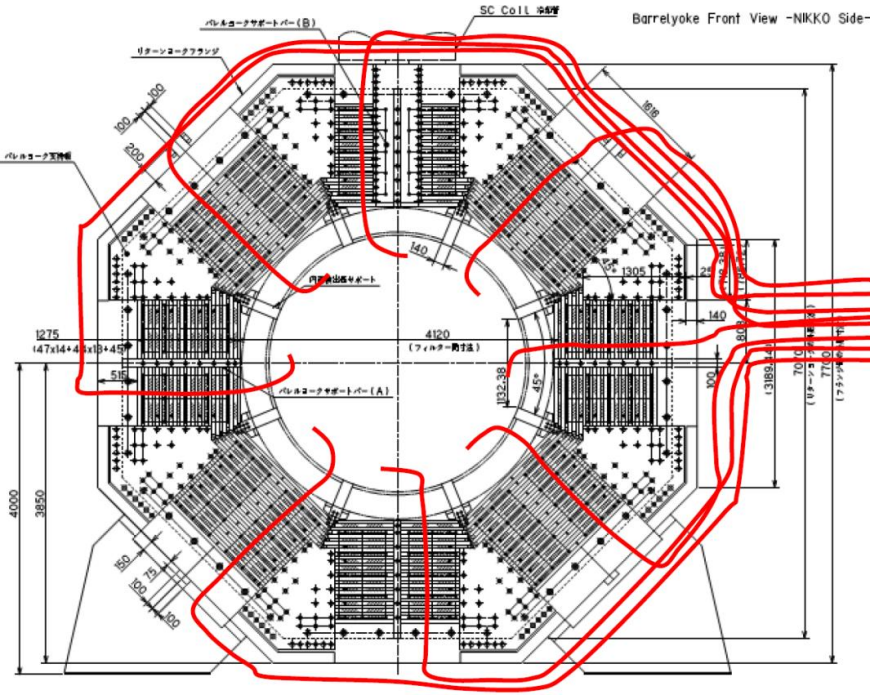
TOP services

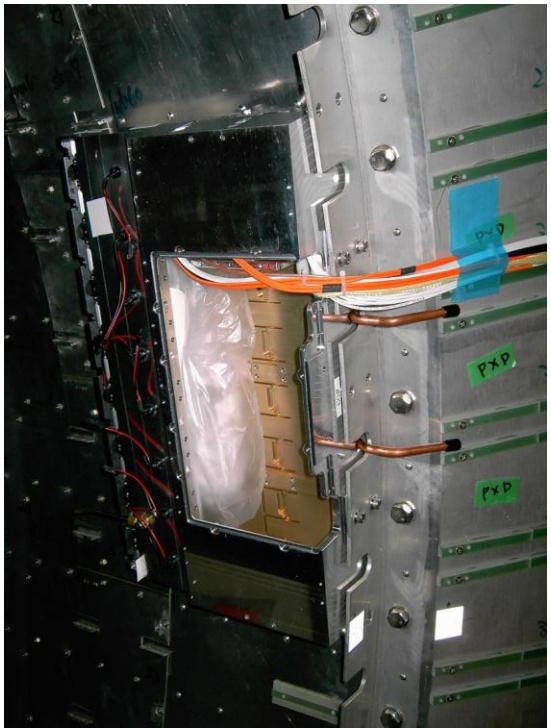
- cables, pipes -

2015/7 K.Inami (Nagoya)

