

OEC Integration Workshop

Design of the PP1 Cabling and dress-up in SR1

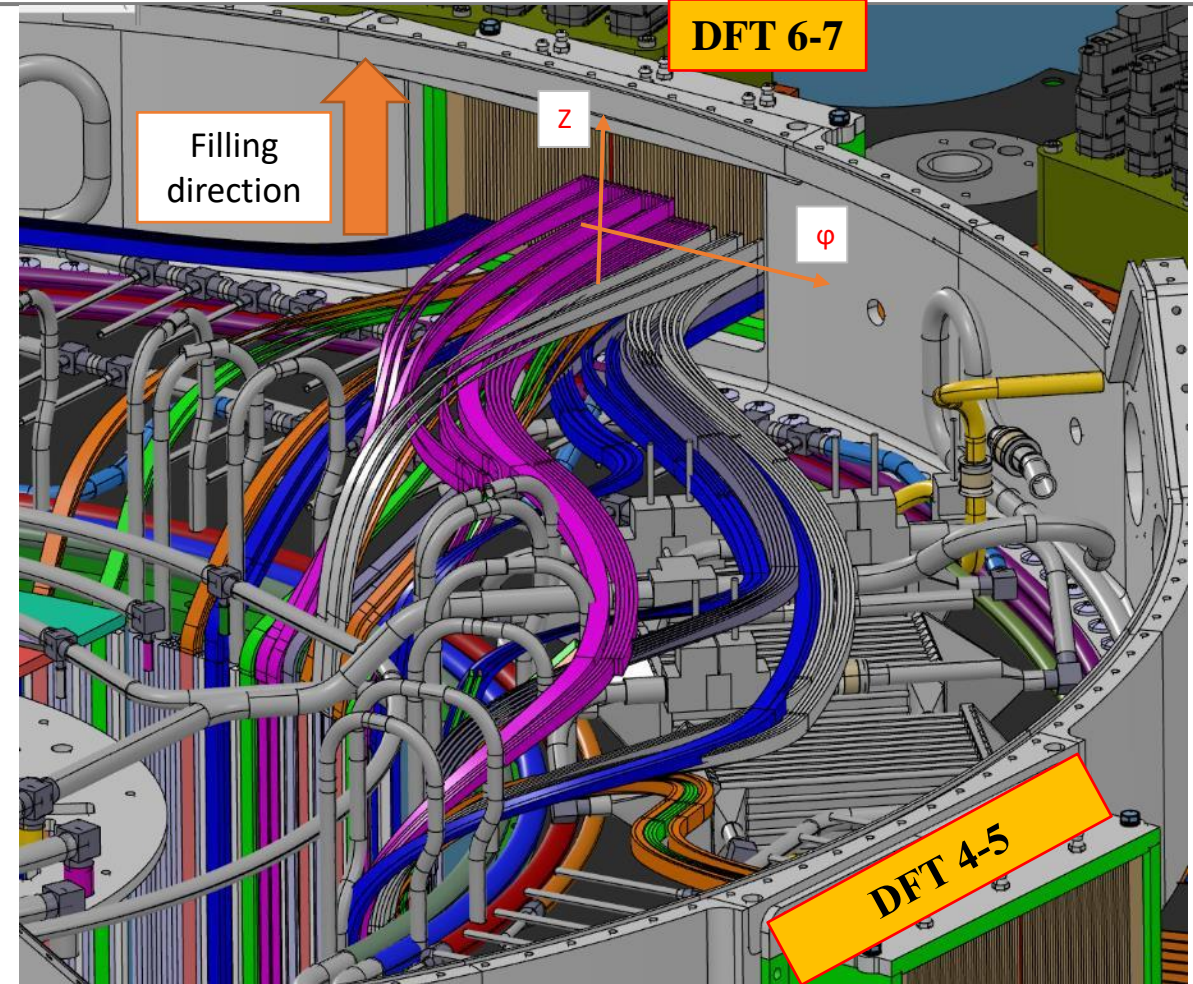
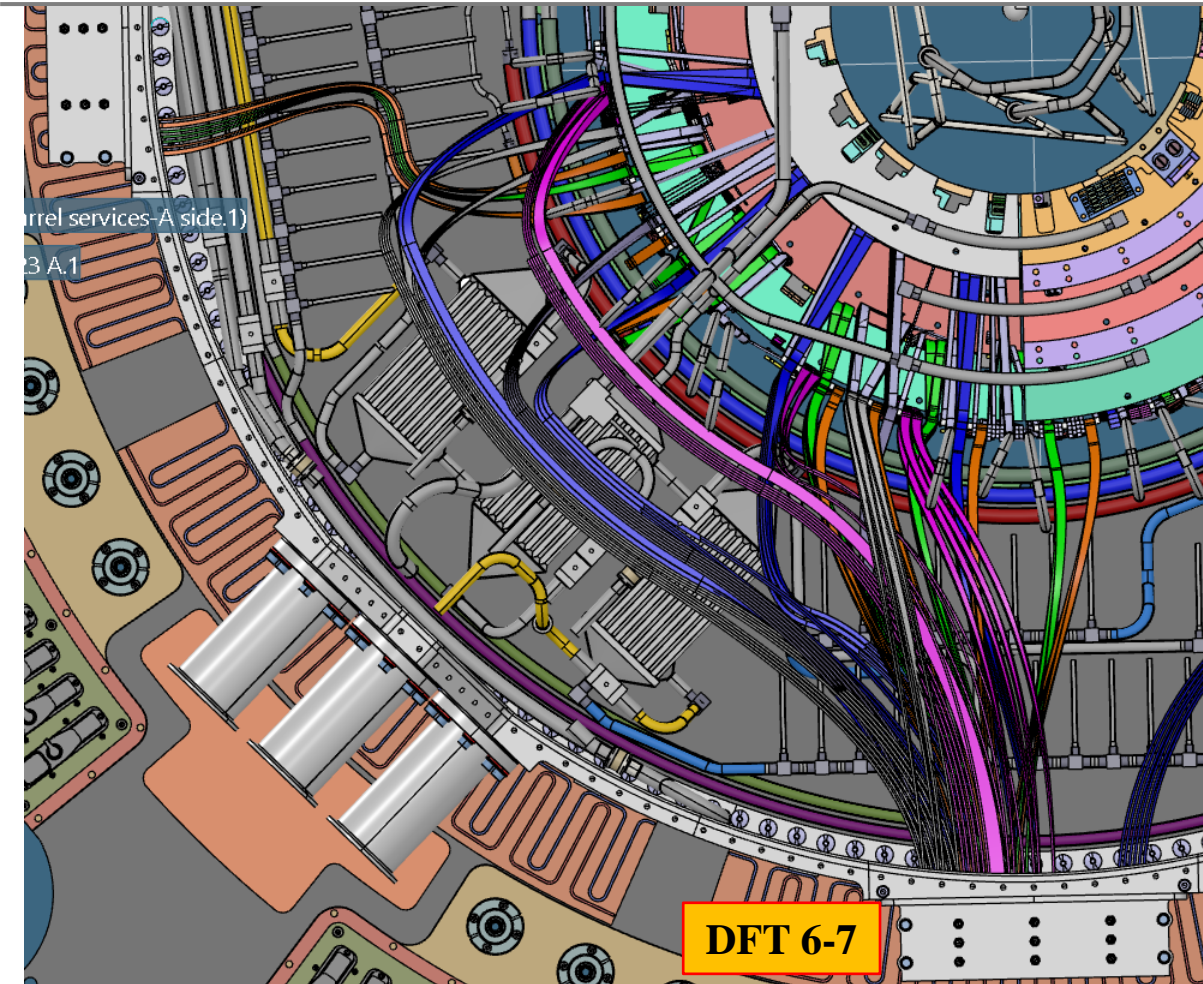
INFN-LNF

