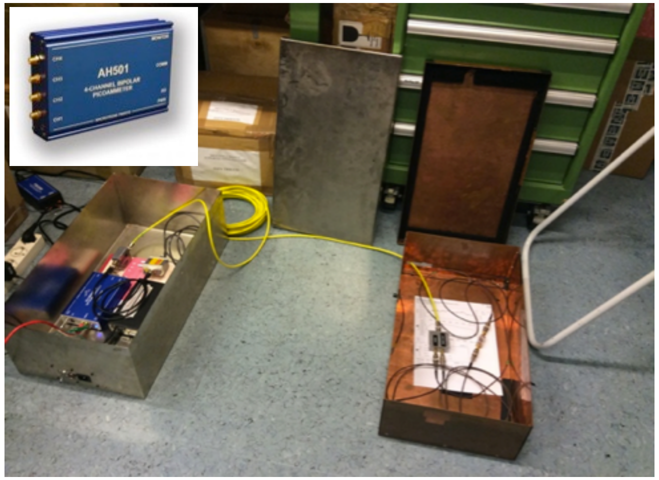




Cablaggi, scelta e layout

3 m coaxial (HS SM47LSFH) dai sensori ai DOCKs

+ 15 m HS S_04162-B60, double shield

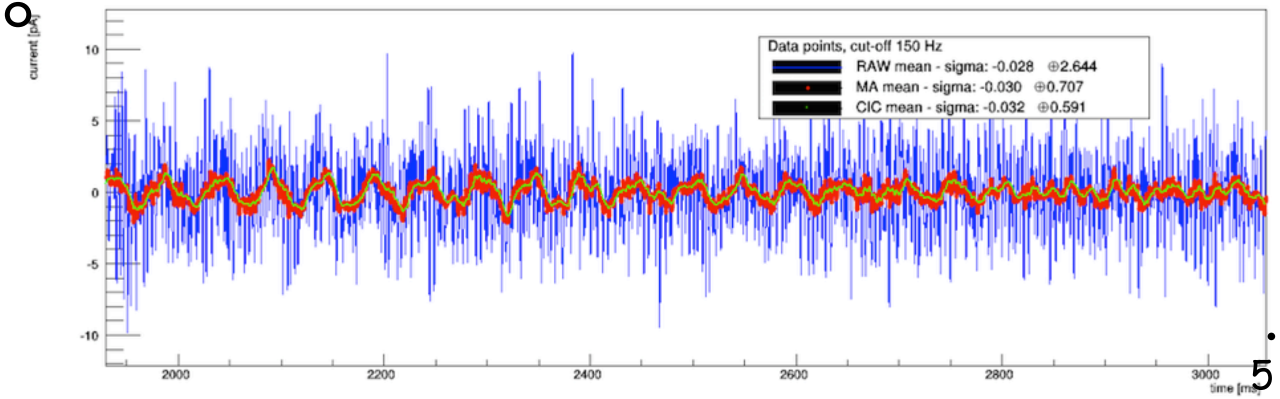


Misure di rumore e filtraggio digitale

Picoamperometro AH501 (da Elettra)

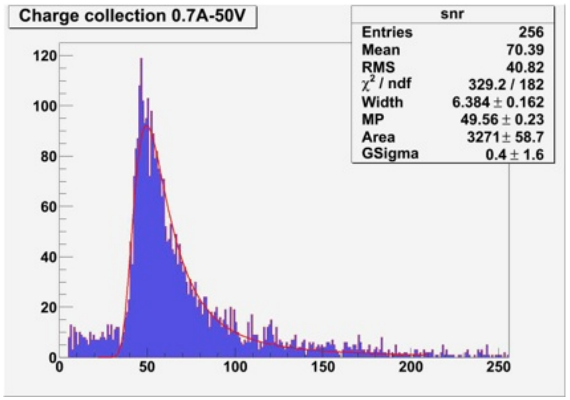
Livello rumore ≈ pA (50 Hz e multipli)

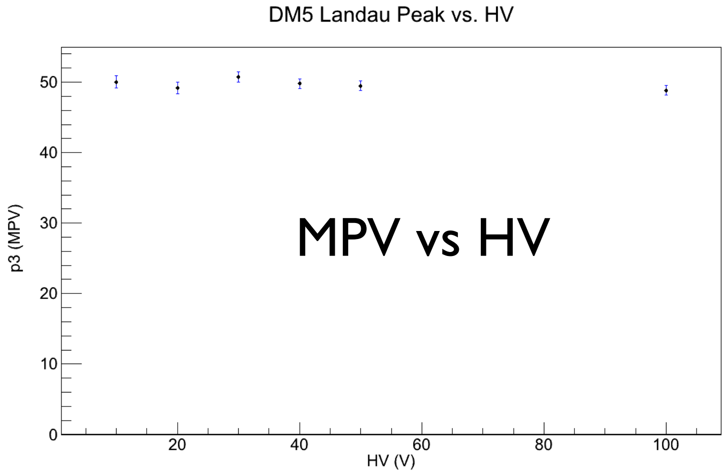
Riducibile con filtraggio digitale (running avg)



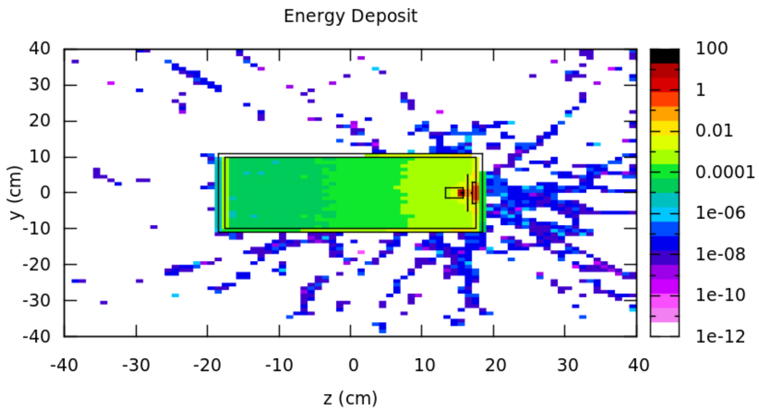
Caratterizzazione dei sensori scCVD (2014)

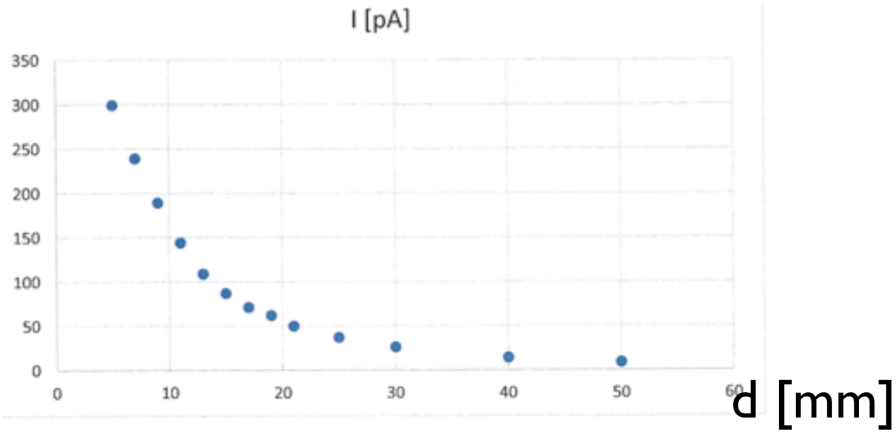
Elettroni singoli, 1-2 MeV (MIP): Landau peak vs HV





Sorgente puntiforme Sr90, attività 3.2 MBq, a diverse distanze confronti con simulazioni FLUKA, studi di riproducibilità





Electronics: preliminary specs

For each of the 4 input channels (diamond sensors)

- Individual HV supply
- Effective bandwidth: 100 kHz (matched to 1 revolution = 10 μs)
- Selectable current range: 0-50 μA or 0-2 mA
- 16 (24?) - bit ADC; over-sampling possible with freq > 100 kHz
- 4 circular data buffers, updated every 10 μs:
  - "Raw data" and 3 levels of "sliding sums" over programmable numbers of cycles
  - digital filtering levels and time responses, from "immediate" (10 us) to "very slow" (typically 1 s)
- 4 levels of abort signals
  - from the comparison of raw data and sliding sums with the programmable thresholds, selected according to a "SuperKEKB Status Register"

Approach similar to FermiLab Beam Loss Monitor (BLM) and CERN LHC BLM systems

Specifications discussed within Belle II and with SuperKEKB

In collaboration with G.Cautero, D.Giuressi, and R.H.Menk from Elettra - Sincrotrone Trieste S.C.p.A.

NTC temperature sensors

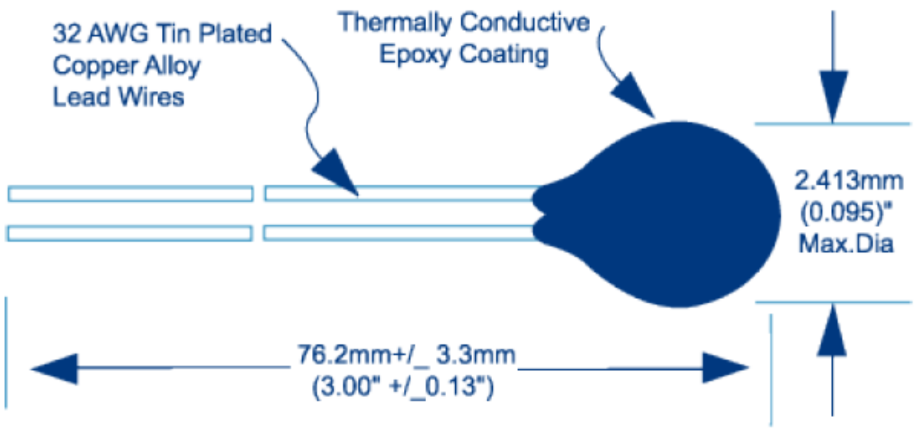
At least 28 x 2 = 56 NTC thermistors; system design for up to 96

- 12 sensor pairs attached to the 12 half-rings supporting the SVD ladders
- 16 sensor pairs on the inlets and outlets of the CO_2 cooling pipes
- A few positioned near fibers for cross-calibration, and possibly at other locations