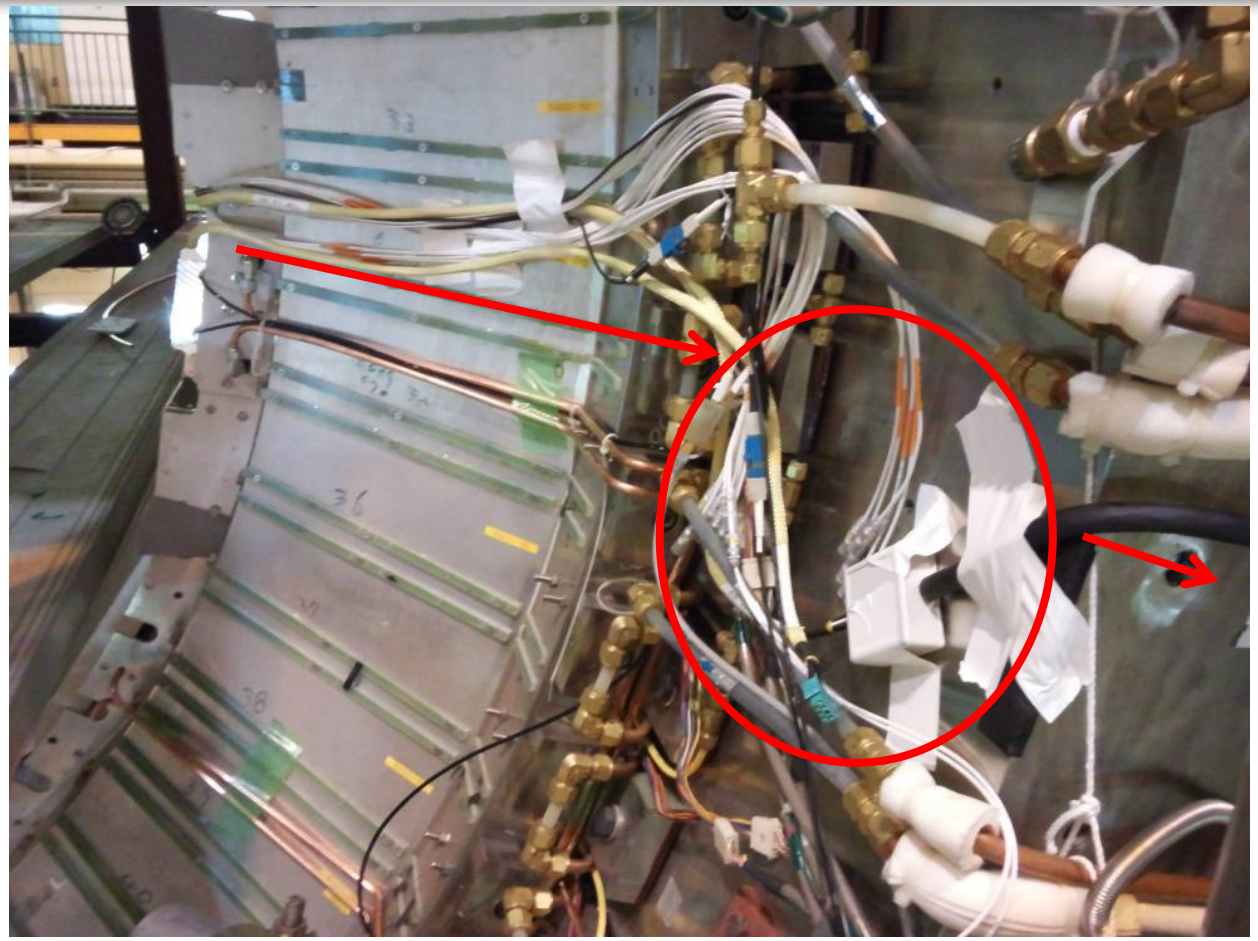
Cables for front end/HV

- For each TOP modules:
  - 32 HV wires (RG-316 size) probably bundled
  - 4 LV bundles (~15 mm diameter each)
  - 8 CAT-7 cables
  - 4 Electronic charge injection cables (RG-316 size)
  - 8 Optical fibers for readout (really 16, but each fiber has a pair)