F. Rosatelli

2024-02-01

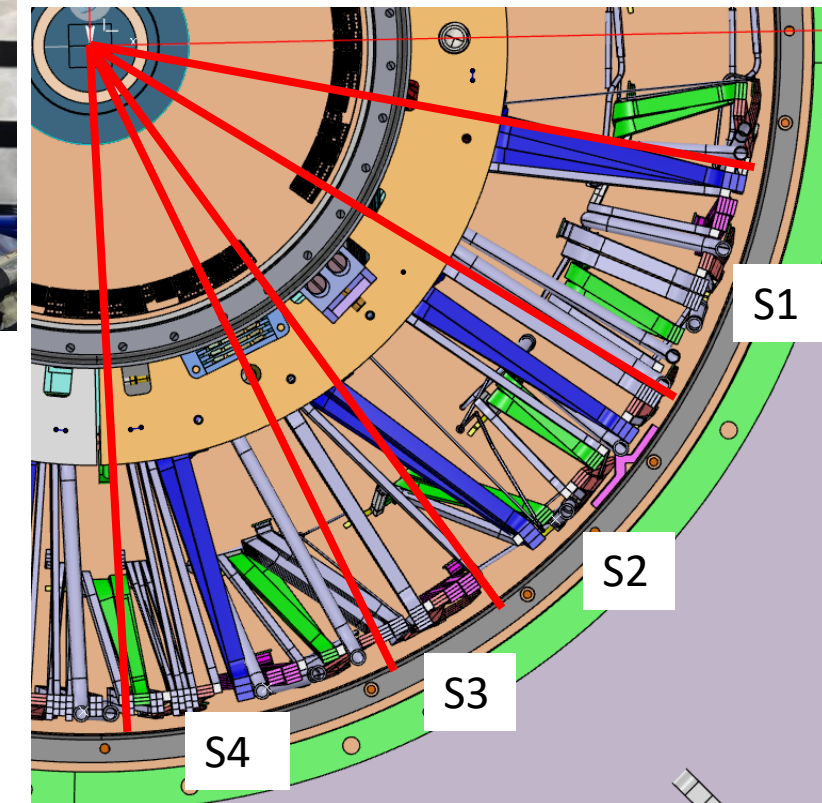
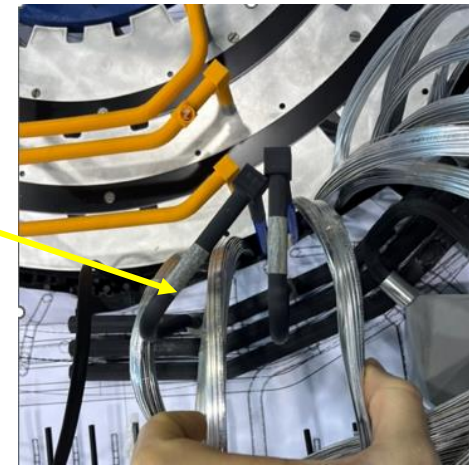
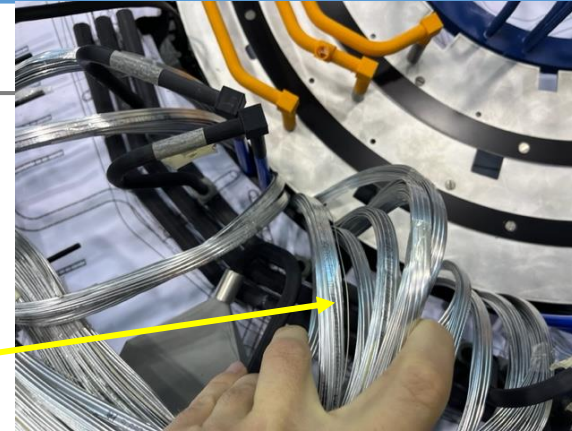
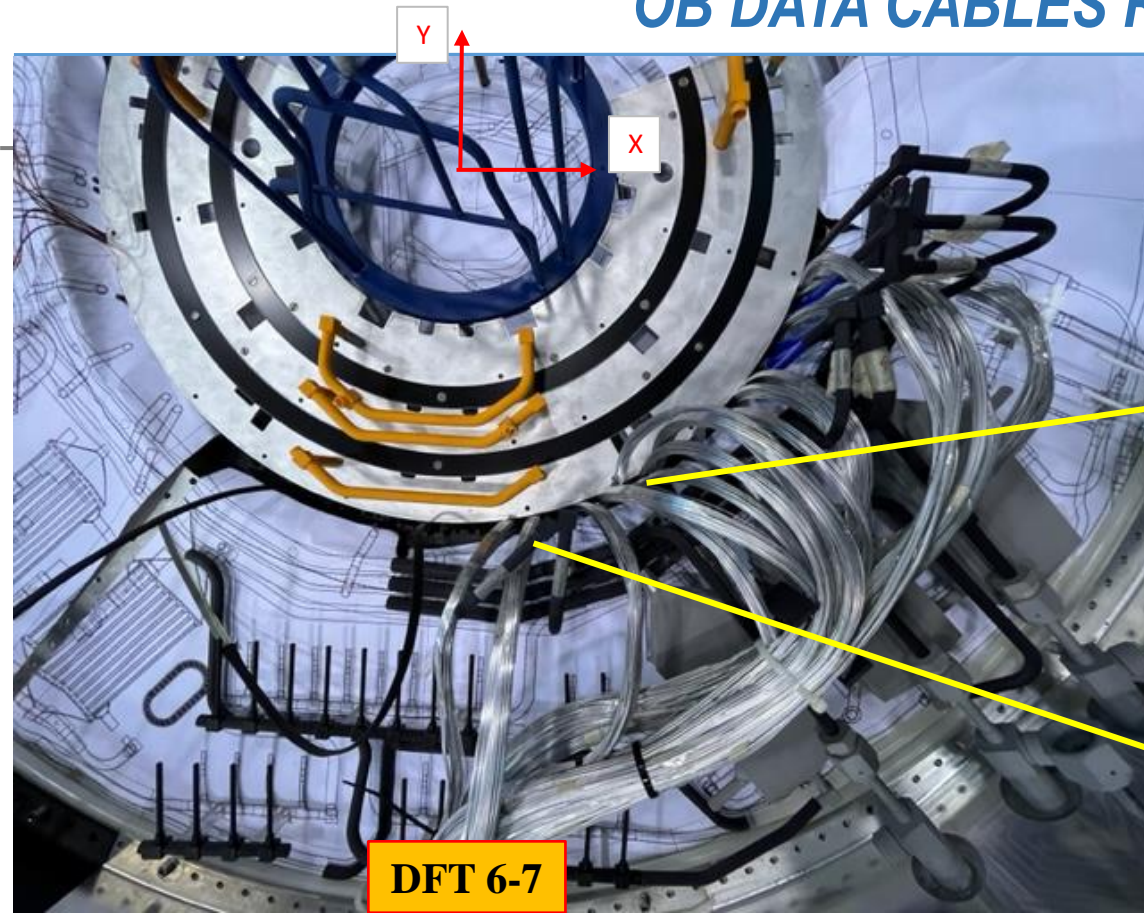


OB DATA CABLES ROUTING DESIGN



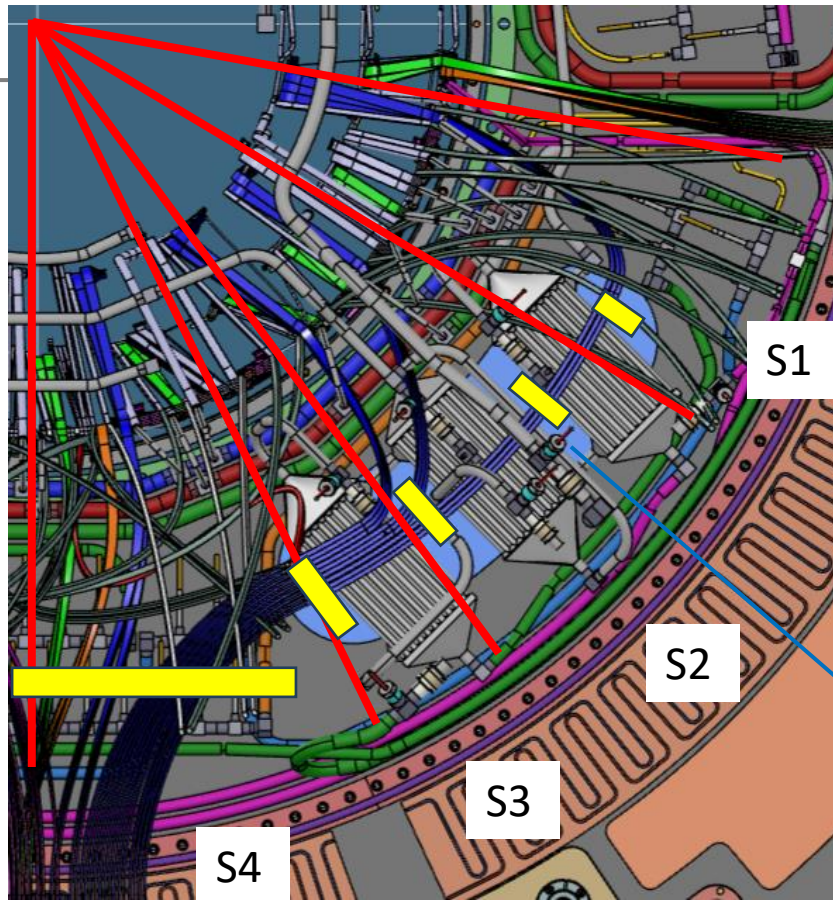
- All Q3 OB data cables modeled.
- They are dressed after installation of cooling pipes.

OB DATA CABLES ROUTING DESIGN-Mockup

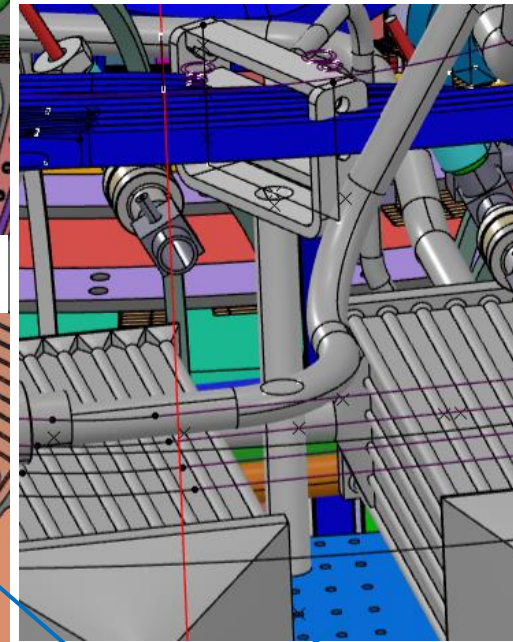


- For other quadrant, routing and data cables lengths are taken from PP1 Mockup
- Order bundles in groups.