Rad-hard Betatherm 100kΩ NTC thermistors

- 2 borrowed from CMS, 100 more already procured

Shape and Dimensions



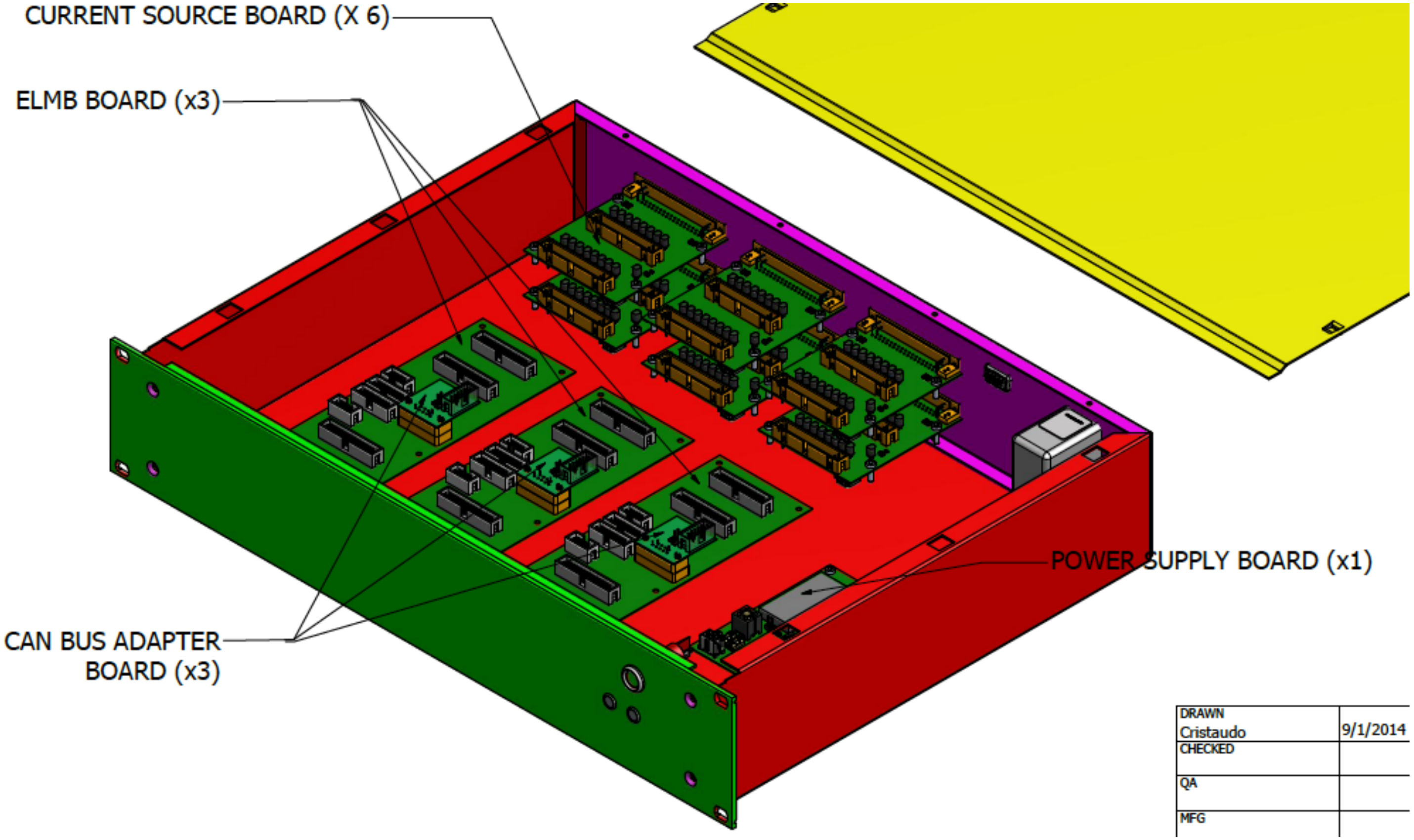
Features

- Fast time response (1 second typical in liquids).
- DC (Dissipation Constant) = 0.75 mW/°C typical in still air at 25°C.
- Available in custom probe assemblies.
- Tight tolerance available – +/– 0.1°C from °C to 70°C.
- Proven Stability and Reliability.
- Min./Max Temperature Exposure = –80°C to +150°C.
- Alloy lead wires for reduced thermal conductivity ("stem effect").

System design for 96 NTCs

In one box, with 3 x 32 NTC channels modularity:

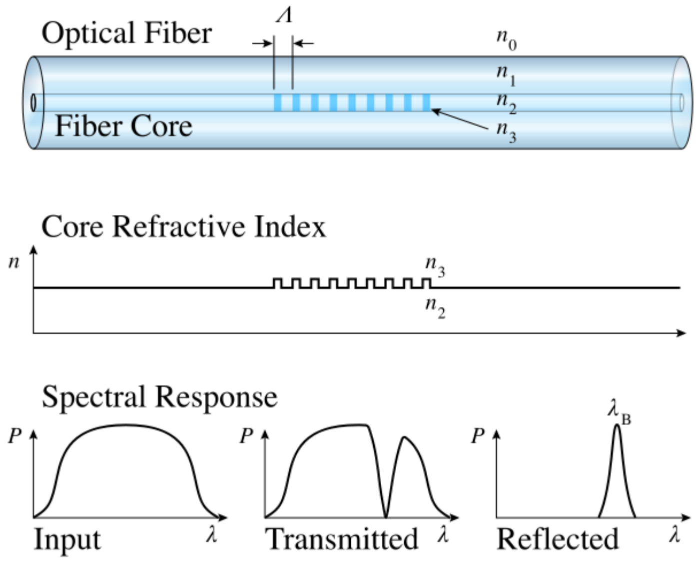
1 power supply board, 3 motherboards with ELMB and CANbus adapter, 3 x 2 current source boards, 3 x 2 x 16-channel connectors



Temperature Monitoring – FOS fibers (2014)

PXD FOS R&D completed
successfully tested at the DESY beam test Jan 2014

Same solution can be adopted for SVD:
one fiber per ladder, inserted in the Airex foam,
to measure silicon temperature.
One FBG temperature sensor for each of the SVD strip sensors in layers 4,5,6; 38 fibers and 120 sensors are needed.



One rack-type sm225-800 interrogation unit*, ten passive couplers** 4x1 in order to have 40 channels.

*Interrogation speed 0.5 Hz; Stability 0.1 °C pm; Repeatability 0.1°C; Accuracy 0.1°C (only for the interrogation unit, FBG sensor error must be added); 16 input channels

**Accoppiatore a larga banda, 1x4, 1550 nm, insertion loss <7 dB, fibra SMF-28e, pigtail lunghezza 1 m tipo 900 micron loose, connettori FC/APC su entrambe le estremità, dimensioni (forma cilindrica) 4x65 mm.

model	Description	cost	Quantity	total
sm230-800	FBG interrogation unit	24,836 €	1	24,700 €
	4x1 passive coupler	45 €	10	450 €
			total	25,350 €

	Description	Nº of fibers	Total
layer 4	2x10 mm FBG in each fiber up to 3 m length	10	3,120 €
layer 5	3x10 mm FBG in each fiber up to 4 m length	12	4,050 €
layer 6	4x10 mm FBG in each fiber up to 5 m length	16	7,320 €
		Total	14,490 €

Humidity Monitoring & Interlocks

Two types of sensors:

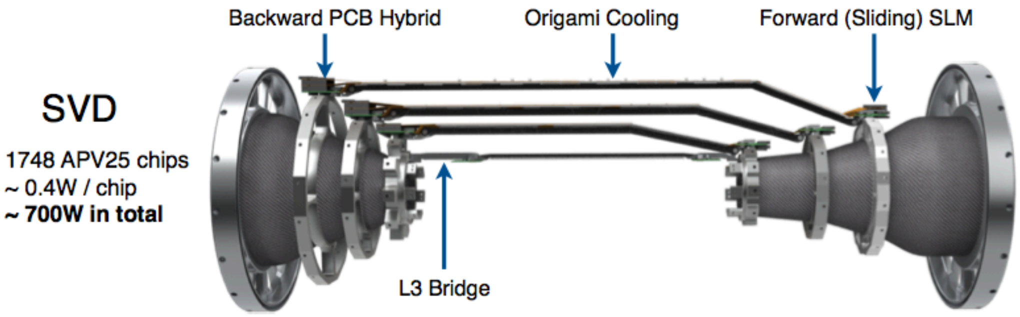
- 8 FOS fibers
  - humidity-sensitive coating,
  - read-out: together with temperature-sensing fibers
- sniffing pipes with external Chilled Mirror Hygrometers
  - good precision and reliability for Dew point limit @ -30 degrees Celsius
  - details (piping, valves, etc.) to be defined

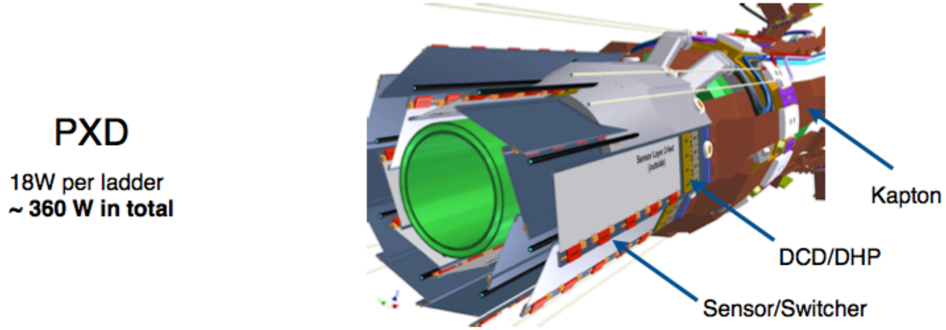
(reference: LHC experiments, for instance CMS tracking upgrade)

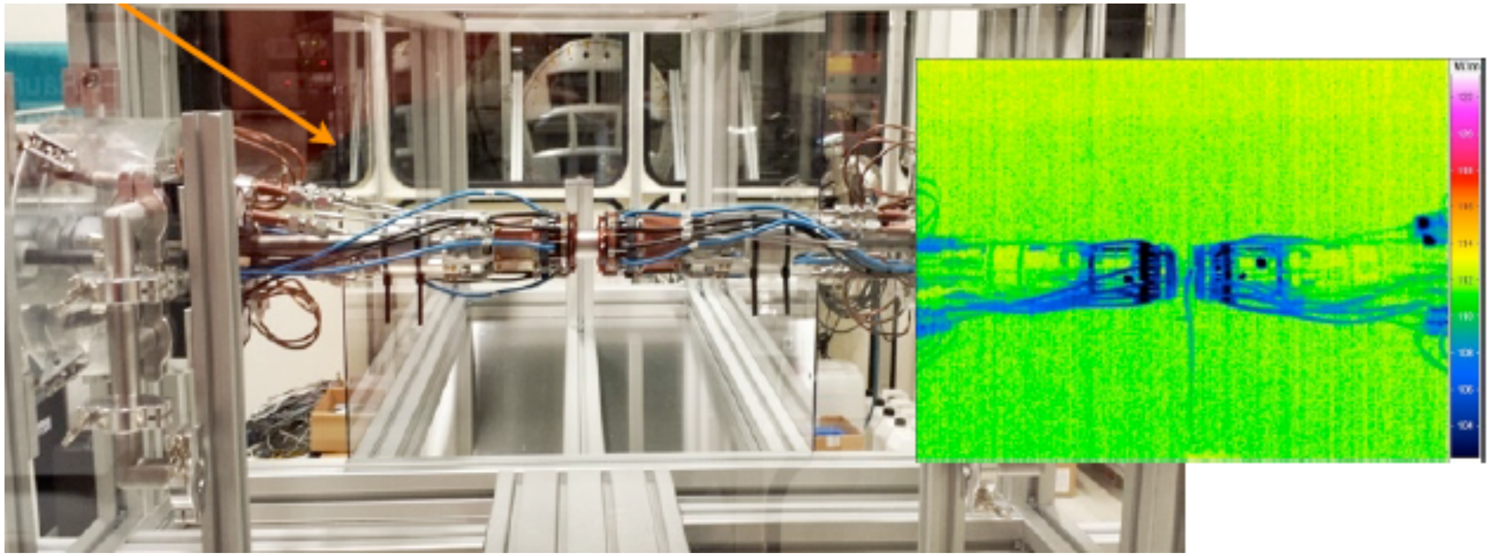
VXD Thermal mock-up (DESY)

PXD+SVD Front End power dissipation: 360+700 W
CO_2 cooling pipes (-20°C); dry air / nitrogen flow (20°C)

A crucial moment for understanding several aspects and setting the exact location for the ambient sensors will be the PXD+SVD thermal mock-up in preparation at DESY (Oct. 2014).







