OEC Integration Workshop

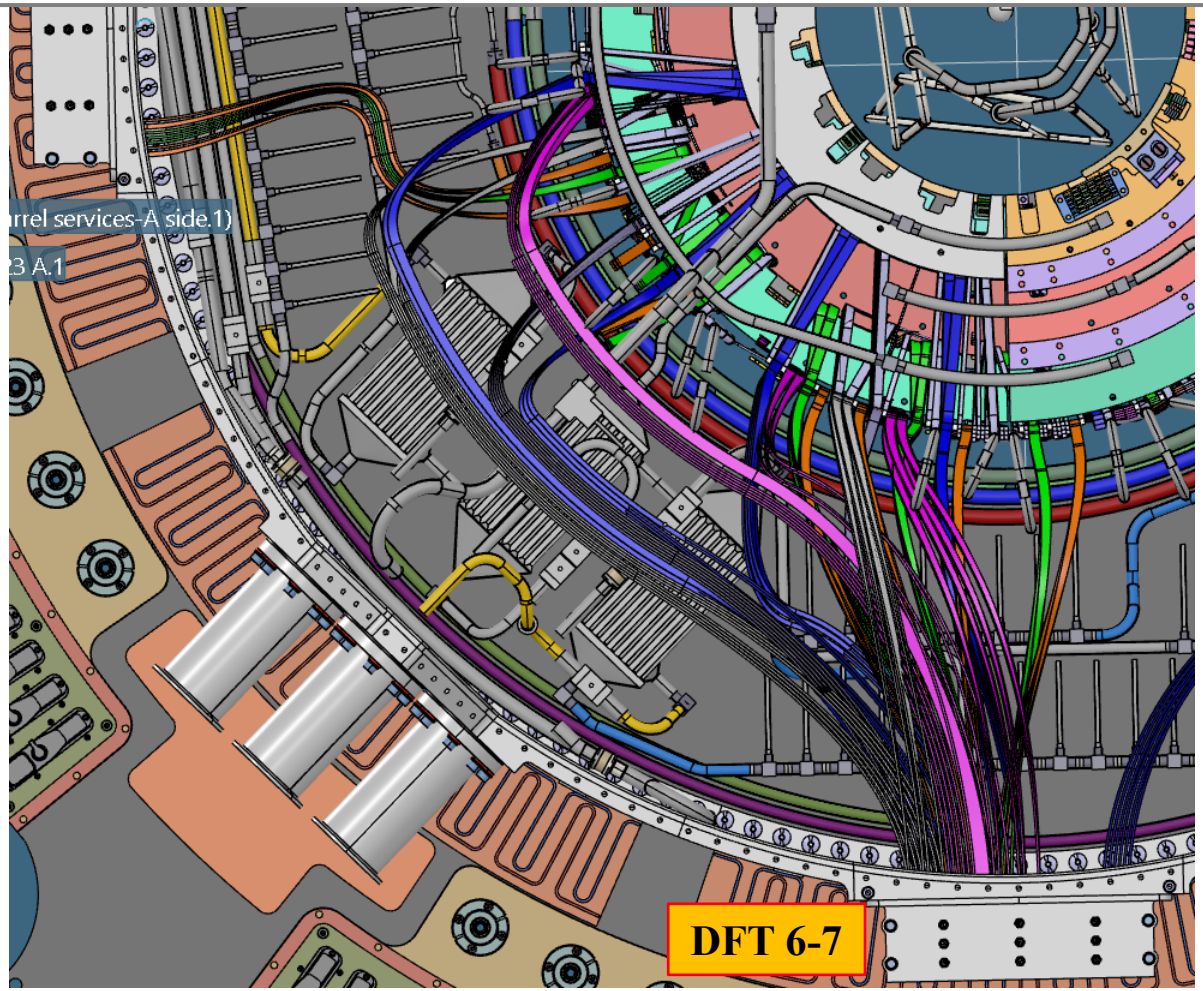
Mock-up status development and cable lengths