OB DATA CABLES ROUTING DESIGN-Mockup



CABLES SUPPORTS



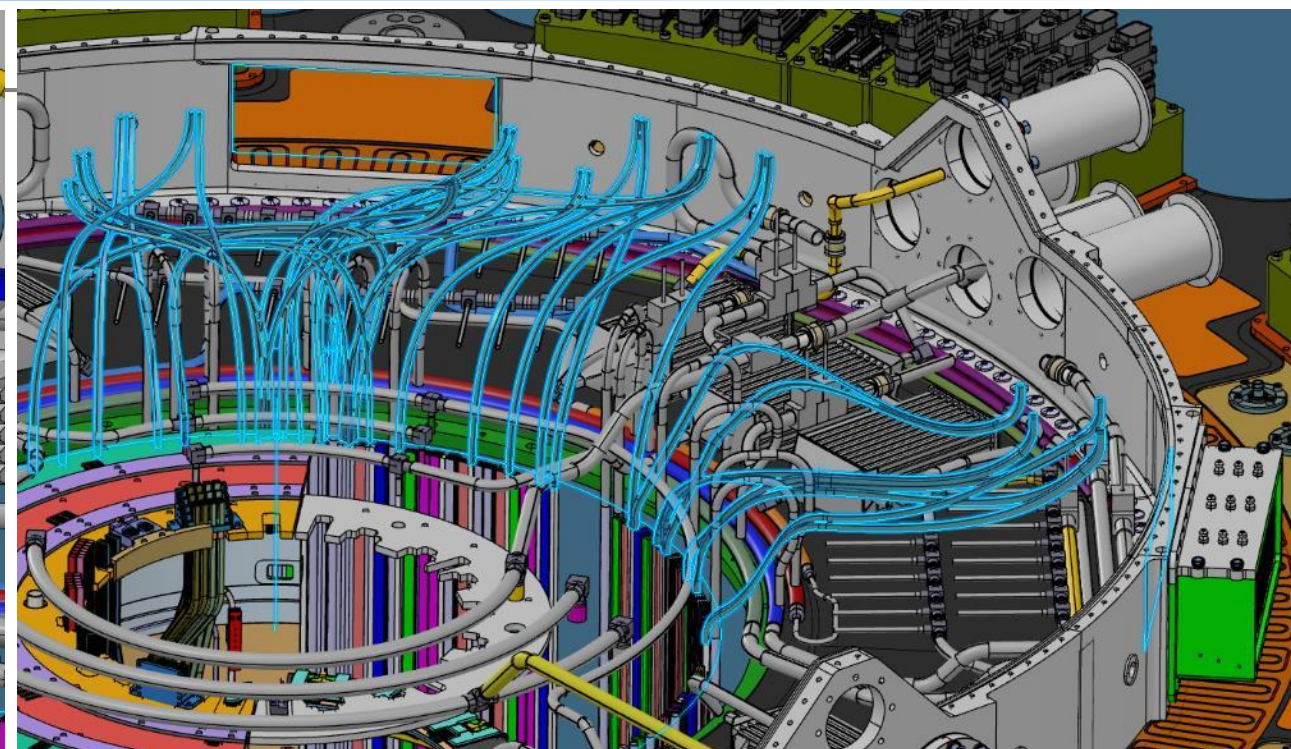
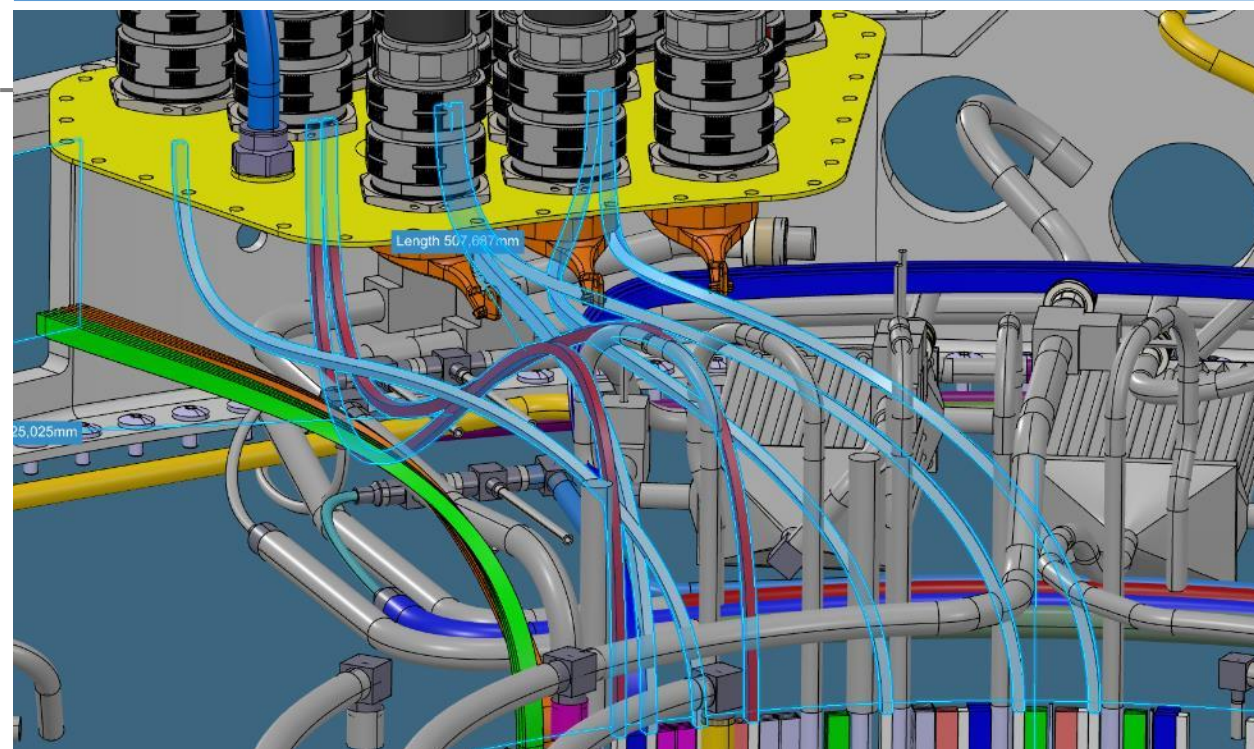
Interface flange
(glued on bulkhead)

	Name	L [mm] *	Weight estimation [Kg]*
S1	G-OB-L2-B16-A-DB	900	0,43
	G-OB-H2-IU4-A-SP-4-OP-8	900	
	G-OB-L4-B27-A-SP-2-DB	900	
	G-OB-H2-IU3-A-SP-4-DB-8	900	
	G-OB-L3-B21-A-SP-2-DB	900	
S2	G-OB-L2-R1-6-B-A-SP-4-OP-4 DC8	750	0,22
	G-OB-L4-B26-A-DB	750	
	G-OB-L2-B15-A-SP-2-DB	750	
	G-OB-L3-B20-A-SP-2-DB	750	
	G-OB-L4-B25-A-SP-2-DB	750	
	G-OB-L3-B19-A-SP-2-DB	750	
	G-OB-L2-B14-A-DB	750	
S3	G-OB-L4-R1-9-B-A-SP-4-DC-11	750	0,28
	G-OB-L4-B24-A-DB	750	
	G-OB-L2-R01-B-A-SP-4-OP-4 DC7	750	
	G-OB-H2-IU3-A-SP-4-DB-7	750	
S4	G-OB-L4-B23-A-SP-2-DB	560	0,19
	G-OB-L3-B18-A-SP-2-DB	560	
	G-OB-L4-R1-9-B-A-SP-4-DC-10	560	
	G-OB-L2-B13-A-SP-2-DB	560	
	G-OB-L4-B22-A-DB	560	
	G-OB-L3-B17-A-DB	560	
			1,13

PRELIMINARY

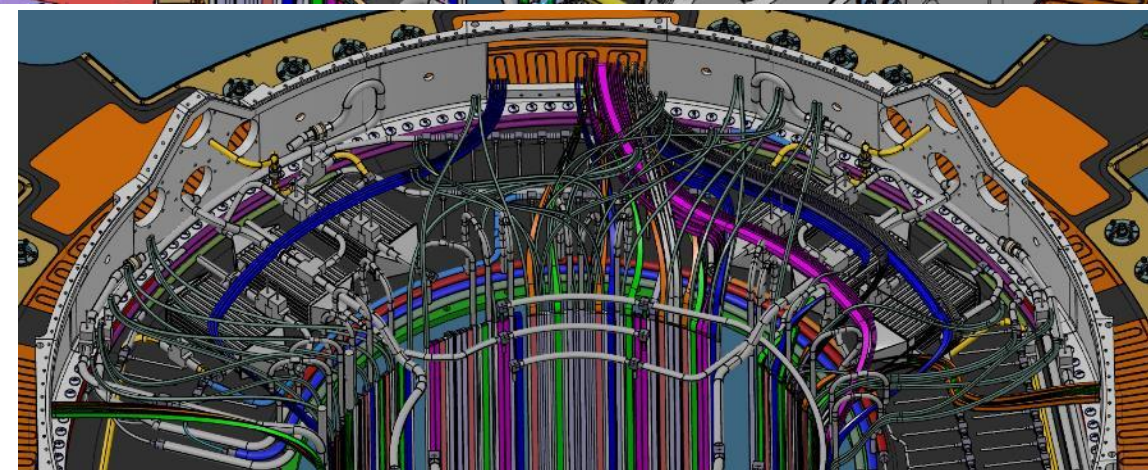
* evaluated from mockp (not allined to CAD)

- Divide a quarter of OB in four sectors to define the length.
- Assign possible position for fixation of cable holders (preliminary).
- Evaluate bundles lengths.
- Evaluate weight. 1,13 Kg.
- Preliminary lengths. Mockup will be allined on CAD, after the piping is mounted (work in progress)



POWER CABLES ROUTING:

- They will be placed after the data cables routing.
- They will pass between the cooling pipes.