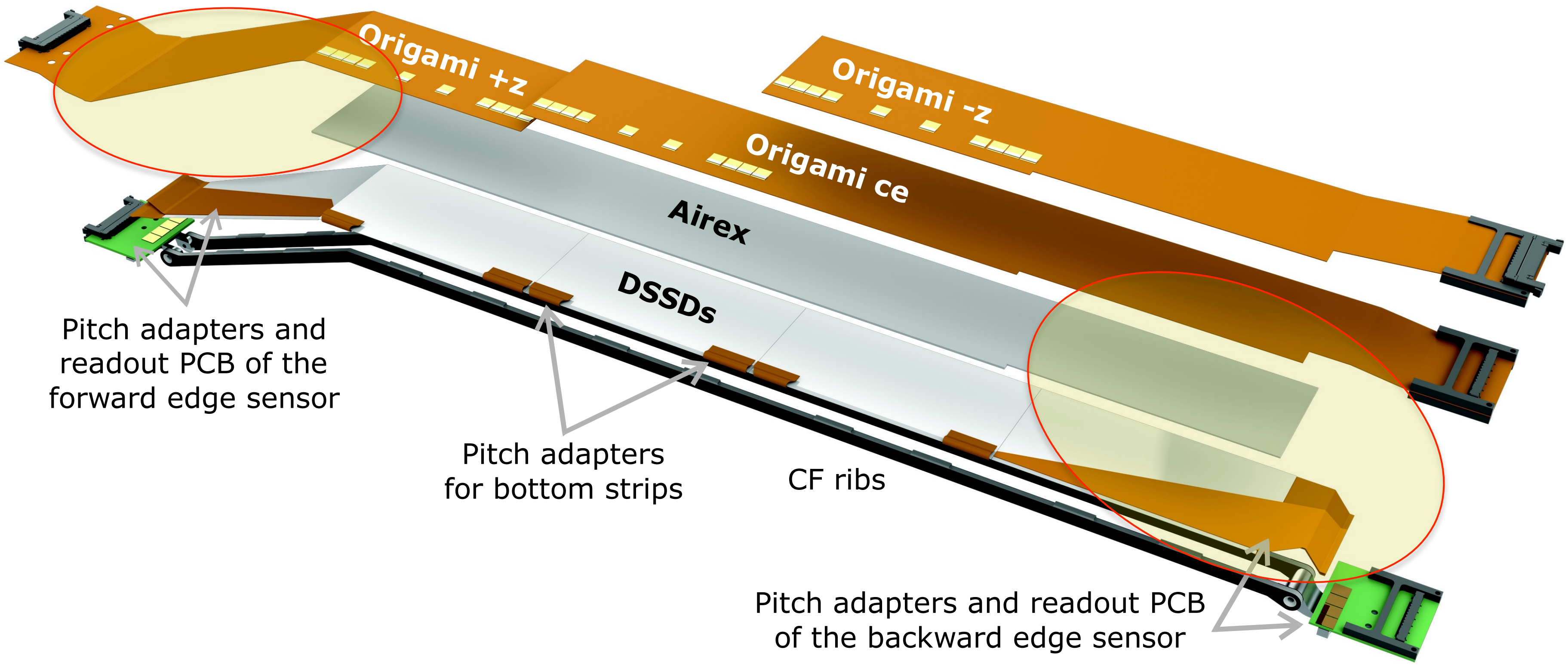
Profilo temporale approssimativo

Radiation	2014				2015				2016	
What	1	2	3	4	1	2	3	4	1	2
Specifications, sign up										
Simulations										
Dosimetry, characterization										
Diamond sensors choice										
Mechanics & cabling design										
Electronics specifications										
Electronics design & proto.										
Overall design, sign up										
Components, procurement										
"final" prototypes (4 ch.)										
BEAST, 1 preliminary tests										
BEAST, 2 complete test (4 ch)										
electronics production & test										
sensors installation & cabling										
electronics installation										

Temperature & humidity	2014				2015				2016	
What	1	2	3	4	1	2	3	4	1	2
T&H Specifications, sign up										
Fibers, mechanical layout										
Fibers, assembly tests (SVD)										
Fibers, multiplexing scheme										
Fibers design sign up										
Procurement, assembly										
installation (PXD & SVD)										
Thermistors, lab tests										
Mechanics & cabling design										
Procurement										
assembly, installation										

SVD-PISA: Forward/Backward Assembly

- Produce single-sensor subassemblies of the forward and backward sensors.
- Connect sensor to pitch adapter, pitch adapter to hybrid
- Ship the tested sensor sub-assembly to the module assembly sites



Status of the FW/BW tools

- Build the L4-5-6 BW and FW assembly (i.e. glue the PA to det's and hybrids and u-bonding) and do their electrical characterization.

  Review FW/BW Assembly Procedures & updates on jigs status, gluing & bonding tests, teststand.

- Safely shipment of the BW/FW assemblies to ladder production sites and sustain a proper production rate

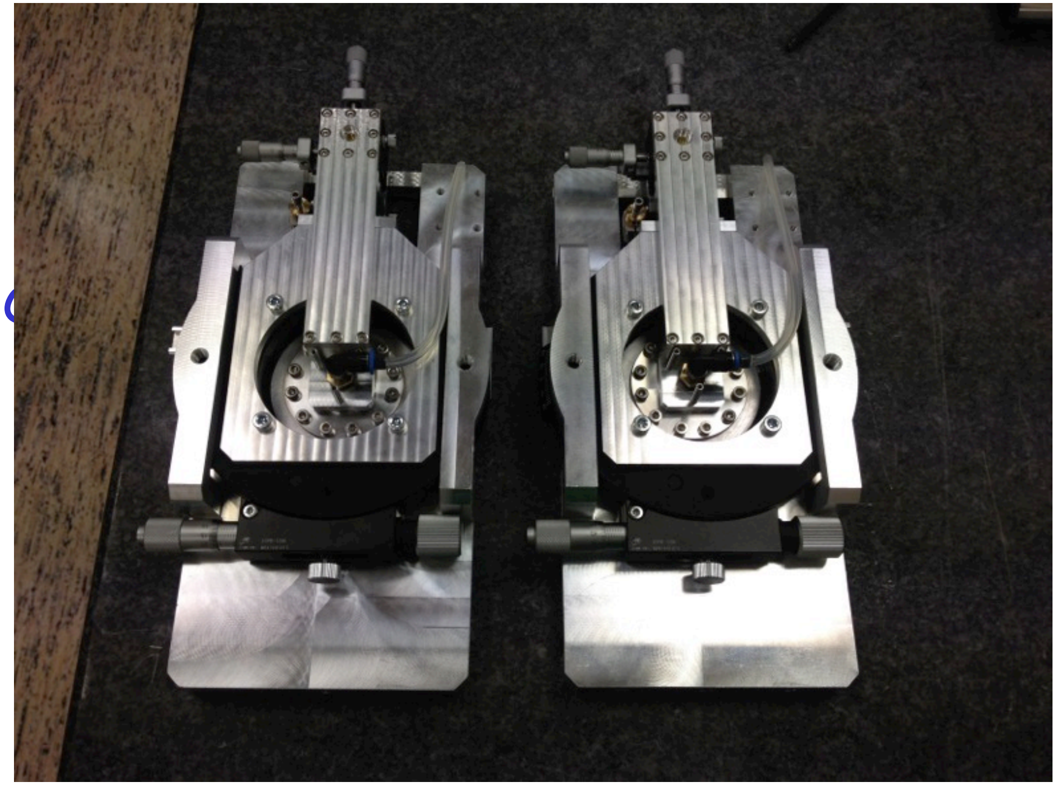
  Multi Purpose jig designed for shipment (bonding & testing during assembly in Pisa).

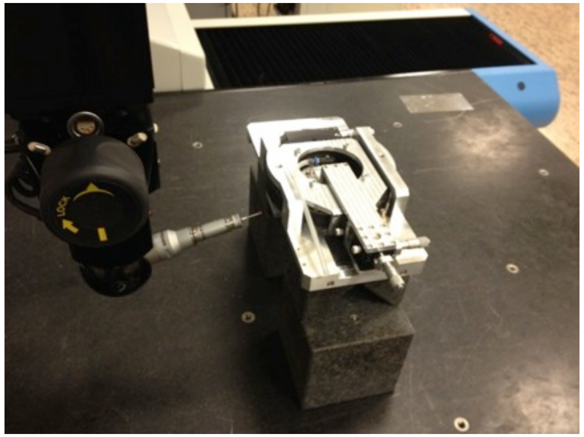
- Align the BW/FW on the assembly bench(es) and go back in stream with the original procedures

  Modified xyz-θ stage built to safely align the BW/FW subassembly with the other detectors on the bench masks

The mod. xyz-theta stages

- One (BW stage) tested OK @ IPMU in June.
- The remaining 3 stages (2FW + 1BW) have been produced, assembled, calibrated and shipped to the assembly sites at the end of July.



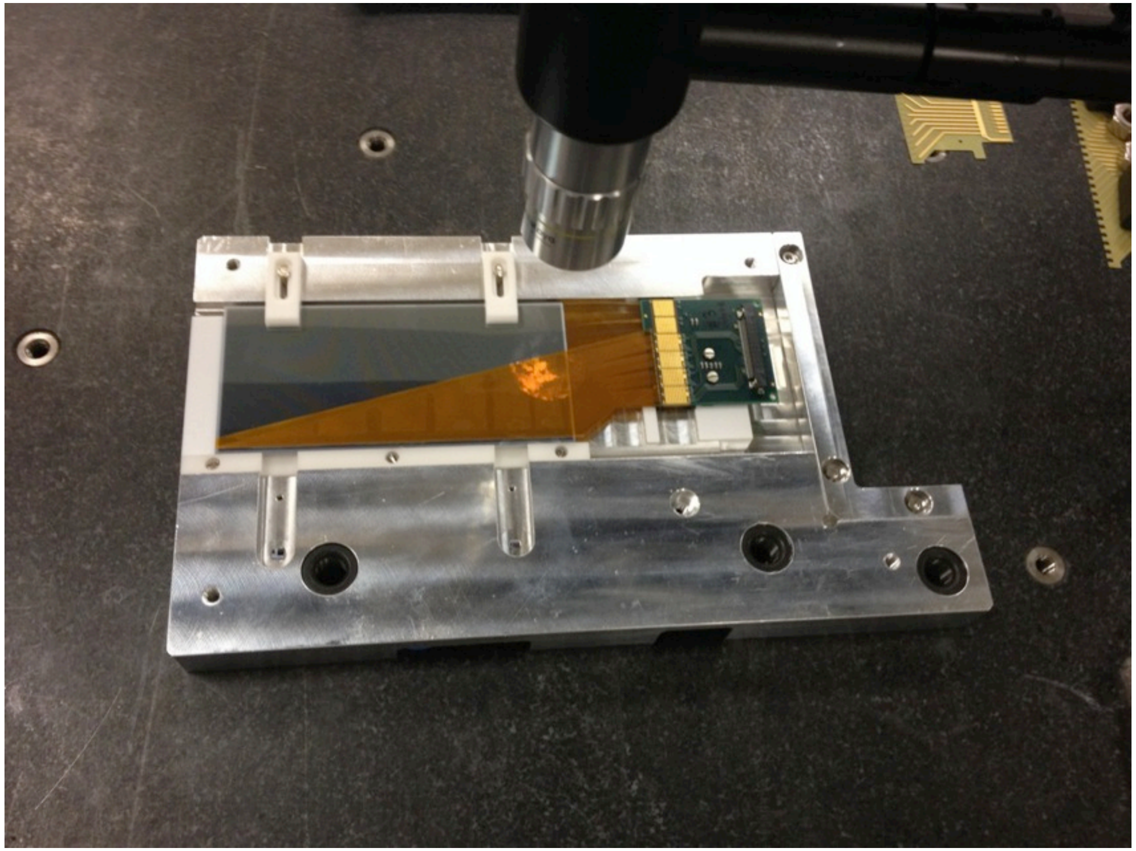


calibration under the CMM

MPC with BW mechanical Assembly

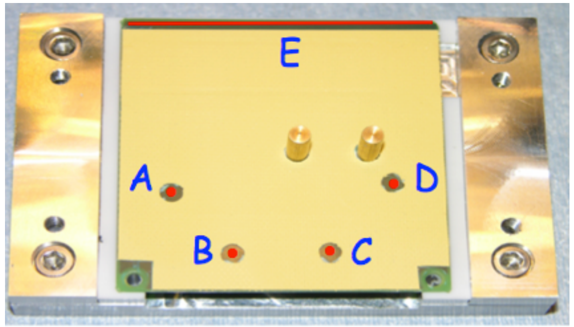
Shipping test successfully done:

