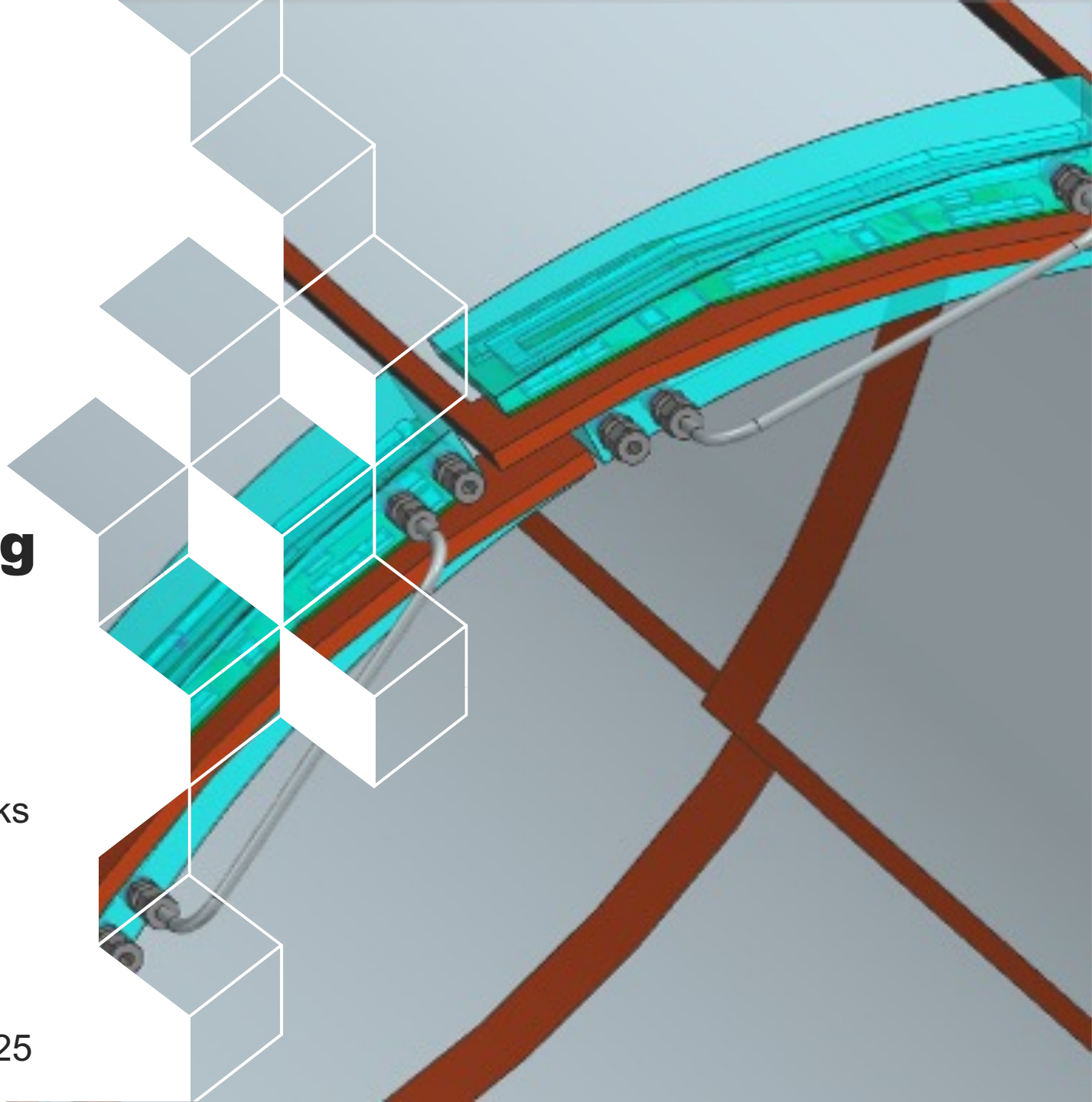
MPGD FEB cooling meeting

Alain Delbart

- ❑ Goal of the meeting – agenda
- ❑ Status of FEB/SALSA (Irakli)
- ❑ Status reports – discussion on the on-going works (Seraphin, Seung Joon, Stefano)
- ❑ Discussion on development plan(s) – next steps