OB DATA CABLES ROUTING DESIGN-CAD

DATA

Detector	Layer	Bundle Completed Name	ODFT	L [mm] in PP1 Region
OB Flat	4	G-OB-L4-B19-A-SP-1-OP-1	6-7	486
OB Flat	4	G-OB-L4-B19-A-SP-2-OP-2	6-7	488
OB Flat	4	G-OB-L4-B19-A-SP-2-OP-3	6-7	488
OB Flat	4	G-OB-L4-B20-A-SP-1-OP-1	6-7	456
OB Flat	4	G-OB-L4-B20-A-SP-2-OP-2	6-7	461
OB Flat	4	G-OB-L4-B20-A-SP-2-OP-3	6-7	466
OB Flat	4	G-OB-L4-B22-A-SP-2-OP-3	6-7	439
OB Flat	4	G-OB-L4-B22-A-SP-2-OP-2	6-7	435
OB Flat	4	G-OB-L4-B22-A-SP-1-OP-1	6-7	422
OB Flat	4	G-OB-L4-B21-A-SP-2-OP-2	6-7	421
OB Flat	4	G-OB-L4-B21-A-SP-2-OP-3	6-7	423
OB Flat	4	G-OB-L4-B21-A-SP-1-OP-1	6-7	423
OB Flat	3	G-OB-L3-B17-A-SP-2-OP-3	6-7	425
OB Flat	2	G-OB-L2-B09-A-SP-2-OP-3	6-7	940
OB Flat	3	G-OB-L3-B16-A-SP-2-OP-3	6-7	455
OB Flat	2	G-OB-L2-B10-A-SP-2-OP-3	6-7	735
OB Flat	3	G-OB-L3-B17-A-SP-2-OP-2	6-7	423
OB Flat	3	G-OB-L3-B15-A-SP-2-OP-3	6-7	493
OB Flat	2	G-OB-L2-B11-A-SP-2-OP-3	6-7	590
OB Flat	2	G-OB-L2-B09-A-SP-2-OP-2	6-7	940
OB Flat	3	G-OB-L3-B16-A-SP-2-OP-2	6-7	446
OB Flat	2	G-OB-L2-B12-A-SP-2-OP-3	6-7	440
OB Flat	2	G-OB-L2-B10-A-SP-2-OP-2	6-7	735

POWER

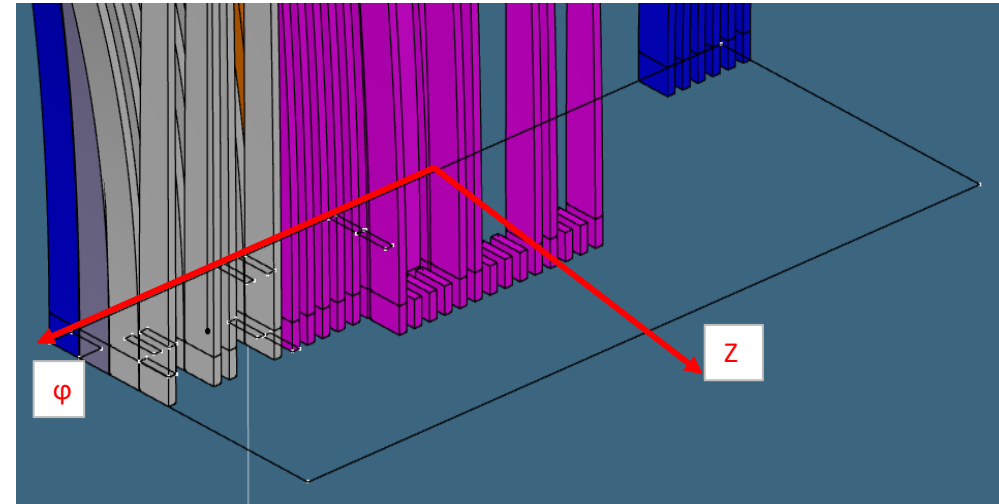
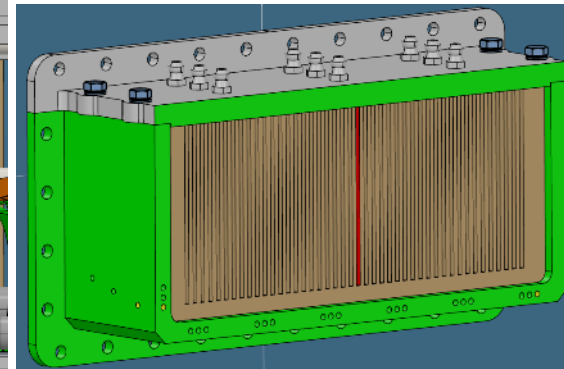
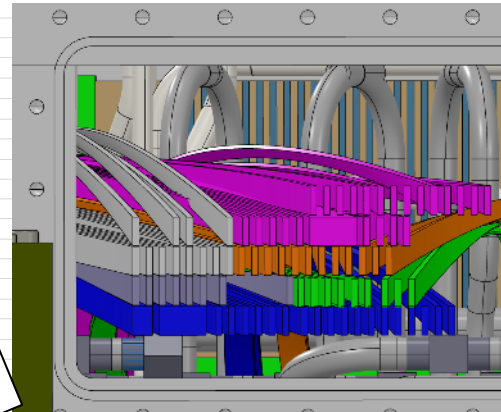
Bundle Complete Name	Length inside PP1 [mm]
G-OB-L2-R01-B-A-SP-4-PB	362
G-OB-L2-R02-B-A-SP-4-PB	362
G-OB-L2-R01-B-A-SP-3-PB	322
G-OB-L2-R02-B-A-SP-3-PB	322
G-OB-L3-R01-B-A-SP-4-PB	399
G-OB-L3-R02-B-A-SP-4-PB	399
G-OB-L3-R01-B-A-SP-3-PB	369
G-OB-L3-R02-B-A-SP-3-PB	369
G-OB-L2-R03-B-A-SP-4-PB	387
G-OB-L2-R04-B-A-SP-4-PB	382
G-OB-L2-R03-B-A-SP-3-PB	425
G-OB-L2-R04-B-A-SP-3-PB	442
G-OB-L3-R05-B-A-SP-4-PB	481
G-OB-L3-R06-B-A-SP-4-PB	481
G-OB-L3-R05-B-A-SP-3-PB	488
G-OB-L3-R06-B-A-SP-3-PB	483
G-OB-L4-R01-B-A-SP-4-PB	517
G-OB-L4-R01-B-A-SP-3-PB	422
G-OB-L4-R07-B-A-SP-4-PB	374
G-OB-L4-R06-B-A-SP-4-PB	365
G-OB-L4-R06-B-A-SP-3-PB	371
G-OB-L4-R07-B-A-SP-3-PB	378
G-OB-L4-B21-A-PB	
G-OB-L4-B22-A-PB	

- **spreadsheets with data and power cable lengths modelled on a quarter of OB H2.**
<https://edms.cern.ch/document/2976763/1>
- **SF (safety factor) not included.**
- **Safety factor for data (extra length)= +20 mm**
- **Safety factor for power (extra length)= +20 mm**

DFT 6-7 A SIDE

G-OB-L2-B16-A-SP-2-OP-3	G-OB-L2-B16-A-SP-2-OP-2	G-OB-L3-R01-B-A-SP-4-OP-8 2	G-OB-L3-R01-B-A-SP-4-OP-7 2	G-OB-L4-R09-B-A-SP-4-DC-10 8
G-OB-L2-B15-A-SP-1-OP-1	G-OB-L2-B16-A-SP-1-OP-1	3	3	7
G-OB-L2-B15-A-SP-2-OP-2		G-OB-L3-R04-B-A-SP-4-OP-8 6	4	G-OB-L4-R05-B-A-SP-4-DC-10 6
G-OB-L2-B15-A-SP-2-OP-3	G-OB-L2-R06-B-A-SP-4-DC-8 5	G-OB-L3-R05-B-A-SP-4-OP-8 7	5	G-OB-L4-R04-B-A-SP-4-DC-10 3
G-OB-L2-B14-A-SP-1-OP-1	4	G-OB-L3-R08-B-A-SP-4-OP-8 8	G-OB-L3-R08-B-A-SP-4-OP-7 3	G-OB-L4-R01-B-A-SP-4-DC-10 2
G-OB-L2-B14-A-SP-2-OP-2	3	G-OB-L4-R09-B-A-SP-4-OP-8 7	G-OB-L4-R04-B-A-SP-4-OP-8 2	
G-OB-L2-B14-A-SP-2-OP-3	2	G-OB-L4-R05-B-A-SP-4-OP-8 6	G-OB-L4-R09-B-A-SP-4-DC-11 8	G-OB-L4-R04-B-A-SP-3-DC-9 3
G-OB-L2-B13-A-SP-2-OP-3	G-OB-L2-R01-B-A-SP-4-DC-8 4		G-OB-L4-R01-B-A-SP-3-DC-8 2	
G-OB-L2-B13-A-SP-2-OP-2	G-OB-L2-R01-B-A-SP-4-DC-7 3	G-OB-L4-B25-A-SP-1-OP-1 G-OB-L4-B25-A-SP-2-OP-2	G-OB-L4-R05-B-A-SP-4-DC-11 5	G-OB-L4-R01-B-A-SP-3-DC-8 2
G-OB-L2-B13-A-SP-1-OP-1	G-OB-L2-R05-B-A-SP-4-DC-7 4	G-OB-L4-B24-A-SP-2-OP-3 G-OB-L4-B24-A-SP-2-OP-2	G-OB-L4-R04-B-A-SP-4-DC-11 3	
G-OB-L2-B12-A-SP-2-OP-3	3	G-OB-L4-B24-A-SP-1-OP-1 G-OB-L4-B23-A-SP-2-OP-2	G-OB-L4-R01-B-A-SP-4-DC-11 2	
G-OB-L2-B12-A-SP-2-OP-2	G-OB-L2-R02-B-A-SP-4-DC-7 G-OB-L3-B19-A-SP-1-OP-1	G-OB-L4-B23-A-SP-1-OP-1 G-OB-L4-B22-A-SP-2-OP-3	G-OB-L4-R04-B-A-SP-3-DC-8 3	
G-OB-L2-B12-A-SP-1-OP-1	G-OB-L3-B19-A-SP-2-OP-2 G-OB-L3-B19-A-SP-2-OP-3	G-OB-L4-B22-A-SP-2-OP-2 G-OB-L4-B22-A-SP-1-OP-1	G-OB-L4-R01-B-A-SP-3-DC-8 2	
G-OB-L2-B12-A-SP-2-OP-3	G-OB-L3-B18-A-SP-2-OP-3 G-OB-L3-B18-A-SP-2-OP-2	G-OB-L4-B21-A-SP-2-OP-3 G-OB-L4-B21-A-SP-2-OP-2	G-OB-L4-R04-B-A-SP-3-OP-5 3	G-OB-L4-R09-B-A-SP-3-DC-8 G-OB-L4-R08-B-A-SP-3-DC-8
G-OB-L2-B12-A-SP-2-OP-2	G-OB-L3-B18-A-SP-1-OP-1 G-OB-L3-B17-A-SP-2-OP-3	G-OB-L4-B21-A-SP-1-OP-1 G-OB-L4-B20-A-SP-2-OP-3	G-OB-L4-R01-B-A-SP-3-OP-5 2	7
G-OB-L2-B12-A-SP-1-OP-1	G-OB-L3-B17-A-SP-2-OP-2 G-OB-L3-B17-A-SP-1-OP-1	G-OB-L4-B20-A-SP-2-OP-2 G-OB-L4-B19-A-SP-2-OP-3	G-OB-L4-R09-B-A-SP-3-OP-5 6	G-OB-L4-R05-B-A-SP-3-DC-8
G-OB-L2-B11-A-SP-2-OP-3	G-OB-L3-B16-A-SP-2-OP-3 G-OB-L3-B16-A-SP-2-OP-2	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L4-R08-B-A-SP-3-OP-5 5	
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G-OB-L2-B10-A-SP-2-OP-3	G-OB-L2-R06-B-A-SP-3-OP-3 G-OB-L2-R05-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R08-B-A-SP-3-OP-6 7	
G-OB-L2-B10-A-SP-2-OP-2	G-OB-L2-R04-B-A-SP-3-OP-3 G-OB-L2-R03-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R08-B-A-SP-3-OP-6 7	
G-OB-L2-B10-A-SP-1-OP-1	G-OB-L2-R02-B-A-SP-3-OP-3 G-OB-L2-R01-B-A-SP-3-OP-3 DC5	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R08-B-A-SP-3-OP-6 6	
G-OB-L2-B09-A-SP-2-OP-3	G-OB-L2-R02-B-A-SP-3-OP-3 G-OB-L2-R03-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R05-B-A-SP-3-OP-6 G-OB-L3-R04-B-A-SP-3-OP-6	
G-OB-L2-B09-A-SP-2-OP-2	G-OB-L2-R04-B-A-SP-3-OP-3 G-OB-L2-R05-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R05-B-A-SP-3-OP-6 3	
G-OB-L2-B09-A-SP-1-OP-1	G-OB-L2-R06-B-A-SP-3-OP-3 G-OB-L2-R06-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1 G-OB-L4-B19-A-SP-1-OP-1	G-OB-L3-R04-B-A-SP-3-OP-6 2	