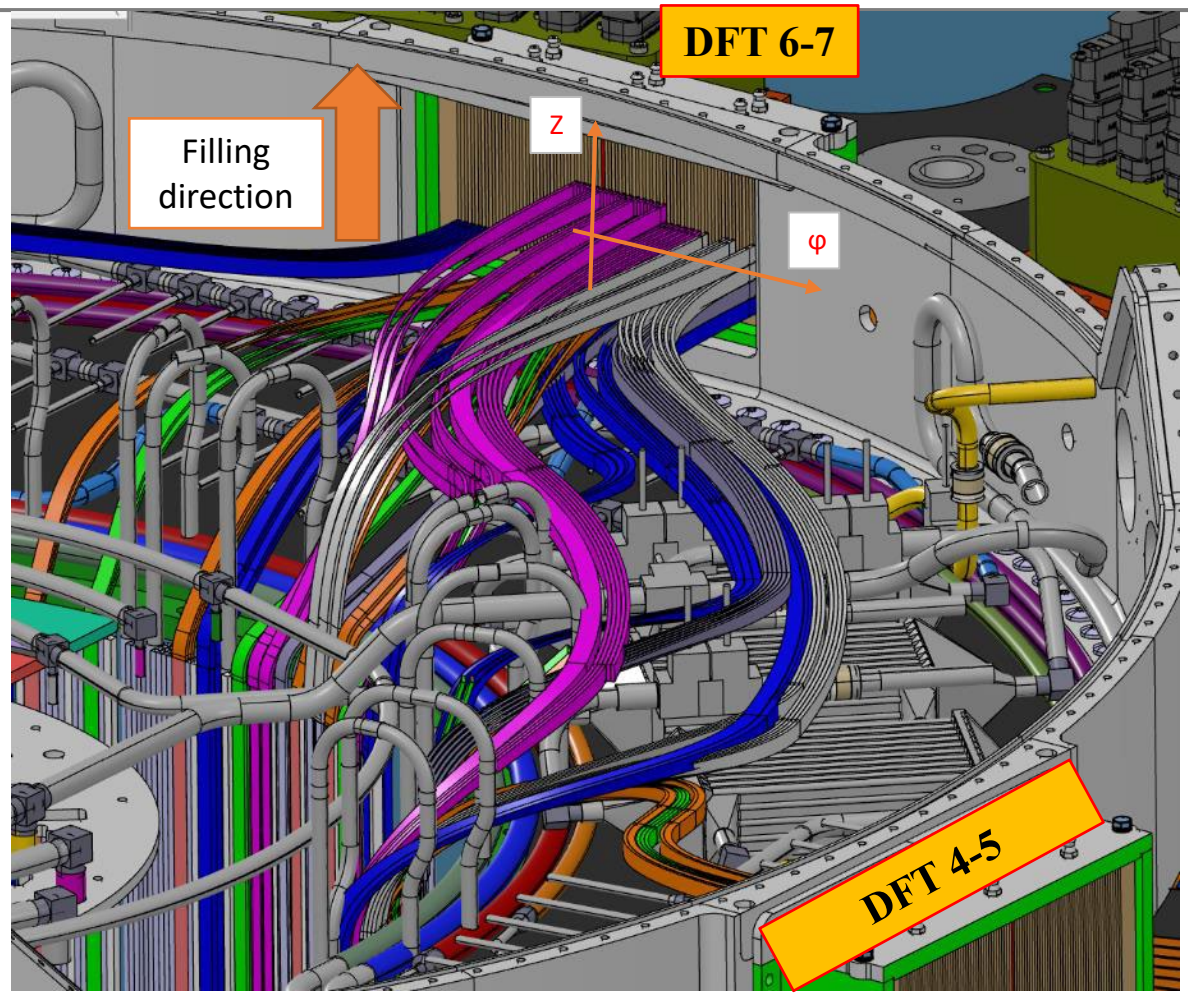
INFN-LNF

F. Rosatelli

2024-05-08

OB DATA CABLES ROUTING DESIGN





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

OB DATA CABLES ROUTING DESIGN-CAD

DATA

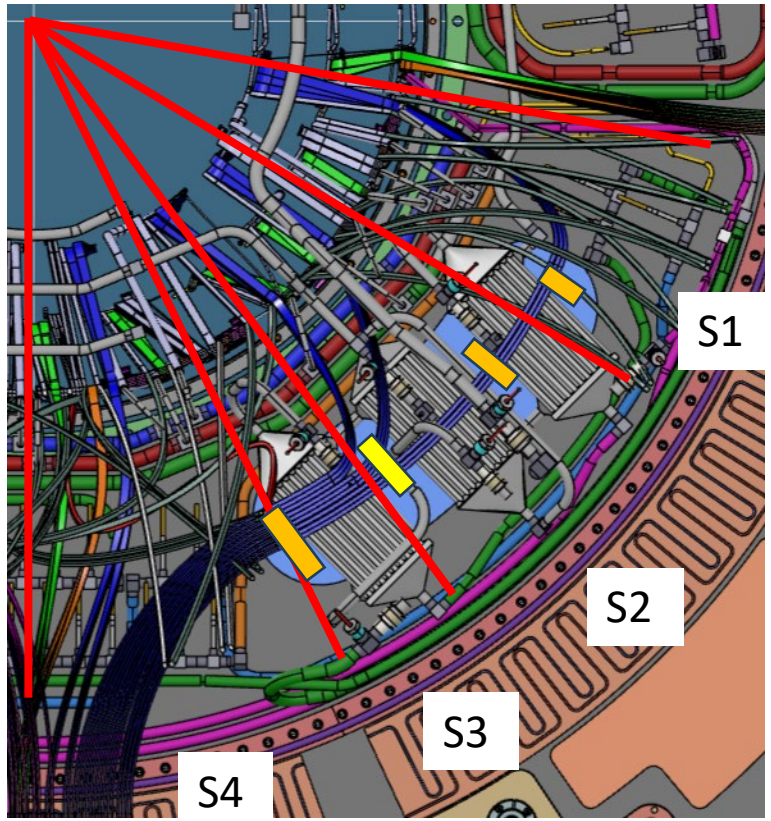
Detector	Layer	Bundle Completed Name	ODFT	L [mm] in PP1 Region
OB Flat	4	G-OB-L4-B19-A-SP-1-OP-1	6-7	486
OB Flat	4	G-OB-L4-B19-A-SP-2-OP-2	6-7	488
OB Flat	4	G-OB-L4-B19-A-SP-2-OP-3	6-7	488
OB Flat	4	G-OB-L4-B20-A-SP-1-OP-1	6-7	456
OB Flat	4	G-OB-L4-B20-A-SP-2-OP-2	6-7	461
OB Flat	4	G-OB-L4-B20-A-SP-2-OP-3	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