MPGD FEB cooling meeting, 17 september 2025

Goal of the meeting & agenda

- Share our current knowledge of the Front-End Electronics design (Irakli)

→ Components, interfaces, form-factor. Identify inputs needed for cooling simulations and for development plan of FEB design & FEB cooling

- For each MPGD : status report on on-going activities related to FEB cooling simulations, integration on detector and in EPIC (Seraphin, Seug Joon, Stefano)

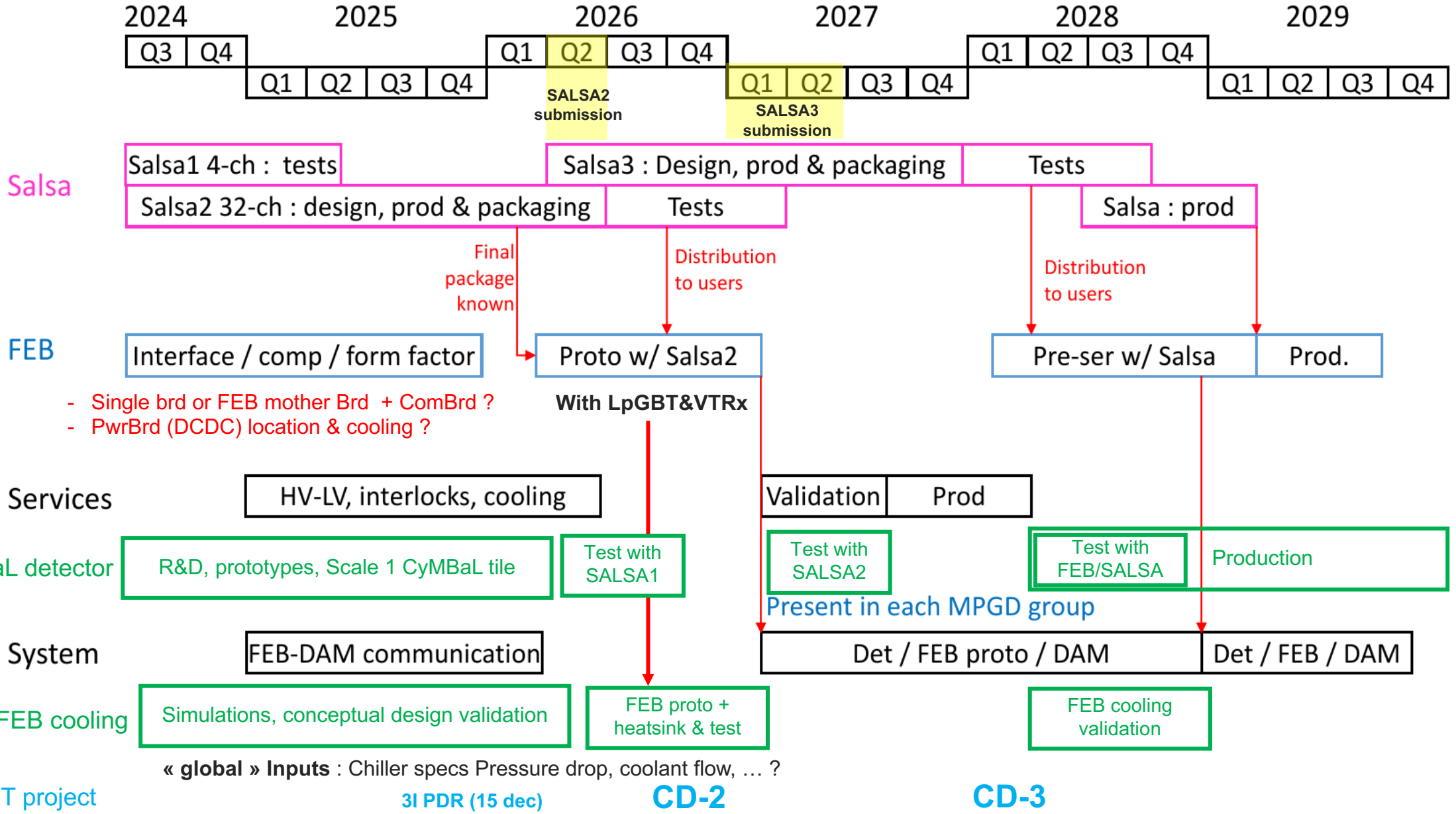
→ Identify the specific constraints of each MPGD regarding FEB integration & cooling