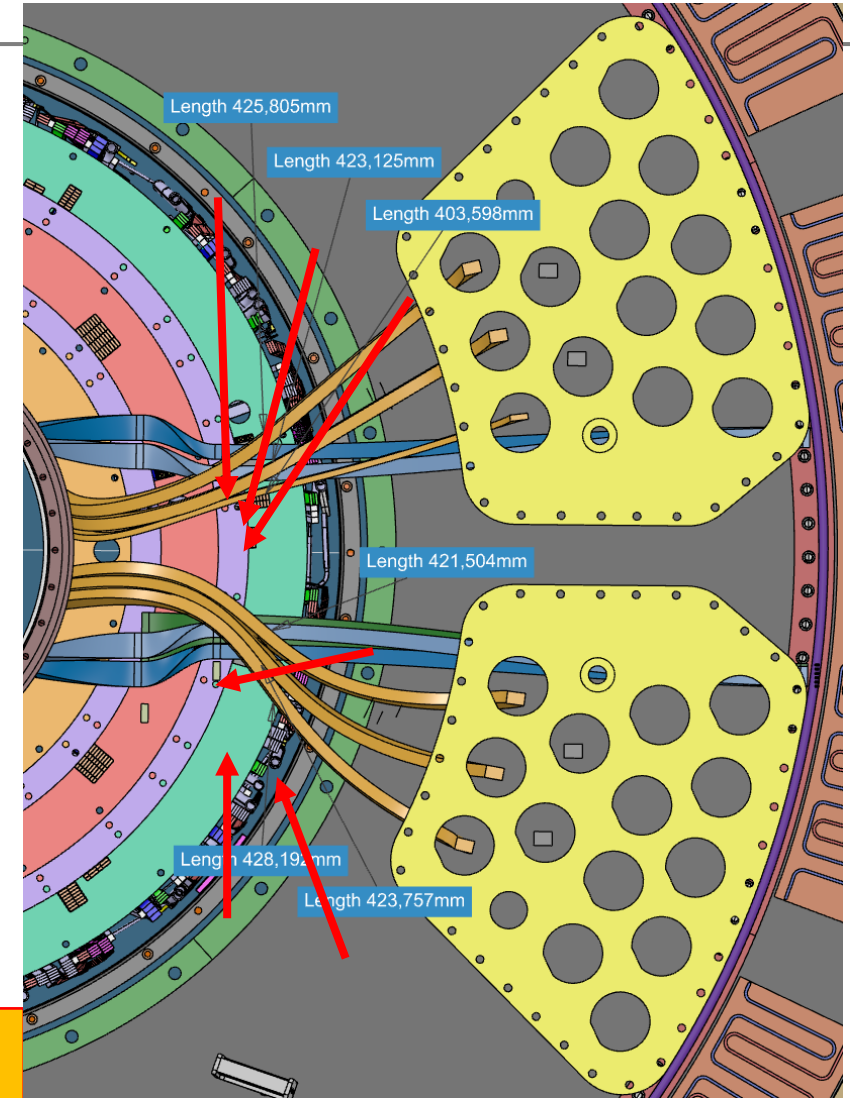
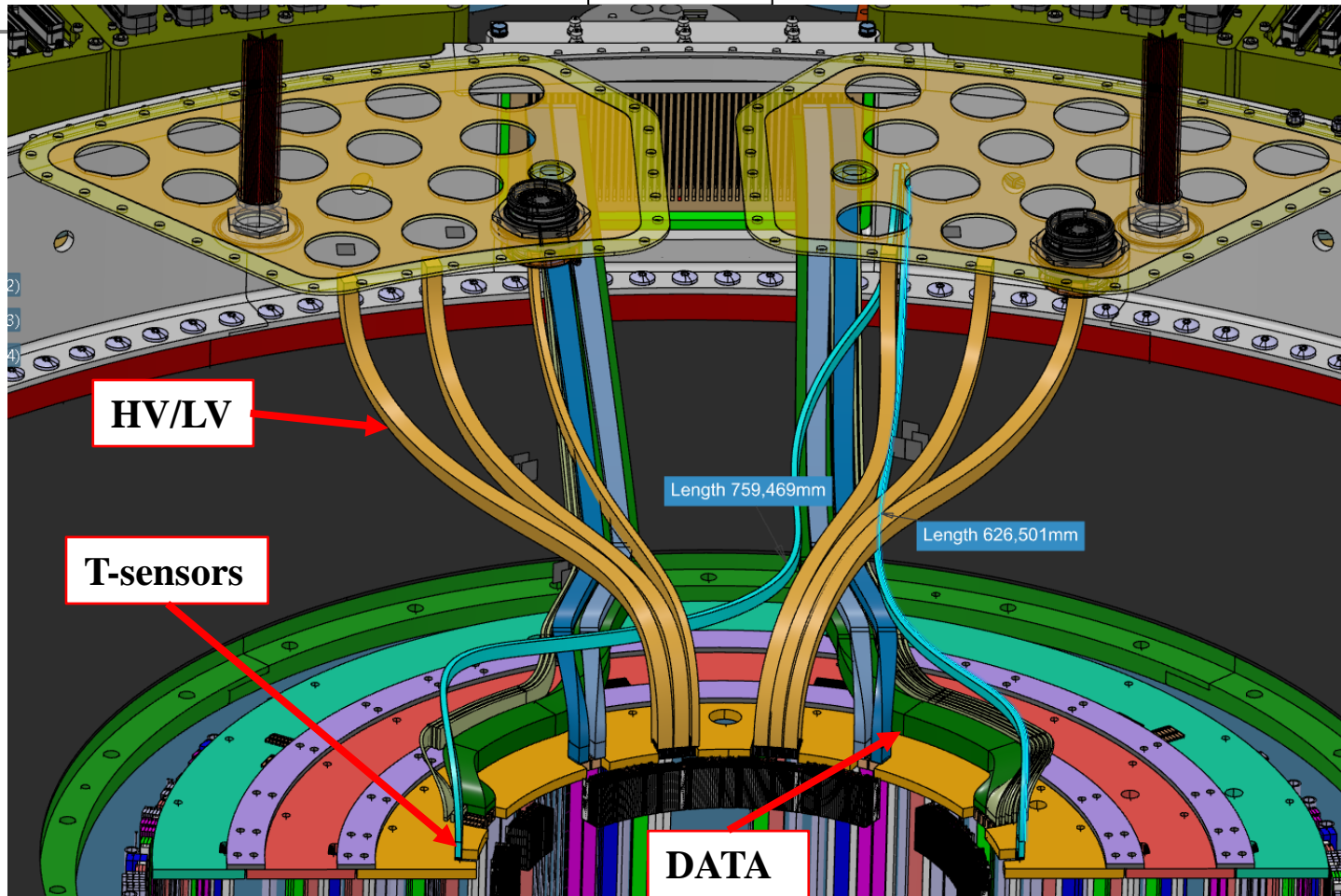
Frozen. According with Martin Janda