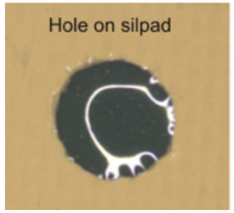
- under survey before shipping
- Travel inside a box as a hold luggage
- Minor modification needed to couple with the transfer jig
- No movement (<3um) recorded at destination

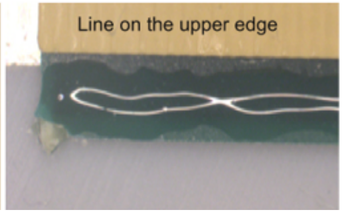


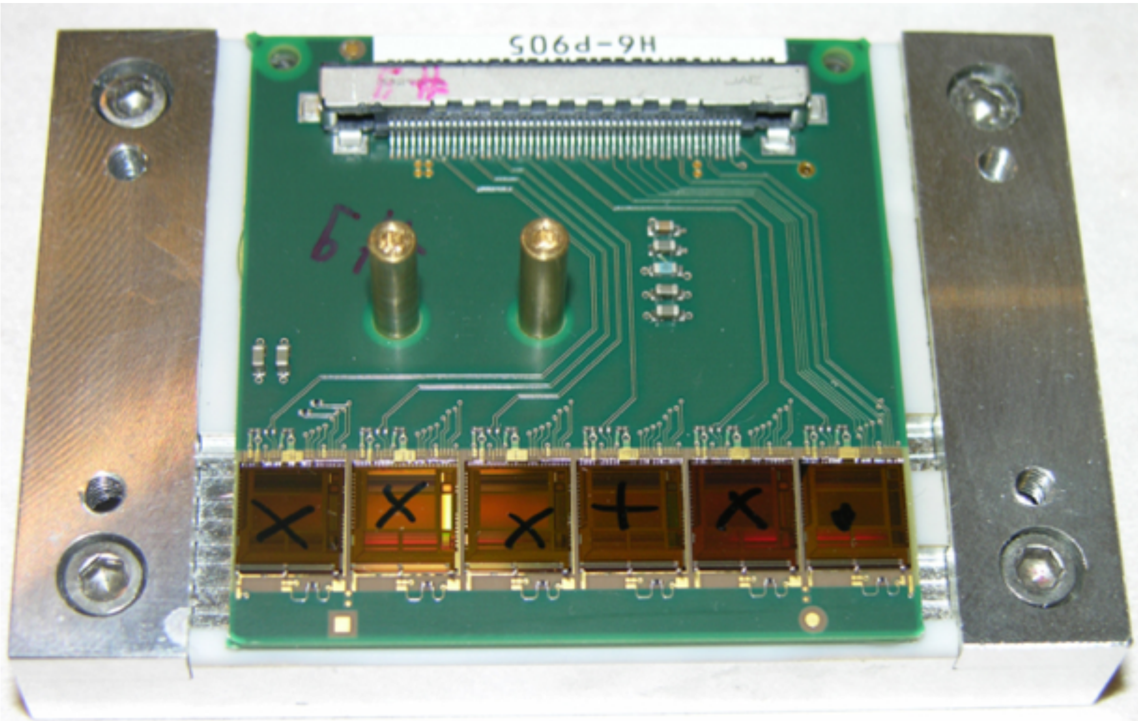
Hybrid gluing mask

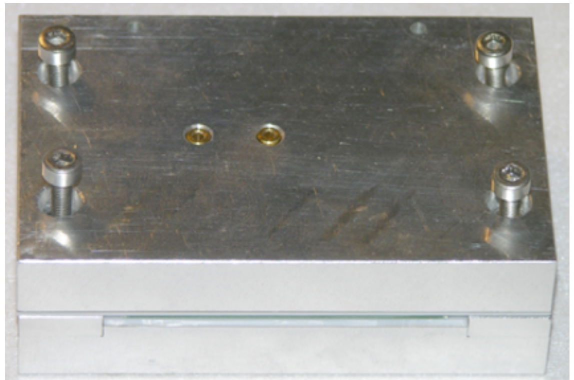
- Single face L4-5-6 hybrids are equipped with chip, u-bonded by Vienna and sent to Pisa.
- The double faced hybrid is assembled by inserting 4 glue dots and 1 line into the SilPad interposer (electrical insulator, thermal conductor), stuck on the n-side.
- The goal is to reach uniformity in thickness.
- Already produced 3FW+3BW (class C) + 1 BW class B double-face hybrids.





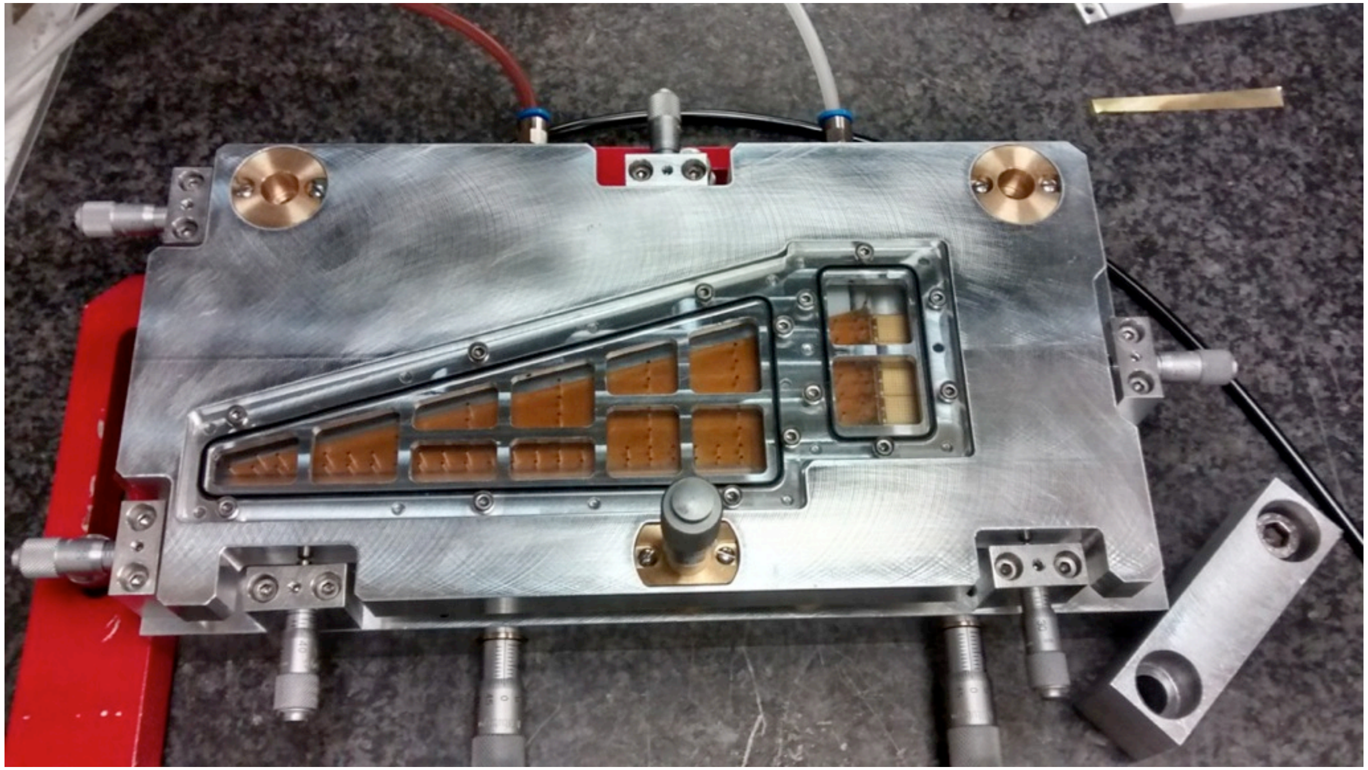






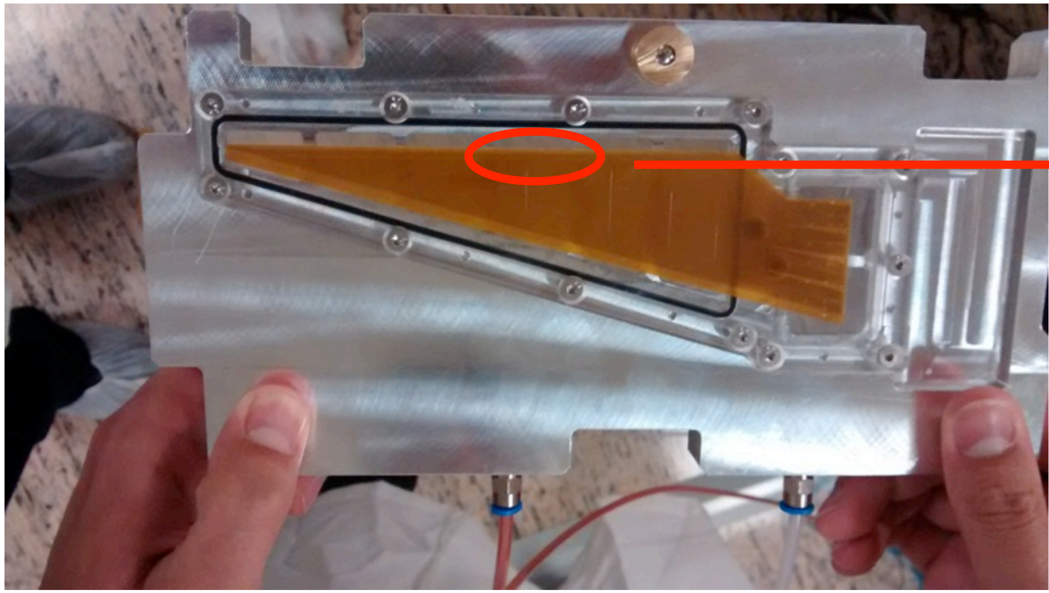
Test of the BW gluing jigs

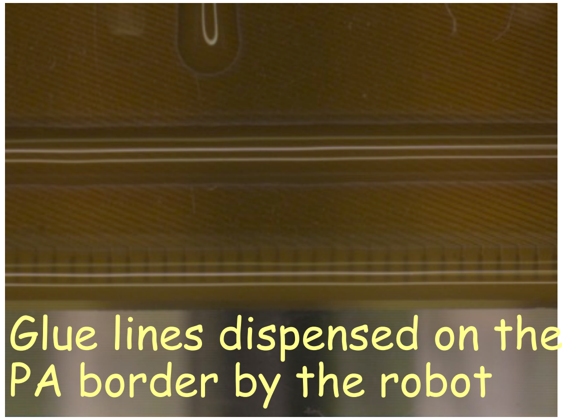
- Realized the BW-z PA chuck and a first gluing on the detector successfully done, proving its functionality.
- Produced and bonded the 1st BW class C assembly
- The 2nd one ready this week.
- Then pass to build the class B BW.