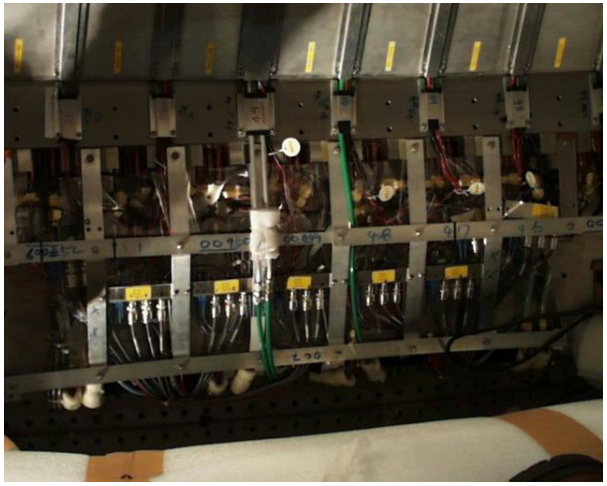




Pigtail connectors

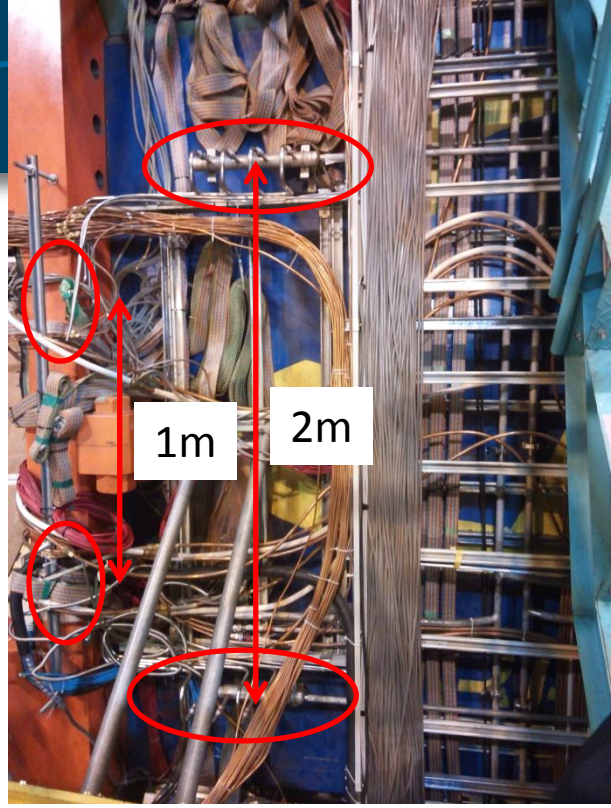


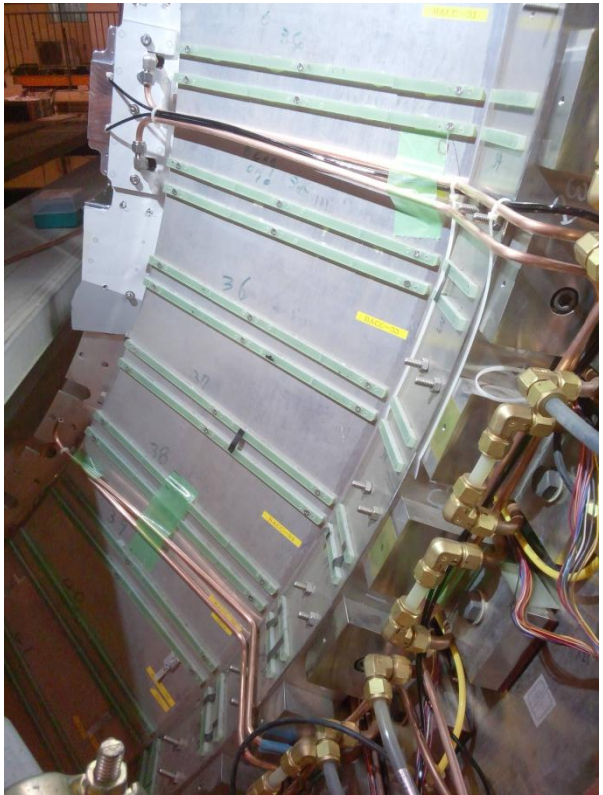
Route straight out over ECL, put patch connectors in the cage (as Belle-TOF did), then straight out of detector (Cables for inner detectors run over the cage)



Cooling

- Reuse old ACC pipes from E-hut to detector outside
  - 4 pairs of ACC manifolds. Each manifold for 4 modules.
  - Pipe 12.7mmϕ → 8mmϕ at around ECL-magnet wall
- Pressure drop estimated
  - Difference of flow late for fixed pressure is small.