Mapping DFT 6-7

Filling direction

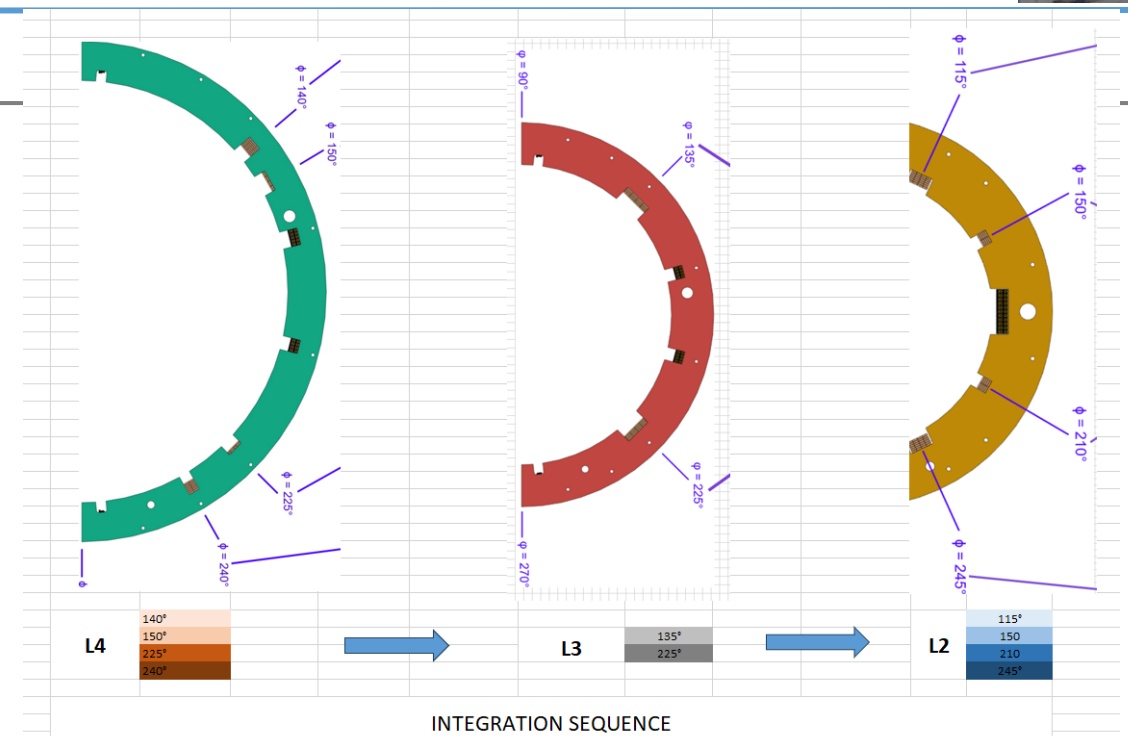
DFT 1-8



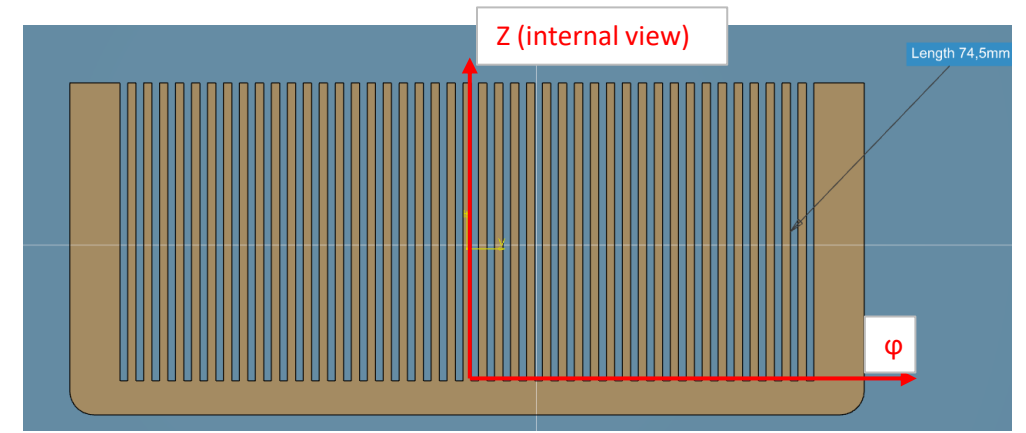
- Layout of EC L2. Routing will change in function of the other layers and the mapping of DFT 1-8.
- They will be placed after the data cables routing.
- They will pass between the cooling pipes

DFT 1-8 A SIDE

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	G-OB-L3-B03-A-SP-1-OP-1	G-EC-L4_R07_N-C-SP2		G-EC-L3_R08_N-C-SP2									
2	G-OB-L3-B03-A-SP-2-OP-2	G-EC-L4_R06_N-C-SP2		G-EC-L3_R07_N-C-SP2									
3	G-OB-L3-B03-A-SP-2-OP-3	G-EC-L4_R05_N-C-SP2		G-EC-L3_R06_N-C-SP2									
4	G-OB-L3-B02-A-SP-1-OP-1	G-EC-L4_R04_N-C-SP2		G-EC-L3_R05_N-C-SP2									
5	G-OB-L3-B02-A-SP-2-OP-2	G-EC-L4_R03_N-C-SP2		G-EC-L3_R04_N-C-SP2									
6	G-OB-L3-B02-A-SP-2-OP-3	G-EC-L4_R02_N-C-SP2		G-EC-L3_R03_N-C-SP2									
7	G-OB-L3-B01-A-SP-1-OP-1	G-EC-L4_R01_N-C-SP2		G-EC-L3_R02_N-C-SP2									
8	G-OB-L3-B01-A-SP-2-OP-2	G-EC-L4_R07_N-C-SP1		G-EC-L3_R01_N-C-SP2									
9	G-OB-L3-B01-A-SP-2-OP-3	G-EC-L4_R06_N-C-SP1		G-EC-L3_R08_N-C-SP1									
10	G-OB-L4-B04-A-SP-1-OP-1	G-EC-L4_R05_N-C-SP1		G-EC-L3_R07_N-C-SP1									
11	G-OB-L4-B04-A-SP-2-OP-2	G-EC-L4_R04_N-C-SP1		G-EC-L3_R06_N-C-SP1									
12	G-OB-L4-B04-A-SP-2-OP-3	G-EC-L4_R03_N-C-SP1		G-EC-L3_R05_N-C-SP1									
13	G-OB-L4-B03-A-SP-1-OP-1	G-EC-L4_R02_N-C-SP1		G-EC-L3_R04_N-C-SP1									
14	G-OB-L4-B03-A-SP-2-OP-2	G-EC-L4_R01_N-C-SP1		G-EC-L3_R03_N-C-SP1									
15	G-OB-L4-B03-A-SP-2-OP-3	G-EC-L4_R08_N-C-SP2		G-EC-L3_R02_N-C-SP1									
16	G-OB-L4-B02-A-SP-1-OP-1	G-EC-L4_R09_N-C-SP2		G-EC-L3_R01_N-C-SP1									
17	G-OB-L4-B02-A-SP-2-OP-2	G-EC-L4_R08_N-C-SP1											
18	G-OB-L4-B02-A-SP-2-OP-3	G-EC-L4_R09_N-C-SP1											
19	G-OB-L4-B01-A-SP-1-OP-1			G-EC-L2_R05_N-C-SP2	G-EC-L2_R05_N-C-SP2	G-EC-L2_R11_N-C-SP2	G-EC-L2_R11_N-C-SP2						
20	G-OB-L4-B01-A-SP-2-OP-2			G-EC-L2_R04_N-C-SP2	G-EC-L2_R04_N-C-SP2	G-EC-L2_R09_N-C-SP2	G-EC-L2_R09_N-C-SP2						
21	G-OB-L4-B01-A-SP-2-OP-3			G-EC-L2_R03_N-C-SP2	G-EC-L2_R03_N-C-SP2	G-EC-L2_R08_N-C-SP2	G-EC-L2_R08_N-C-SP2						
22				G-EC-L2_R02_N-C-SP2	G-EC-L2_R02_N-C-SP2	G-EC-L2_R07_N-C-SP2	G-EC-L2_R07_N-C-SP2						
23				G-EC-L2_R01_N-C-SP2	G-EC-L2_R01_N-C-SP2	G-EC-L2_R06_N-C-SP2	G-EC-L2_R06_N-C-SP2						
24				G-EC-L2_R05_N-C-SP1	G-EC-L2_R05_N-C-SP1	G-EC-L2_R11_N-C-SP1	G-EC-L2_R11_N-C-SP1						
25				G-EC-L2_R04_N-C-SP1	G-EC-L2_R04_N-C-SP1	G-EC-L2_R10_N-C-SP1	G-EC-L2_R10_N-C-SP1						
26				G-EC-L2_R03_N-C-SP1	G-EC-L2_R03_N-C-SP1	G-EC-L2_R09_N-C-SP1	G-EC-L2_R09_N-C-SP1						
27				G-EC-L2_R02_N-C-SP1	G-EC-L2_R02_N-C-SP1	G-EC-L2_R08_N-C-SP1	G-EC-L2_R08_N-C-SP1						
28				G-EC-L2_R01_N-C-SP1	G-EC-L2_R01_N-C-SP1	G-EC-L2_R07_N-C-SP1	G-EC-L2_R07_N-C-SP1						
29													
30				G-EC-L3_R08_N-C-SP2		G-EC-L2_R06_N-C-SP1	G-EC-L2_R06_N-C-SP1						
31				G-EC-L3_R07_N-C-SP2									
32				G-EC-L3_R06_N-C-SP2									
33				G-EC-L3_R05_N-C-SP2									
34				G-EC-L3_R04_N-C-SP2									
35				G-EC-L3_R03_N-C-SP2									
36				G-EC-L3_R02_N-C-SP2									
37				G-EC-L3_R01_N-C-SP2									
38				G-EC-L4_R07_N-C-SP1									
39				G-EC-L4_R06_N-C-SP1									
40				G-EC-L4_R05_N-C-SP1									
41				G-EC-L4_R04_N-C-SP1									
42				G-EC-L4_R03_N-C-SP1									
43				G-EC-L4_R02_N-C-SP1									
44				G-EC-L4_R01_N-C-SP1									
45													
46	ϕ	8,5	21,6	34,7		47,8		60,9		74			
47			13,1										
48													
49													