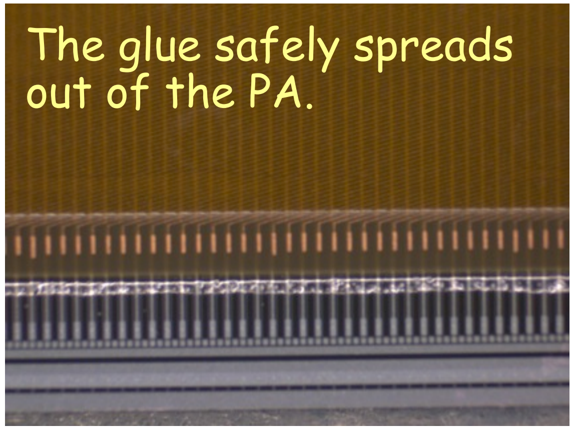


BW PA Z chuck (definitive)

- The PA chuck has been design and machined to allow a planarity of about 20 um over the whole area of the PA (<< glue line height).
- The detector is placed in position by mechanical stops.
- The towers of the detector and the hybrid are raised to reach the PA (held by vacuum) and squeeze the glue. The PA has the border (~1.5 mm) left free, to prevent the glue climbing and spreading between the PA and the chuck.
- Gluing has been successfully realized and the feature of the Z PA chuck adopted also for the phi chuck.







SVD Construction Schedule

Task	Begin	End	
Ladder parts production	14/01	14/10	
FWD/BWD site setup and assembly tests	14/01	14/08	
L3 site setup and assembly tests	14/01	14/08	
L4 site setup and assembly tests	14/01	14/09	
L5 site setup and assembly tests	14/01	14/09	
L6 site setup and assembly tests	14/01	14/08	
Class C prototypes (mechanical)	14/09	14/11	C
Class B prototypes (fully working)	14/10	14/12	B
Class A prototypes (first spare ladder)	14/11	15/01	A
FWD/BWD assembly production	14/12	15/06	FB
L3 ladder production	15/01	15/05	L3
L4 ladder production	15/02	15/09	L4
L5 ladder production	15/02	15/11	L5
L6 ladder production	15/01	15/12	L6
Ladder mount preparation	14/01	15/05	
Ladder mount test & training	15/06	15/08	
Ladder mount 1st half shell	15/09	15/11	1
Ladder mount 2nd half shell	15/12	16/02	2
SVD commissioning and test	16/03	16/04	
VXD integration	16/10	16/11	
VXD commissioning / cosmic run	16/11	17/02	
VXD installation	17/03	17/05	
Beast phase 2	16/10	17/02	B2
Short run period (phase3)	17/06	17/06	
Summer Shutdown	17/07	17/09	
Start of physics run	17/10	17/12	P

The production of FW/BW sub-assemblies will extend up to the summer 2015

FW/BW production schedule 2014

- July - August
  - Complete the production of the remaining assembly jigs and verification
  - Verification of assembly procedure with final jigs
- September
  - Assembly of Class C set (3FW+3BW modules) and pre-prod. components, with bonding → shipment to assembly sites **Beginning of October**
  - Testing of Hybrid board & gluing p and n sides
- October
  - Assembly of Class B set (3FW+3BW modules) electrically functioning, low-quality parts → shipment to assembly sites **End of October**
- November
  - Assembly of Class A set (3FW+3BW modules) final components, electrically functional, high-quality parts → shipment **End of November**
- December: start of FW/BW production (2 FW + 2 BW / week)

FW/BW assemblies delivery plan for the SVT qualification sites and BPAC review (nov. 2014)

For the Pisa pre-qualification (BW only):

(Oct. 4th)

Assembly	Class C	Class B
BW	yes	yes
FW	hopefully	NO

- The 2 BW class C assemblies for IPMU and TIFR
- The 1! BW class B assembly for Vienna

Fabricated with final procedures and jigs.

For the qualification of other sites:

- The FW assembly must be fabricated with temporary jigs
- We plan to produce one class C and one class B by Oct. 15th: in time for IPMU pre-qualification and L5 class B module.
- We are not sure to be able to assemble another Class C for TIFR in time for pre-qualification

  → it can be available in late October.

	Ladder	BW	FW
Test-Beam	L5 (Class B)	4-Oct	15-Oct
pre-qual. IPMU	L6 (Class C)	4-Oct	10-Oct
pre-qual. TIFR	L4 (Class C)	4-Oct	hopefully

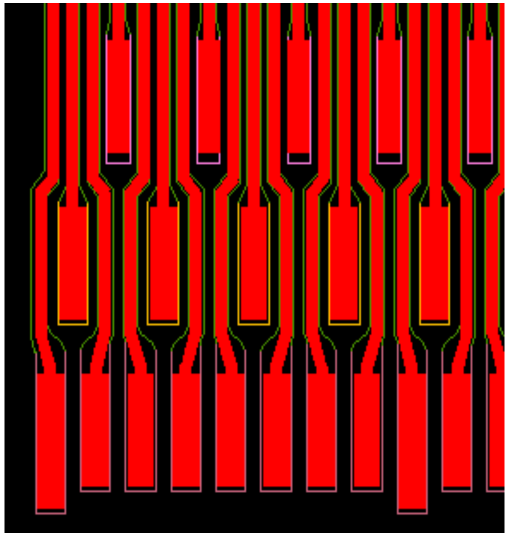
dates: ready in Pisa

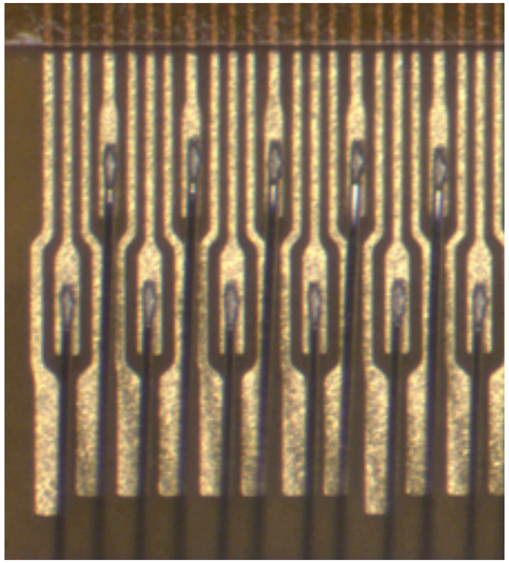
3-Row Pitch Adapter

- Specification
  - Single-layer flex circuit
  - **New Idea:** Split inner row of bond pads into 2 rows → **3 rows of bond pads** in total
  - 3µm Ni plating
  - Bond pad width:

	inner row	middle row	outer row
design	40µm	49µm	50µm
measured	34µm	45µm	42µm

  - First samples received end of May
    - Pad width of inner row at the lower limit (~34µm)
    - Good wire bonding results
    - **Yield ~20 % → acceptable**





Unexpected failure on the cooling system of the clean-room

- At the re-opening of the Institute (25/9) a major problem arose in the clean-room (~600 m^2) forced air system:
  - The heat exchange system experienced a serious failure, preventing the operation of the clean room at the nominal conditions (21°C, 50% RH);
  - The filtering system was not affected
- The maintenance company was soon called and they spotted the failure of the cooling circuit of the refrigerator system.
- Since 25 Aug. the temperature inside is 29→32 °C and RH is 80→90%. The activities in the C.R. stopped:
  - not possible a long stay inside for operators
  - glue behavior (viscosity, curing time) quite different
- Short term solution: use the cold water of the general air-cooling system of the buildings.
- A major maintenance work is foreseen to replace many parts of the cooling system (long term and definitive solution). Major/special request of funds to INFN giunta.
- Despite our efforts to minimize the production downtime to the closing period of the institute, the unexpected cooling problem affected the scheduled works, causing a delay of about one week.

New Power Supplies Option

- Desire to replace the Kenwood Power Supplies
  - More than 10 years old and out of production and maintenance.
  - Little flexibility in granularity because designed for another system
  - Few HV channels:
    - can become a problem with large and/or non-uniform irradiation.
    - individual sensors going haywire may affect a large group of sensors
- Option to use the CAEN Power system
  - Keep the basic LV structure:
    - 8 boxes * (6 board/box) * (2 LV/board) = 96 LV with 5V/10A channels
  - For the HV voltage:
    - 48 HV Channels 100V/1mA, powering each a group of 4 sensors
    - Need fully floating channels that can be referenced to +HV, -HV or GND.
  - Finer granularity would require significant modifications of other electronic boards.

Sta partendo la GARA per il Procurement dei Power Supply (finanziamento 115kE)

- Clausole contrattuali e disciplinare inviato alla giunta per la firma (11/9)
- Subito dopo: lettere di invito alle 5 ditte
- Gara (< 6 mesi)

Nel 2015:

Commissioning dei Power Supply

(x certificazione/verifica del sistema)

Power Supply System for the Belle-II Silicon Vertex Detector

Technical specifications

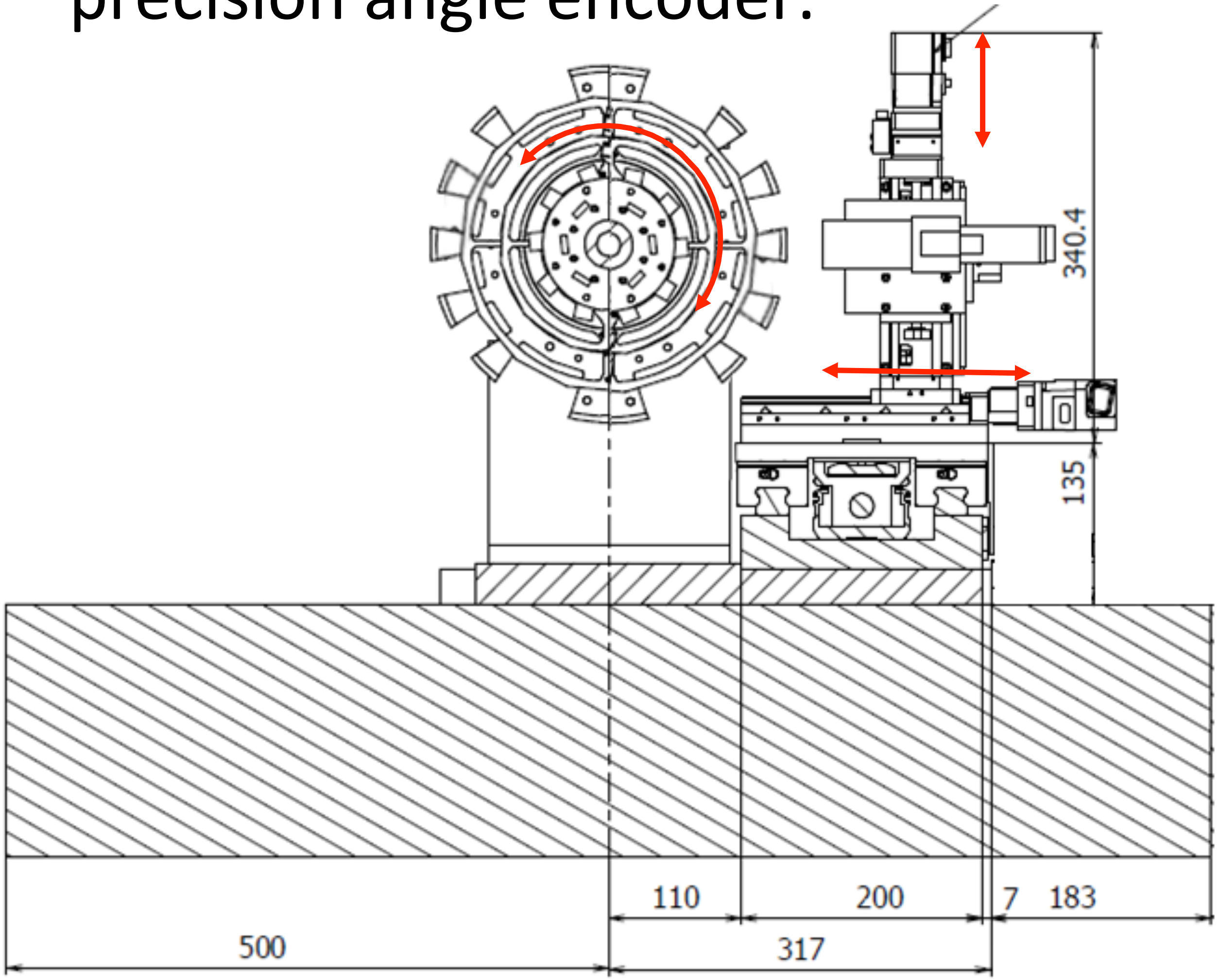
INFN – Pisa

3.3. Verification and certification

Within 2 months from delivery, the system will be subject to a verification and certification by INFN personnel, who will test the system against the stated specifications. Only the positive verification and certification will authorize the full contract payment by INFN.