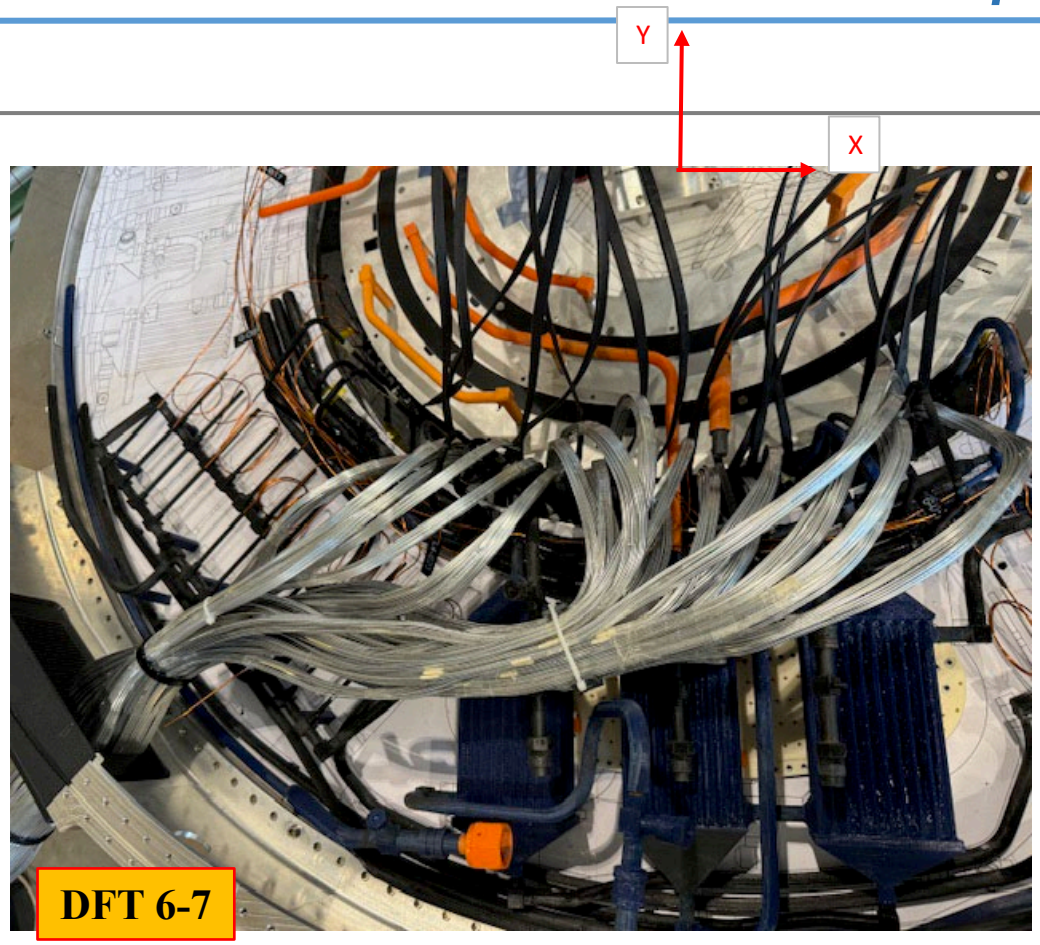
POWER

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**

OB DATA CABLES ROUTING DESIGN-Mockup





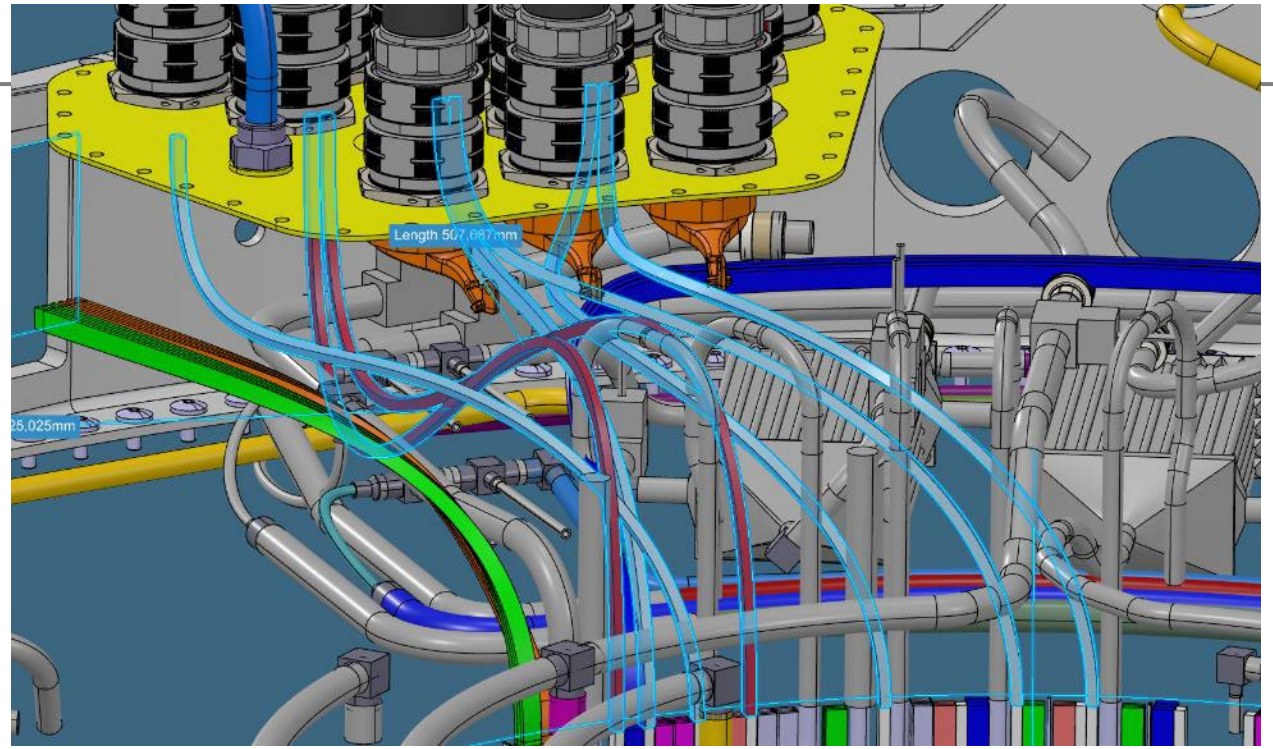
Anchor point

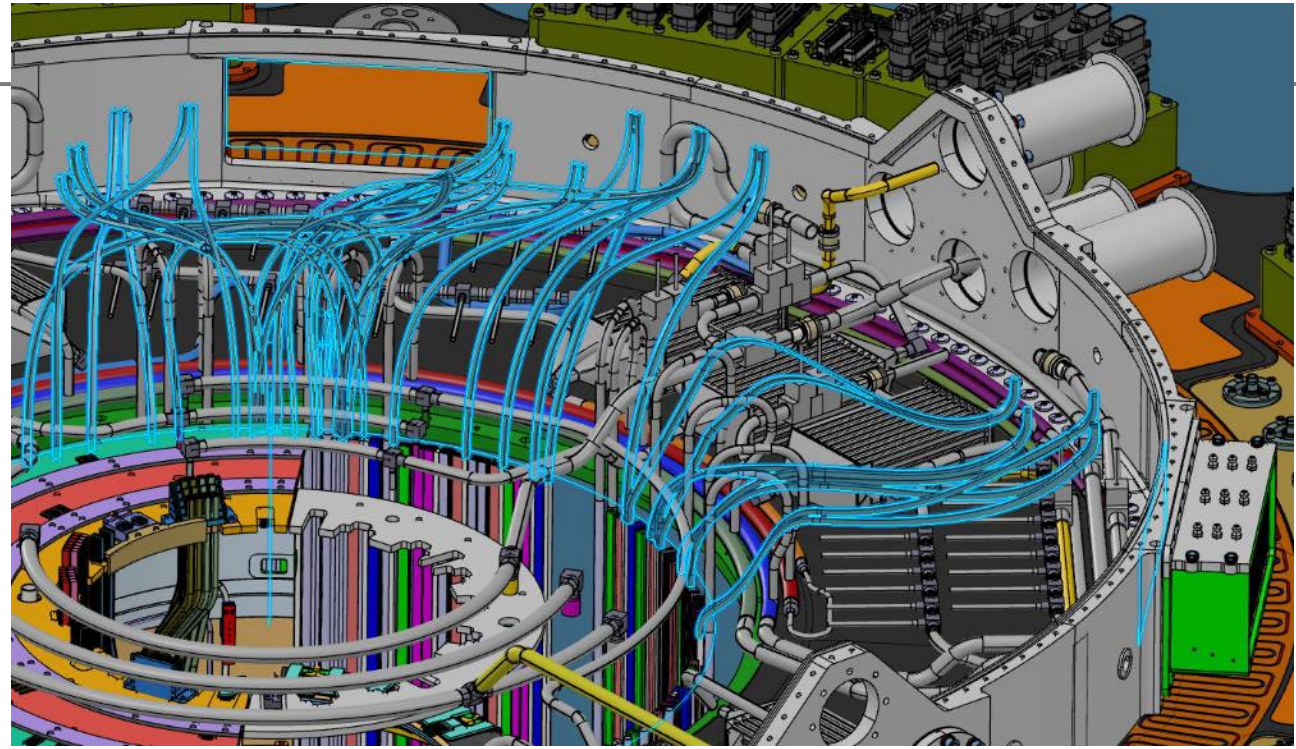
Extra anchor points

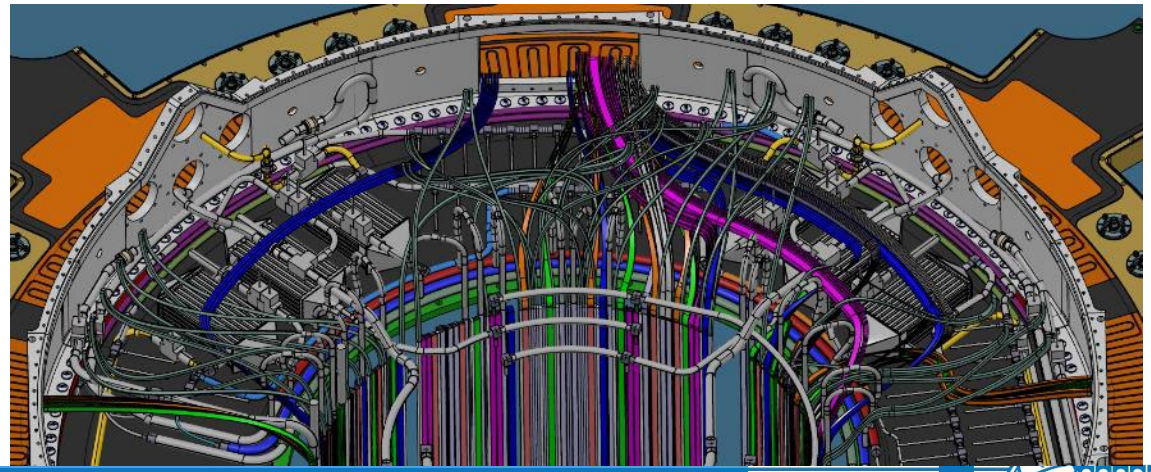
- **For Q4, routing and data cables lengths are taken from PP1 Mockup.**
- **Divide a quarter of OB in four sectors to define the length.**
- **Assign possible position for fixation of cable holders.**