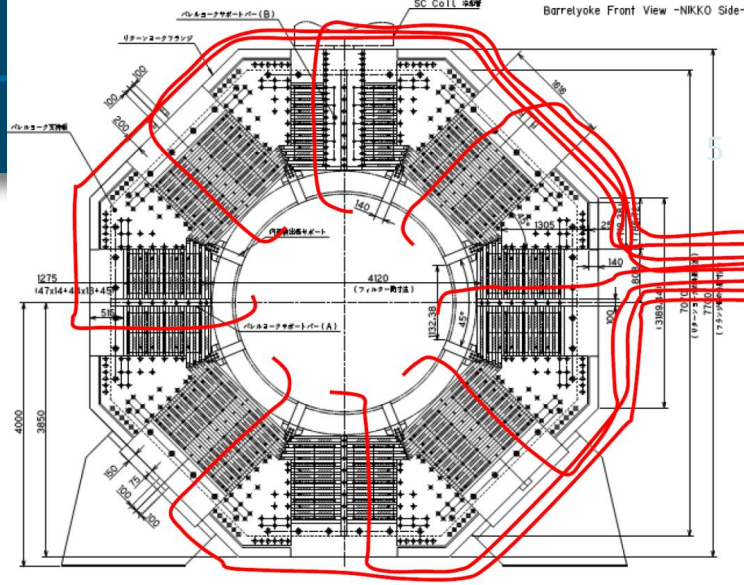




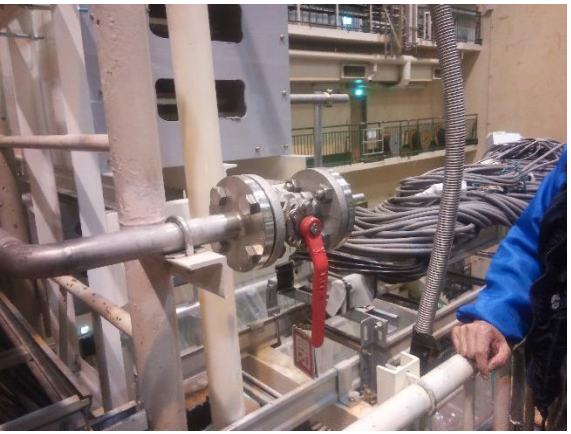
Pipe Run	Pipe ID (mm)	Effective Length (m)	dP (UPDATED, psi)
E-hut to Belle	17.5	55.3	1.5
Around KLM	17.5	11.6-37.2	0.3-1.0
KLM to ECL	10	8.9	0.3
ECL to TOP	**6**	**5.1-6.4**	**2.0-2.5**
Cold plate	6	7.0	2.3
Total			**6.4-7.6**

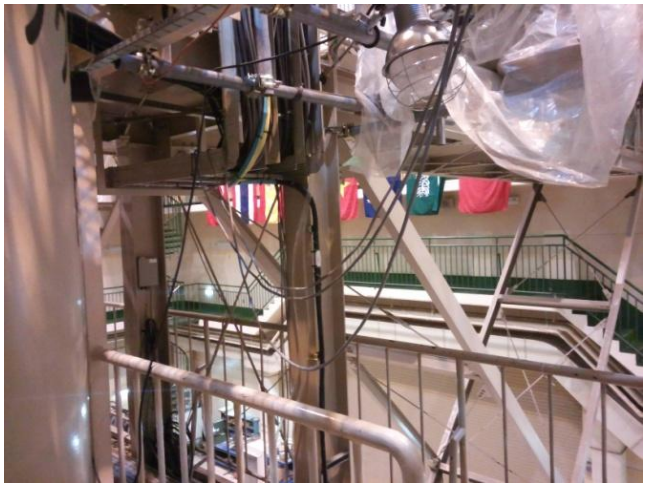
High purity N2 gas

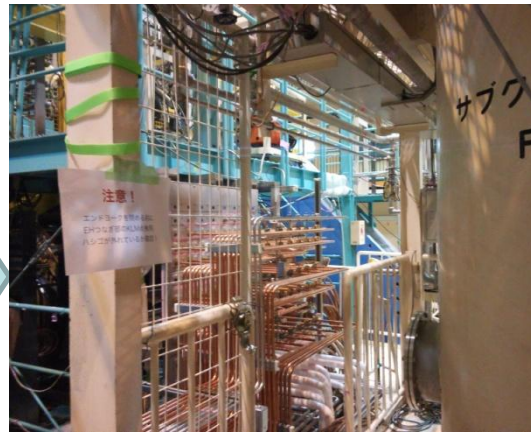
- Forward(in)/backward(out)
  - Need 1/4" SUS pipe x 16 x 2(F/B) around Belle