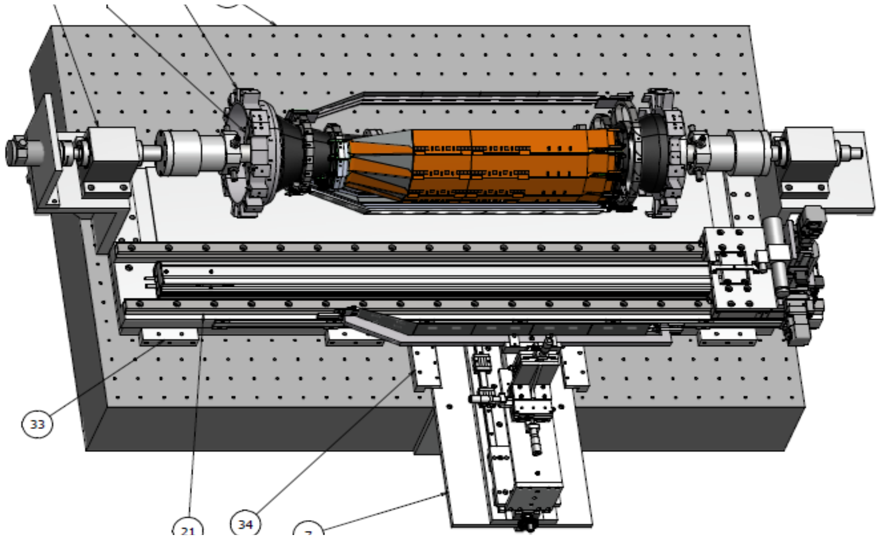
The VXD assembly table (2015)

- The SVD support accuracy will be surveyed with an engineering microscope on a XYZ sliding rail and a high-precision angle encoder.



Model	**SOD10X**
Magnification	x10
Work distance	55 mm
Resolution	1.5 μm
Field Depth	17 μm
CCD size	1/3”
CCD pixels	640 x 480

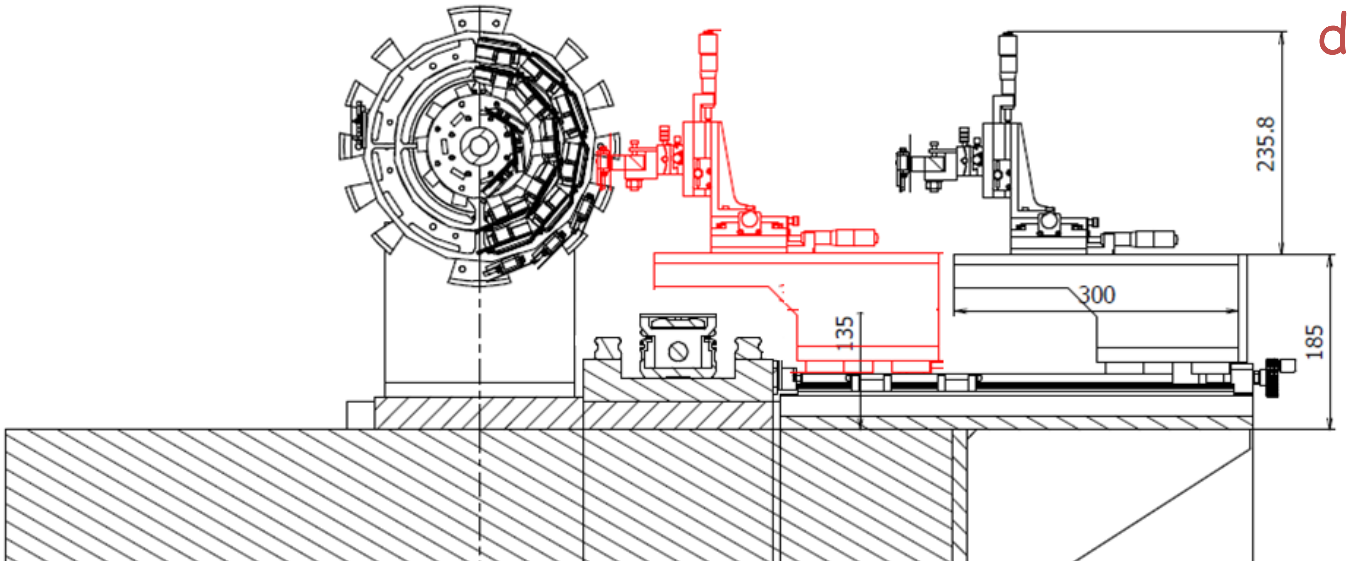
Ladder mount



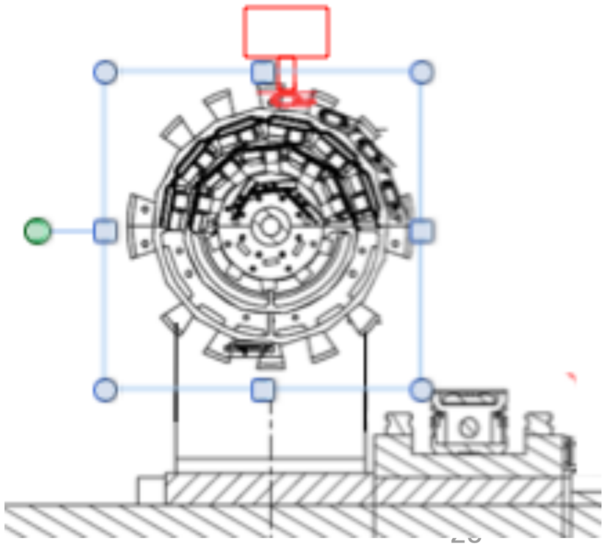
- Clearance between modules:

Less than 1 mm!

Option 1: hold ladders with arm and approach to the end rings by side, insert pins of ladders to the positioning holes.



Option 2: support ladders from top using a sliding guide in vertical direction.



Our concept

- According to our (BaBar-SVT) experience, this is the approach we want to implement:
  - Put the ladder from top, safely held by an arm at the ends.
  - Lower the arm acting on a precise (motorized) actuator, able also to provide a small rotation (pin-wheel geometry)

- The system can be mechanically designed/realized/tested at home, reproducing the essential features on a mock-up and then shipped to KEK.

SVD	PI	consumo	A	meccanica per il posizionamento ladders sui coni	25
SVD	PI	consumo	A	mock-up coni e cooling rings per test posizionamento	10

SVD	PI	missioni	D	1 contatto/prep.installazione moduli 2kE x 2 pers (incl. tecnici)	4
SVD	PI	missioni	D	3 M.U. per installazione moduli	18

Richieste 2015 SVD

Sys	Sede	Capitolo	Categoria	Descrizione	Richiesta
SVD	TS	missioni	A	2 x SVD workshop (2kE) x 2 persone	8
SVD	TS	missioni	A	2 x preparazione/installazione sensori FOS 2kE x 2 pers. (incl. tecnici)	6
SVD	TS	missioni	A	0.5 M.U. beam test DESY 2015	3
SVD	TS	missioni	D	2 M.U. monitoring radiazione a KEK, BEAST fase 1	12
SVD	TS	missioni	C	Coordinamento monitor radiazione e ambientale VXD	2
SVD	TS	consumo	A	contributo consumi e manutenzioni, laboratorio elettronica e officina mecc.	3
SVD	TS	consumo	A	primi prototipi elettronica (radiation monitor e beam abort)	4
SVD	TS	consumo	A	prototipo interlock temperatura basato su NTC thermistors	2
SVD	TS	consumo	A	cablaggi e meccanica per radiation monitors BEAST fase 1	2
SVD	TS	consumo	A	consumi per beam test	2
SVD	TS	apparati	A	24 sensori diamante con montaggio, cavi (3m) e connessione ai "docks"	91
SVD	TS	apparati	A	accoppiatori per fibre FOS	6
SVD	TS	apparati	A	monitoring umidità	10
SVD	TS	trasporti	A	spedizione sensori monitor e cavi	2
SVD	PI	missioni	A	2 SVD workshop 2kE x 4 pers	16
SVD	PI	missioni	D	Installazione/collaudo Power Supply a KEK (2 pers. a 2 kE)	4
SVD	PI	missioni	A	1 M.U. beam test Desy 2015	6
SVD	PI	missioni	D	1 contatto/prep.installazione moduli 2kE x 2 pers (incl. tecnici)	4
SVD	PI	missioni	D	3 M.U. per installazione moduli	18
SVD	PI	trasporti	A	spedizioni FW/BW	10
SVD	PI	trasporti	A	spedizione meccanica tools di posizionamento ladders	2
SVD	PI	consumo	A	consumabili di laboratorio	8
SVD	PI	consumo	A	contributo manutenzioni laboratorio	5
SVD	PI	consumo	A	meccanica per il posizionamento ladders sui coni	25
SVD	PI	consumo	A	mock-up coni e cooling rings per test posizionamento	10
SVD	PI	missioni	C	Coordinamento SVD	5