INTEGRATION SEQUENCE



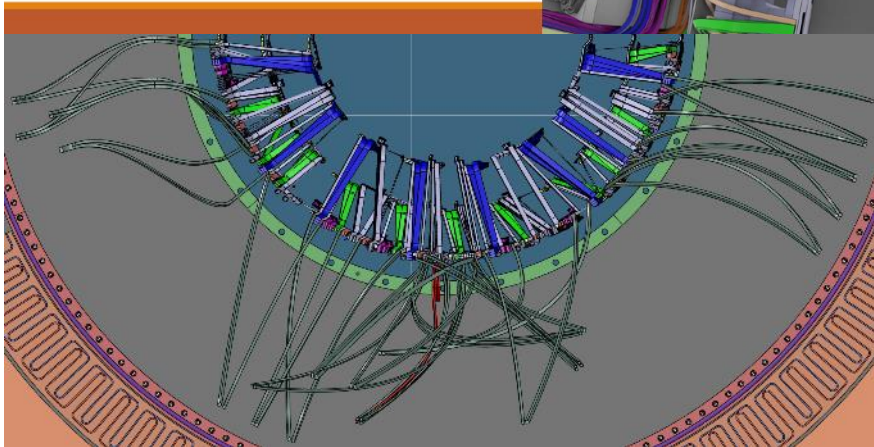
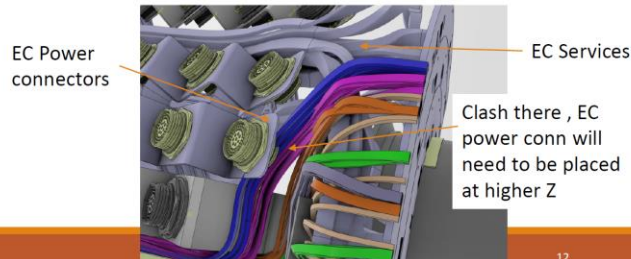
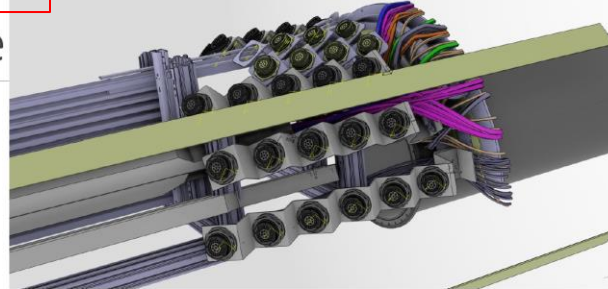
DFT 1-8:

- OB cables first and after EC cables.
- Complete mapping of DFT. Preliminary and not optimized.

FROM ERIC VIGEOLAS

Very limited space

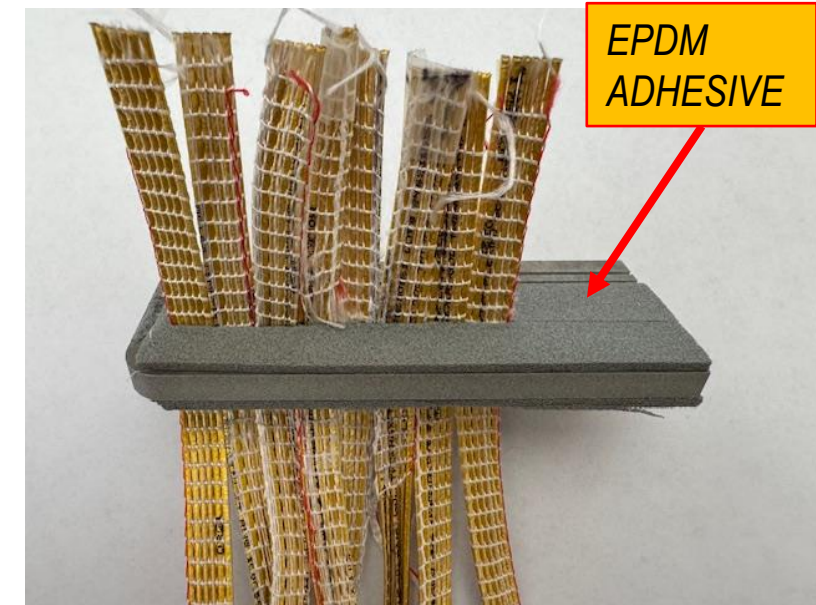
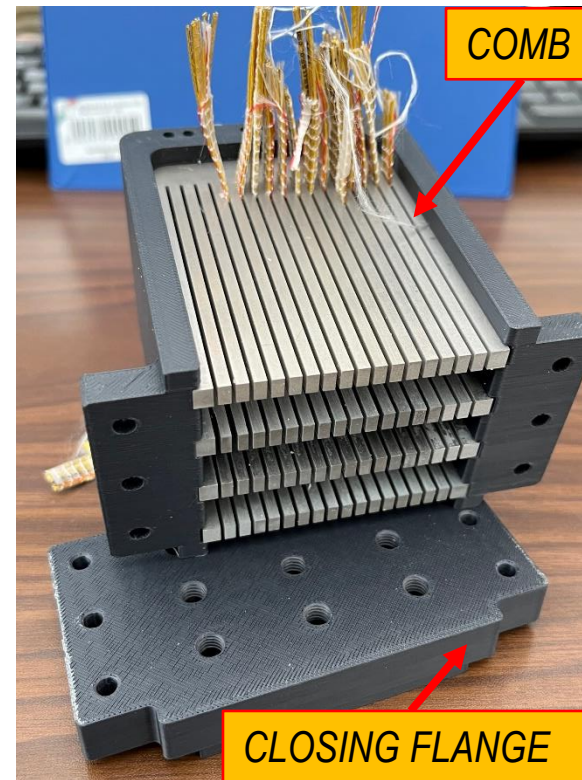
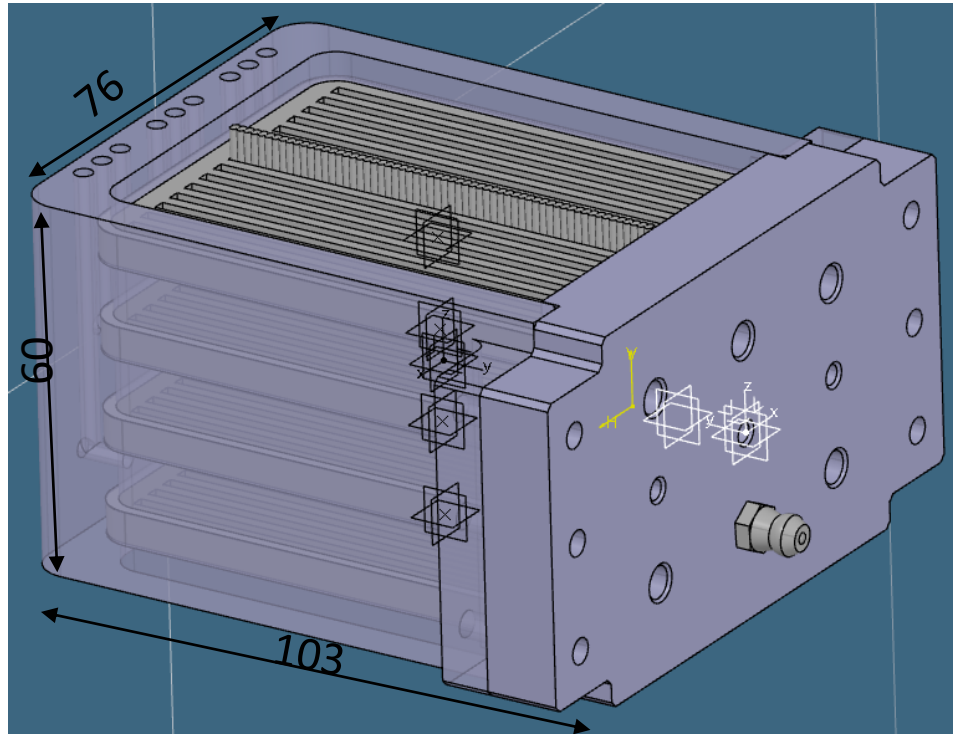
- When adding EC End Flanges and service + Rails envelopes + EC Trolley the space become very limited
- First consequence, Rails on the integration tool will need to be removed when passing from Opened to close configuration
 - No possibility to do differently cables from different Phi position are crossing the rail path
 - This will impose the need to hold temporarily the trolley from the top during this phase
 - This will be needed also after the insertion in Itk When the trolley will be disassembled for PP1 dressing
- OB Cables are routed at higher Z than EC cables, some adjustment are need between EC routing and OB routing