- Discussion on development plan

→ Major milestones for design, production and tests of FEB “mechanical design” and cooling, including “external” interfaces (VTRx&LpGBT components, DC/DC converters, cooling chiller, …)

https://indico.bnl.gov/event/29826/

SALSA/FEB/CyMBaL Timeline



Detector parameters and services update

(in the 2 on-line sheets : « Detector parameters and services document » & « ePIC.Interface Control Document for Services052023)

Barrel Inner MPGDs Services

Person to contact - A. Delbart / I. Mandjavidze / S. Vetter
F. Bossu / F. Jeanneau

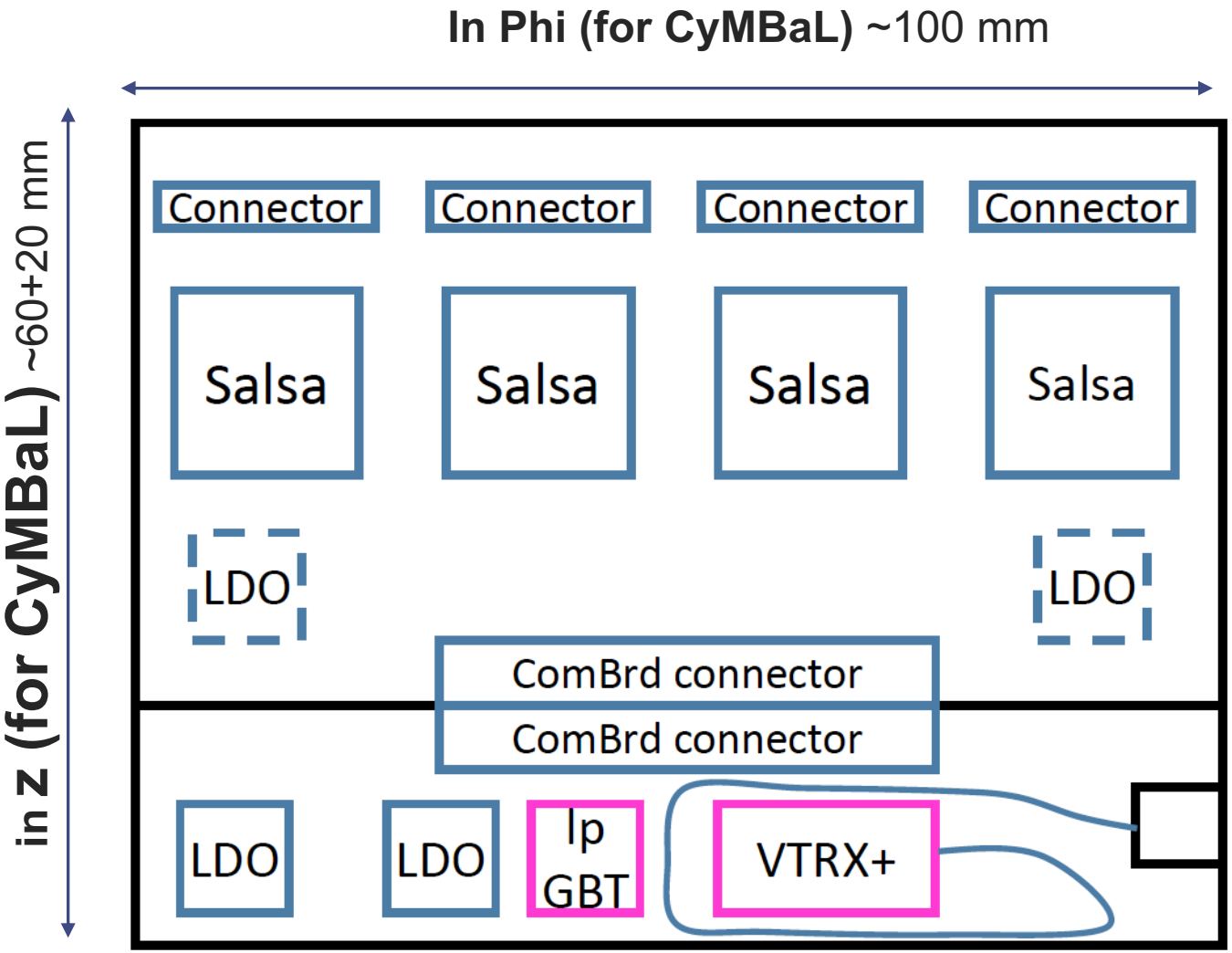
Cables, Fibers, etc.