UPDATE PIANO COMPLESSIVO VXD

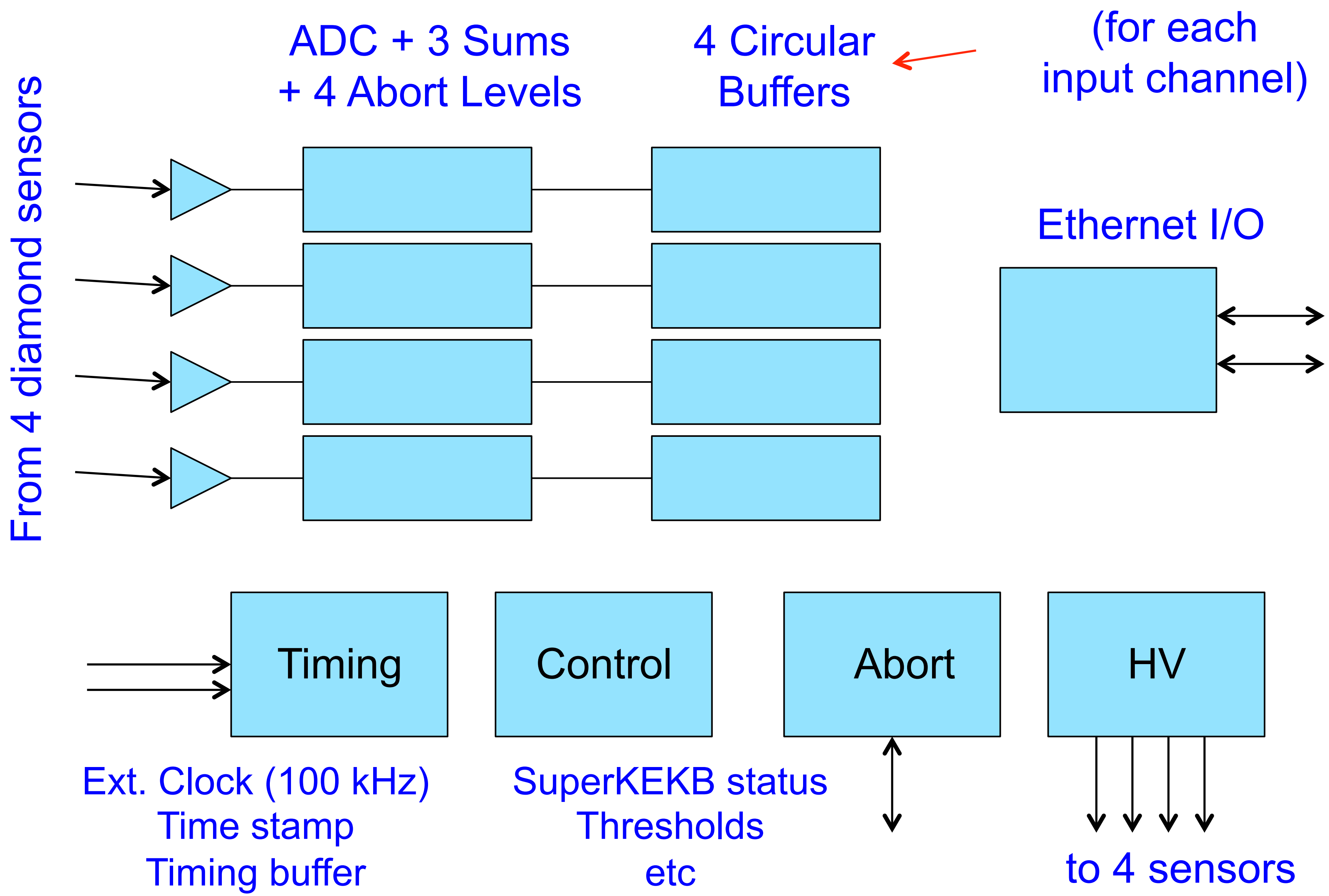
SUBSYTEM	ITEM	Sede	CAT	**TOTAL**	2013	2014	2015	2016	2017	2018
VXD	Monitor radiazione (diam. and electronics)	TS	CORE	**142**	2	11	100	29		
VXD	Monitoring T/Hum & controlli	TS	CORE	**67.5**	0	20.5	13	34		
VXD	Misura sensori wedge	TS	ATTR	**2.5**	2.5	0	0			
VXD	Missioni per installazione + running	TS	MISS	**91**		9	28	18	18	18
VXD	Missioni per Testbeam	TS	MISS	**3**	0	0	3			
VXD	Spedizione sensori	TS	TRASP	**4**		2	2			
VXD	Consumi, manut. lab. e off mecc.+beam-test	TS	ATTR	**5**	0	0	5			
VXD	Jigs per assemblaggio	PI	ATTR	**60**	30	30				
VXD	Setup teststand	PI	ATTR	**6**	6					
VXD	Sensor assembly shipping boxes	PI	ATTR	**25**		25				
VXD	Spedizione	PI	TRASP	**17**		5	12			
VXD	Lab: calibrazione e aggiornamento Mitutoyo di misura	PI	ATTR	**10**	10					
VXD	Lab: consumi costruzione	PI	ATTR	**10**	5	5				
VXD	Materiale per prototipi meccanici	PI	ATTR	**5**	5					
VXD	Power supplies	PI	CORE	**115**		115	0	0		
VXD	Collaudo Power supplies	PI	MISS	**4**			4			
VXD	Contributo systema cooling	PI	CORE	**20**		20				
VXD	Meccanica ladder mounting	PI	CORE	**25**			25			
VXD	Mock-up coni e cooling rings	PI	ATTR	**10**			10			
VXD	Missioni per Testbeam	PI	MISS	**19**	7	6	6			
VXD	Missioni per installazione + running	PI	MISS	**164**	0	18	38	36	36	36
VXD	Missioni coordinamento	PI	MISS	**20**	0	0	5	5	5	5
VXD	**TOTALE VXD BASE**			**825**	**67.5**	**266.5**	**251**	**122**	**59**	**59**

BACK-UP SLIDES

Belle II SVD – Trieste

- Test sensori DSSD, Micron e HPK
- Radiation Monitoring e Beam Abort
  - Sensori diamante scCVD: caratterizzazione, meccanica, cablaggi
  - Elettronica
- Temperature Monitoring & Interlocks
  - NTC thermistors, read-out basato su ELMB
  - FOS fibers
- Humidity Monitoring & Interlocks
- Attività a Trieste, in sintesi
  - Persone, responsabilità, richieste finanziarie per il 2015
  - Profilo complessivo di spesa

Rad.Mon+Abort, 4-channel module



Profilo di spesa (Trieste)

Item	2013	2014	2015	2016	TOT
Initial CORE	5	75	70	0	**150**
DSSD tests	2.5	0	0	0	2.5
Rad.Mon.+Abort (diamonds, cables, etc)	2	7	**96**	10	115
Rad.Mon.+Abort (electronics)	0	4	4	19	27
Temperature Mon. (FOS fibers, offers)	0	**17.5**	**1**	**30**	**48.5**
Temperature Mon. (NTC thermistors)	0	3	2	4	9
Humidity Mon. (very preliminary)	0	0	10	0	10
TOTAL	4,5	31.5	113	63	**212**

Note (dettagli disponibili su uno spreadheet separato):

1) Non inclusi: alcuni prototipi e materiale inventariabile su altri fondi
2) Acquisto di 24 sensori diamante scCVD nel 2015
3) *Spesa imprevista nel 2014, non inclusa: rifacimento dell'impianto di condizionamento della clean room; 2.4 keuro*

ELMB-based read-out

ELMB boards, widely adopted at CERN

64 chan. MUX, 16 bit ADC; CANbus read-out, CANopen read-out protocol

Present status:

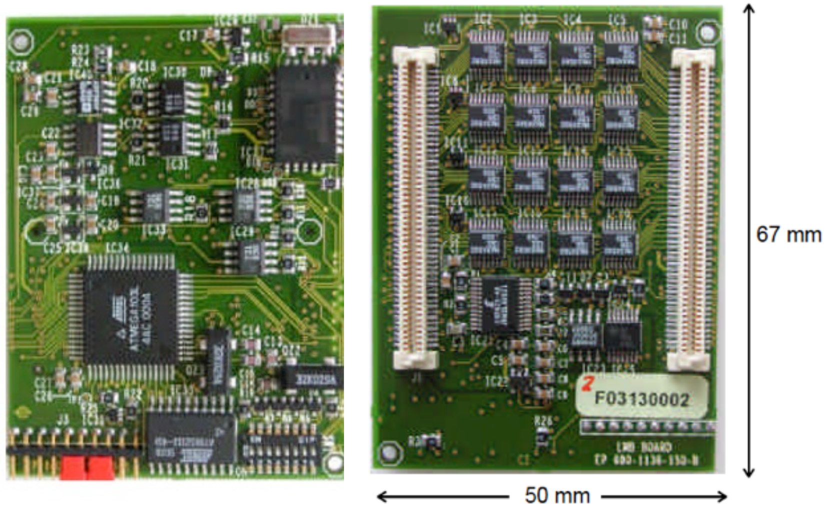
One ELMB board, borrowed from CMS

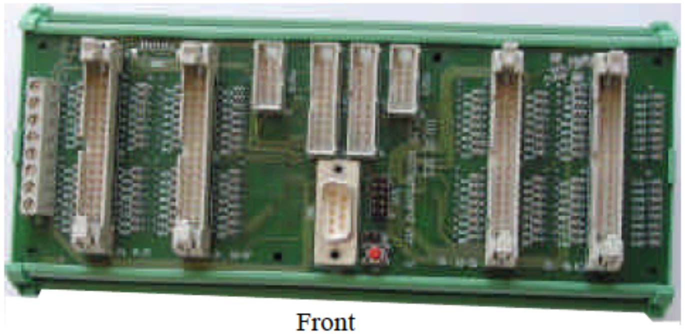
2 motherboards and 10 adapter mini-cards, fabricated based on public CERN design

Read-out via CANbus interface

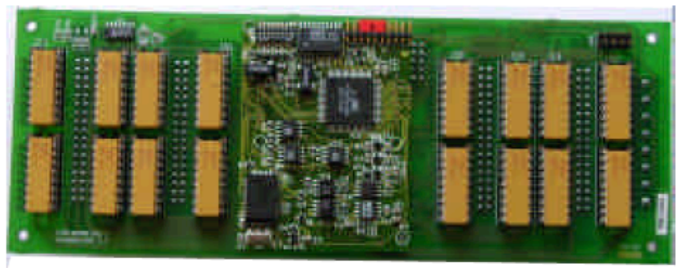
Software packages: installed

LabView test programs: developed and running





Front

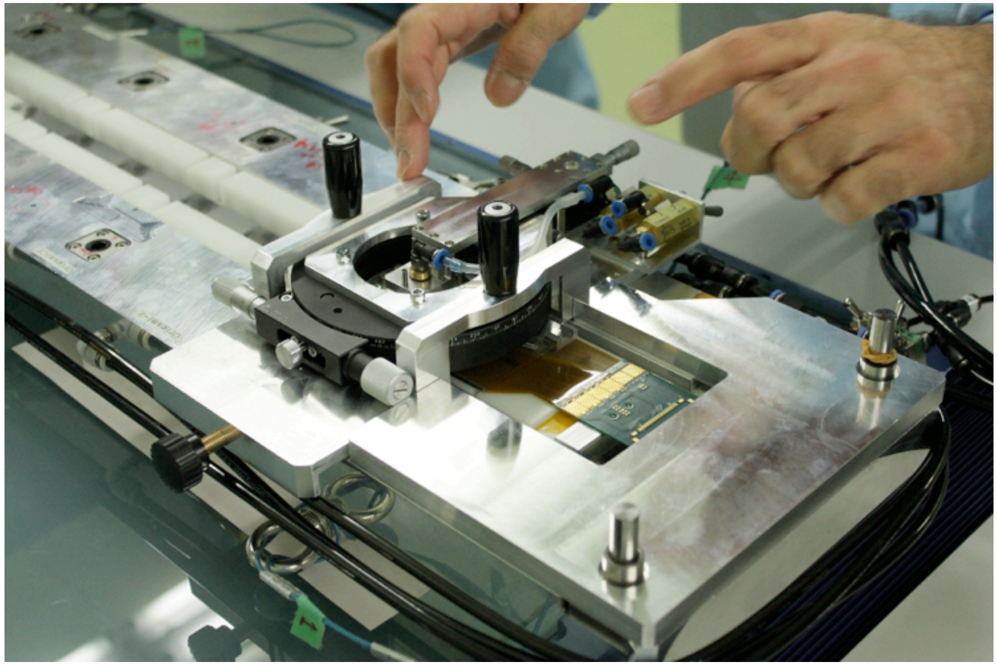


Back

Belle II – Trieste in sintesi

- Partecipanti
  - L. Bosisio 60%
  - L.Lanceri 90%
  - L.Vitale 90%
  - G.Cautero (Elettra) 10%
  - D.Giuressi (Elettra) 10%
  - H.Menk (Elettra) 10%
- Richieste ai servizi
  - Elettronica: 18 m.u.
  - Meccanica: 8 m.u.
- Responsabilità hardware
  - Test sensori microstrip, da Micron e HPK
  - Per VXD = PXD + SVD monitor radiazione e trigger per beam abort
  - Monitor e interlock SVD, temperatura e umidità
- Preventivi 2015
  - Missioni 49 kEuro
  - Consumi 17 kEuro
  - Apparati 107 kEuro
  - Trasporti 2 kEuro

Modified xyzθ stage test @ IPMU



- Succesful test done during the B2GM at IPMU to check the functionality of the jig on the real ladder bench mask and look for possible interference.
  1. Test angle alignment capability
  2. Test capability of positioning to nominal position
  3. Test position when assembly is dropped .