G-OB-L4-B16-A-PB	318	328	328		-328
G-OB-L3-B12-A-PB	406	461	461	355	-106
G-OB-L3-B13-A-PB	377	437	437	402	-35
G-OB-L2-B09-A-PB	454	434	454		-454
G-OB-L2-B10-A-PB	321	381	381	486	105
G-OB-L4-B18-A-PB	495	549	549	428	-121
G-OB-L4-B17-A-PB	497	553	553	393	-160
G-OB-L3-B14-A-PB	435	488	488	464	-24
G-OB-L3-B15-A-PB	462	500	500	445	-55
G-OB-L4-B20-A-PB	496	549	549	426	-123
G-OB-L4-B19-A-PB	550	550	550	408	-142
G-OB-L2-B11-A-PB	441	489	489	425	-64
G-OB-L2-B12-A-PB	448	497	497	441	-56
G-OB-L3-B16-A-PB	381	444	444		-444
G-OB-L3-B17-A-PB	451	462	462		-462
G-OB-L4-B22-A-PB	407	412	412		-412
G-OB-L4-B21-A-PB	357	389	389		-389
G-OB-L2-R01-B-A-SP-3-PB	314	348	348	322	-26
G-OB-L2-R02-B-A-SP-3-PB	327	340	340	322	-18
G-OB-L2-R02-B-A-SP-4-PB	380	366	380	362	-18
OB-L2-R01-B-A-SP-4-PB	391	369	391	362	-29
G-OB-L2-R06-B-A-SP-3-PB	436	489	489		-489
G-OB-L2-R05-B-A-SP-3-PB	434	490	490		-490
G-OB-L2-R04-B-A-SP-3-PB	444	500	500	442	-58
G-OB-L2-B13-A-PB	394	440	440	380	-60
G-OB-L3-B18-A-PB	463	493	493	410	-83
G-OB-L4-B23-A-PB	502	551	551		-551
G-OB-L4-B24-A-PB	496	551	551		-551
G-OB-L2-B14-A-PB	379	432	432	437	5
G-OB-L3-B19-A-PB	447	495	495	506	11
G-OB-L3-B20-A-PB	438	496	496	471	-25
G-OB-L4-B25-A-PB	498	556	556	406	-150
G-OB-L2-B15-A-PB	324	378	378	449	71
G-OB-L4-B26-A-PB	495	563	563	413	-150
G-OB-L3-B21-A-PB	442	502	502	435	-67
G-OB-L4-B27-A-PB	293	340	340	507	167
G-OB-BH3-A-PW-12	415	467	467	471	4
G-OB-L2-B16-A-PB	367	419	419	392	-27
G-OB-L4-B28-A-PB	331	366	366	525	159

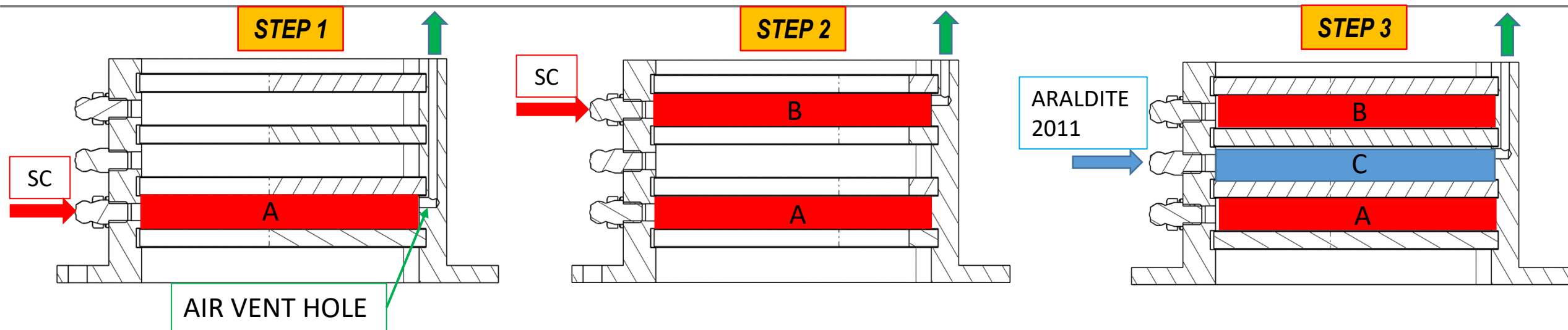
POWER CABLES ROUTING (WIP):

- New cross check with open/close configuration. Maximum delta: – 160 mm (red)
- Red: increase length inside PP1. Green: extra length managed on trolley



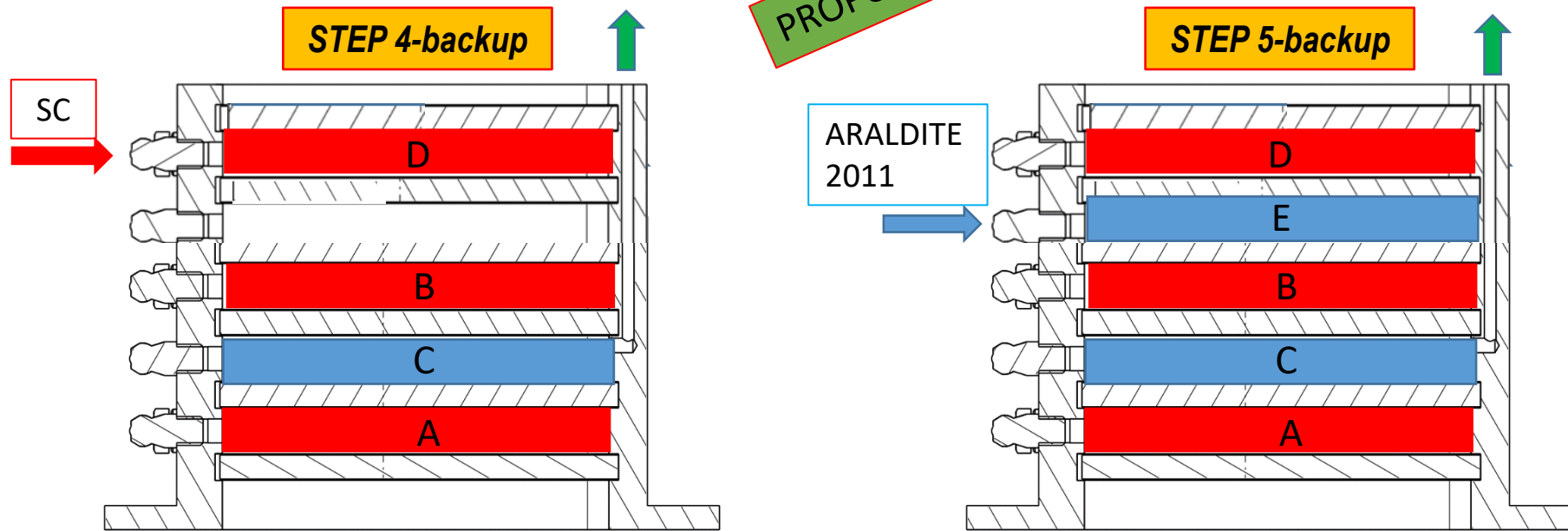
We improved the prototype of 1/3 of Outer Feedthrough:

- **The combs were made of Aluminum using electro-erosion.**
- **Adjust the slots dimensions to grant the best fit possible with the data bundles (Work In Progress).**
- **Reduce the leakage of filler using an adhesive EPDM mousse**
- **Process and design will be applied to the full scale prototype.**



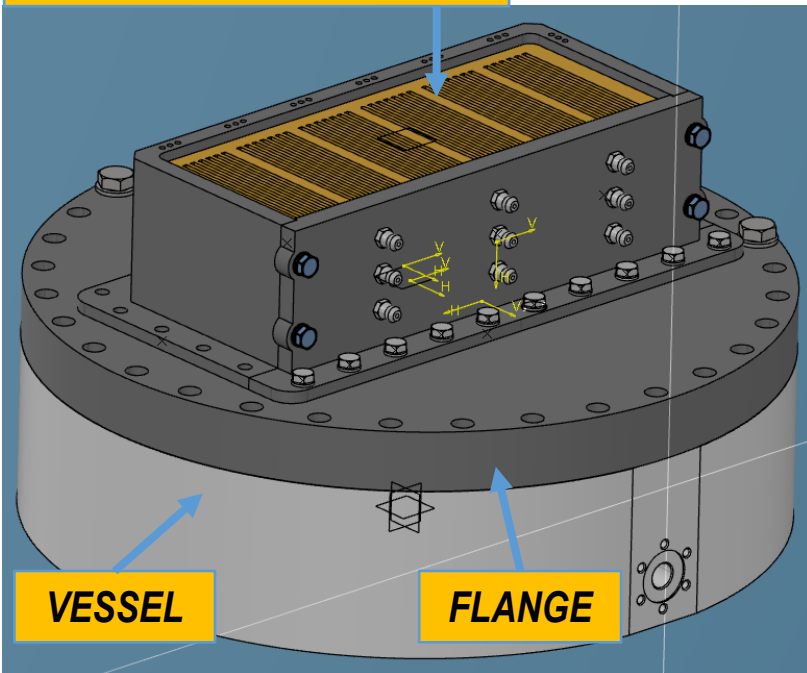
The filling process follows this step by step procedure:

1. **Filling the chamber A with silicon compound (SC). It has high viscosity and low curing time compared to Araldite 2011. This properties are necessary to ensure a containment function.**
The air exits from vent hole, in opposite direction of filling. When the SC leaks out from hole, we proceed to the next injection hole.
2. **Filling the chamber B with SC.**
3. **Now the chamber C is ready for Araldite 2011 injection. It's contained between the two full volumes (A & B) and ensure a tightness in the operative conditions of the detector, due its radiation resistance.**



The backup of filling process is done with two extra chamber:
4. Filling the chamber D with silicon compound.
5. Filling chamber E with araldite 2011.
This new design increase the height of DFT. This solution is a proposal.

1:1 SCALE FEEDTHROUGH



Leak Test OS data feedthrough:

- Flush air using fluximeter up to an assigned Δp . Read absolute pressure with manometer.
- Increase the flux and build a chart $X=\text{flow}$ $Y=\text{pressure}$. The leak is the slope of the curve.
- Normalize curve to Standard helium leak rate.