- N2 gas provided from liquid N2
- Put gas panel at the side of detector







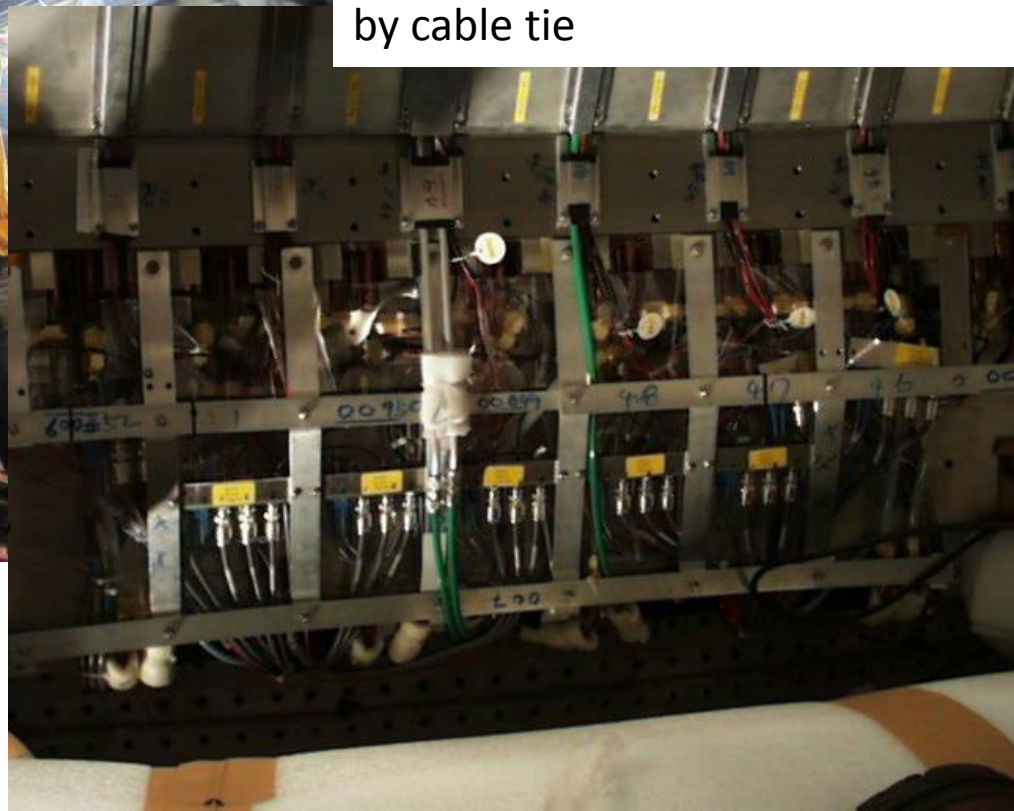
Cable size

	Amount	Size, spec.	Area/module (cm^2)	Connector	Area/module (cm^2)
Pure N2 pipe	16 x 2(F/B)	1/4“ SUS	0.32	-	-
Cooling pipe	32 (B)	8~12mmϕ Cu	1~1.2	8-12mm joint	2.3
HV cable	512 (B)	RG-316 size	26.6 (→~30)	1cm^2	32
LV cable bundle	64 (B)	~10→~14mmϕ		8?cm^2	32?
Cat-7 cable (clock, etc.)	128 (B)	Cat-7		3cm^2	24
Calibration signal cable	64 (B)	RG-316 size		~0.8?cm^2	3.2
Readout fibers	128 (B)	Ethernet fiber		1.4cm^2	11.2
Calibration fiber	24 (B)	~5mmϕ	0.3	14cm^2	14
Dry air pipe	16 (B)	~6mmϕ	0.3	-	-
Total			28.5(→33) +α		118.8+α