- **Route cables and take the lengths.**
- **<u>Mockup allined with the DFT 6-7 mapping.</u>**

	Name	L [mm]
S1	G-OB-L2-B16-A-DB	900
	G-OB-H2-IU4-A-SP-4-OP-8	850
	G-OB-L4-B27-A-SP-2-DB	845
	G-OB-H2-IU3-A-SP-4-DB-8	845
	G-OB-L3-B21-A-SP-2-DB	780
S2	G-OB-L2-R1-6-B-A-SP-4-OP-4 DC8	750
	G-OB-L4-B26-A-DB	750
	G-OB-L2-B15-A-SP-2-DB	770
	G-OB-L3-B20-A-SP-2-DB	770
	G-OB-L4-B25-A-SP-2-DB	740
	G-OB-L3-B19-A-SP-2-DB	730
	G-OB-L2-B14-A-DB	730
S3	G-OB-L4-R1-9-B-A-SP-4-DC-11	690
	G-OB-L4-B24-A-DB	690
	G-OB-L2-R01-B-A-SP-4-OP-4 DC7	690
	G-OB-H2-IU3-A-SP-4-DB-7	760/610
S4	G-OB-L4-B23-A-SP-2-DB	570
	G-OB-L3-B18-A-SP-2-DB	570
	G-OB-L4-R1-9-B-A-SP-4-DC-10	500
	G-OB-L2-B13-A-SP-2-DB	430
	G-OB-L4-B22-A-DB	420
	G-OB-L3-B17-A-DB	420

OB HV/LV ROUTING DESIGN







POWER CABLES ROUTING:

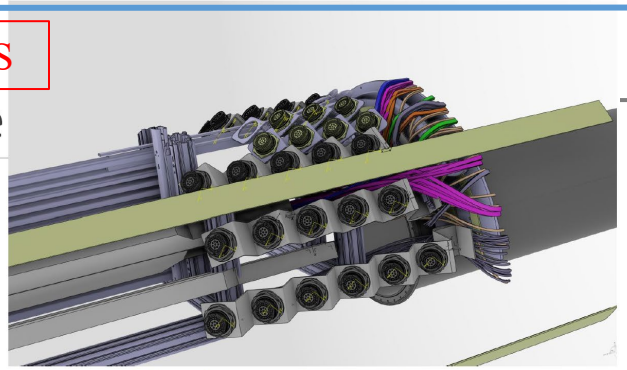
- **They will be placed after the data cables routing.**
- **They will pass between the cooling pipes.**