Item	Description	Quantity	Diameter	Estimated Length	Notes	Assumptions
FEE data	VTRX+ MPO parallel optical fiber	144	connector 10mm To DAM		https://suddendocs.samtec.com/catalog_english/ecue.pdf	
~~RDO data~~	~~FEE optical fibers~~	~~72~~	~~3.2mm~~	~~TBD~~	~~hypothesis: 2 FEB for 1 RDO; **TBD;** MTP® 12 (Male) to MTP® 12 (Female) OM4 Multimode Elite Trunk Cable, 12 Fibers, Type B, Plenum (OFNP), Magenta~~	
HV cables	HV cables to patch panel	144	3.2mm	to patch panel	HTC-50-1-1, 0.5Lz/1.5, CEH50 Dakra; to patch panel Max volume occupancy: 3 x OD 3.2mm cables per tile	Max volume occupancy
	1 drift + 2 resistive					
HV cables	HV cables from patch panel to Rack	TBD (example. ten 9-channel HV cables)	TBD	TBD	possibly high density cables.	
LV cables	**From DC/DC** to FEB	144	0 / 4 to 5.5 mm	0/ 0.3 to 1 m	Alpha Wire 3464C (<0,3m), 6328 (0,3-0,5m), 2414C (upt to 1m)	
LV cables	From LV PS **to DC/DC**	144	6 mm	TBD	Alpha Wire 2424C	Alpha Wire 2424C
DCDC	step down DC voltages at patch panel?	TBD	TBD	TBD	DCDC are need to step down voltages efficiently. At the patch panel?	
Gas tubing	inlet and outlet each 2 modules in serie	24 IN / 24 out	4mm	TBD	https://www.mcmaster.com/5384K524/	2 tiles in series
Flat cables	flat cables from modules to FEEs	1152	1mmx20mm	10cm / 50 cm	within the CYMBAL envelop	

Cooling, etc.

Item	Description	Quantity	Diameter	Estimated Length	Notes	Assumptions
Cooling tubing	Cooling tube to FEEs, N FEE in series TBD	24 IN / 24 out (if 6 FEBs in series)	6.25mm	TBD	https://www.mcmaster.com/5648K74/	6 FEBs in series

FEB form factor and known specifications



CyMBaL constraints

- **In Phi :** FEB width < 105 mm
- **In Z :** CyMBaL tile service area = 6 cm
  → Overlap with active area …
- FEB + heatsink **thickness** to fit in envelop
- restricted space for FEB & services I/O, especially @ 3&9 o'clock GST support bars