Belle case

Cage on the area
  TOF and ECL cables inside cage
Cover TOF connectors

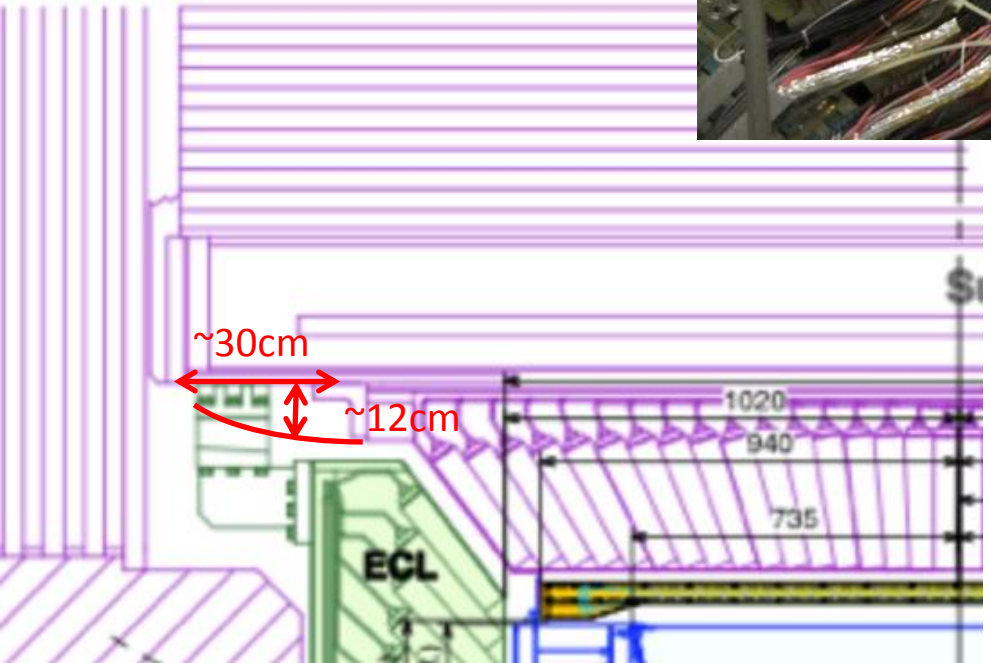
Fix ACC/CDC/SVD cables to cage by cable tie

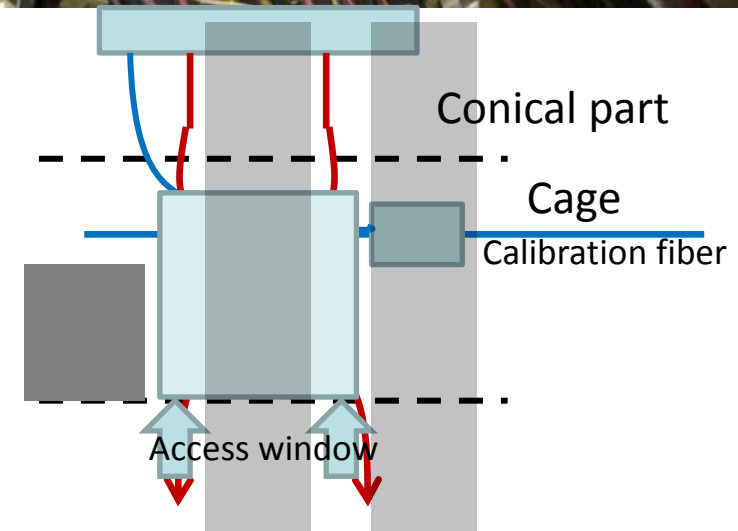


On Belle II

Put cage as well
Put calibration laser box and cable connectors inside cage
Pass through line
Put covers on ECL conical part to protect fibers

(30x12)/2? x90 cm^3
= (180?)cm^2 x 90cm





N2 gas system

- Currently, N2 gas system is running at Fuji hall for module production
  - Achieved dew point is <-90 deg-C.
- Will build similar system at Tsukuba hall
  - Max. flow rate: 1L/min/module
  - Filter, regulator
  - <1kPa at the module
  - Monitor dew point and flow rate