- The jig has demonstrated very good alignment capabilities, it is mechanically compatible with the real bench mask and adds some safety features
  - Minor modifications to improve usability
  - Small rotation in dropping from 250um but (displacement from nominal position ~ 5-15 um is acceptable)
  - No need for bridge to hold the hybrid, since sensor chuck is strong enough.

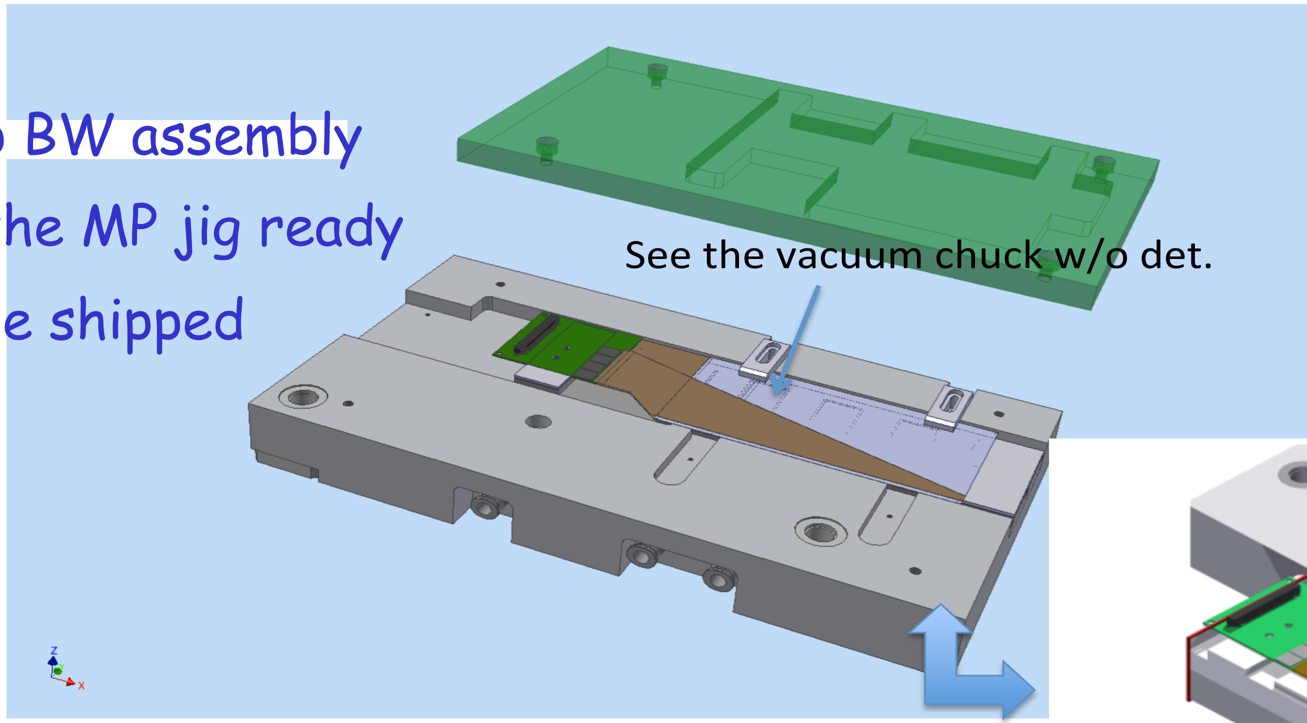
Multi Purpose jig

- The MP jigs are used for bonding/testing & rework operation on both sides.
- It has a holder in which to insert a teflon chuck that can be both phi or z up; the detector can be held with clamps and vacuum.
- The MP jig is also used for the final shipment of the BW/FW subassembly to the ladder construction sites with an appropriate cover.

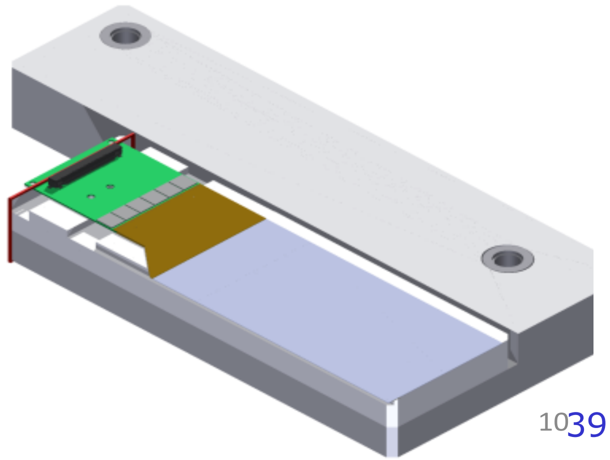
Z-up BW assembly

On the MP jig ready

To be shipped



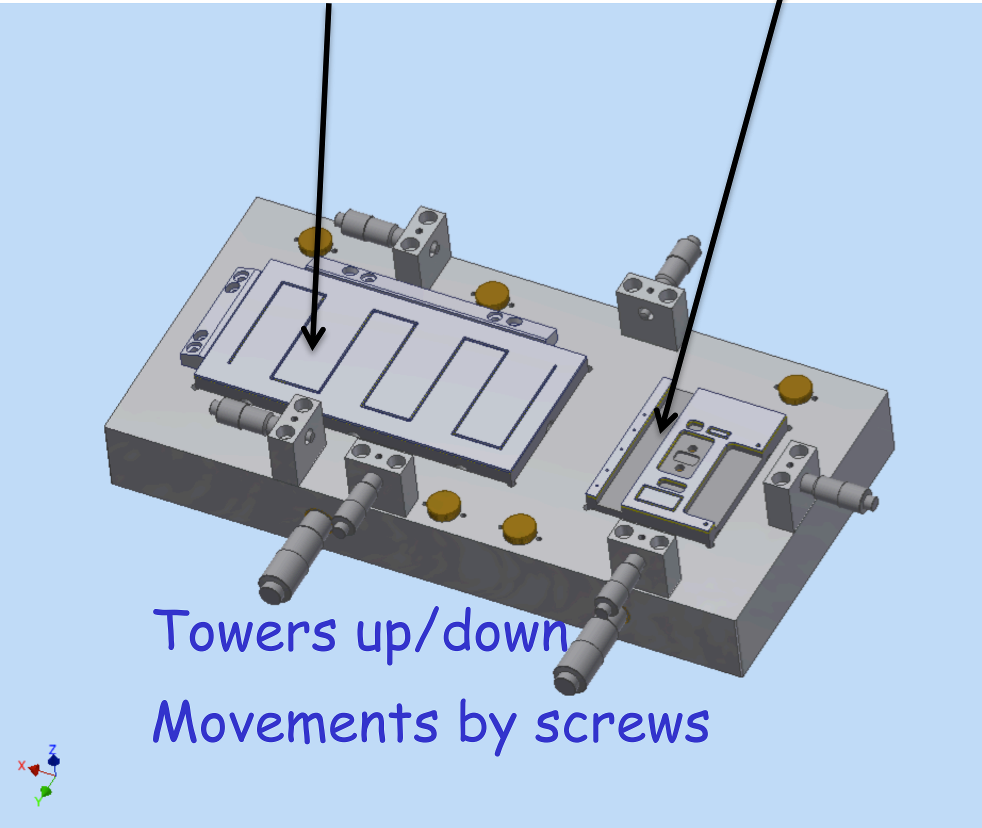
To be used with PB2 chuck to take the BW assembly and place tha the assembly bench



The final design of the Gluing jig (BW-phi)

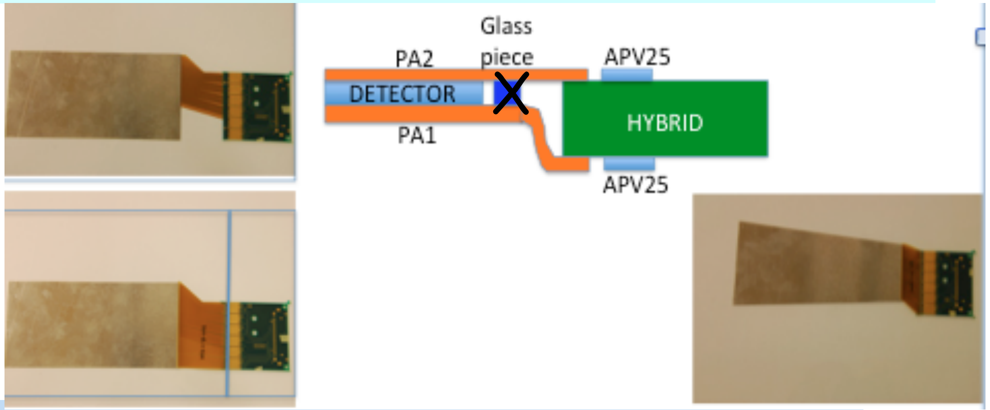
Hybrid tower

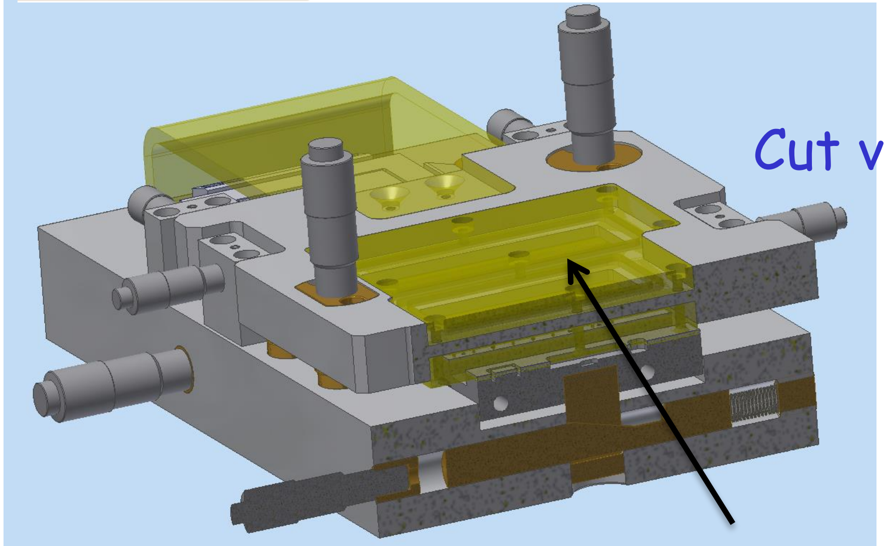
Detector tower



Towers up/down

Movements by screws





Cut view

PA chuck

Other (similar) 3 jigs are required for BW-z, FW-phi and FW-z.

Milestones

- July 2014
  - Finishing L4-L6 hybrids assembly
  - Delivery of first 3-row pitch adapters (all variants)
- August 2014
  - Finishing L3 hybrid assembly
  - Finalizing assembly sites preparation
- September 2014
  - Class C prototype of FWD/BWD modules and L3 ladder
  - First version of construction database
- October 2014
  - Production of class C prototypes
  - Class B prototype of FWD/BWD modules and L3 ladder
- November 2014
  - Production of class B prototypes
- December 2014 – February 2015
  - Start of ladder production

FW/BW assembly plans 2014

- For BW modules we have the final jigs and we can assemble both class C and B in September as planned
- For FW modules we rely on temporary jigs
  - Not good for Pisa site qualification but needed to allow other sites to proceed and to produce class B module for the beam-test
  - Slower and less accurate procedures
- Still, the FW and BW MP chucks are necessary for wirebonding/testing and shipping