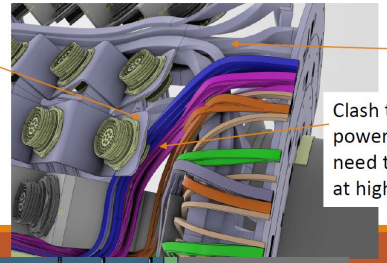
OB HV/LV ROUTING DESIGN

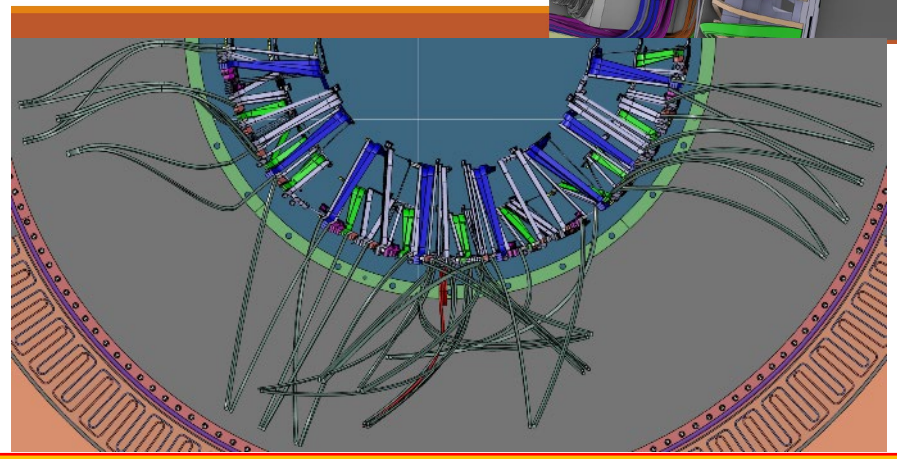
FROM ERIC VIGEOLAS

Very limited space

- When adding EC End Flanges ane 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







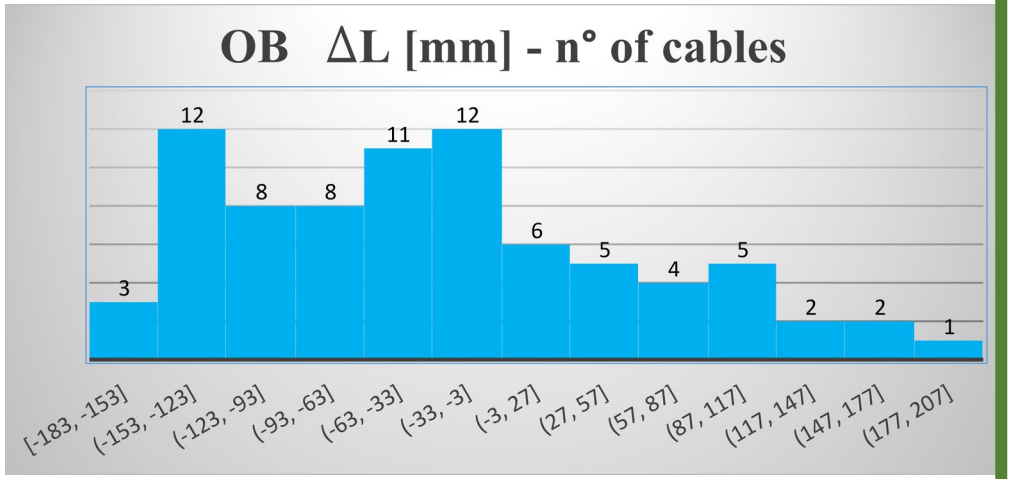
Open configuration EC end to PP1 length(mm)	Closed configuration EC end to PP1 length(mm)	Selected Length(mm)	PP1 side	Δ L
440	399	440	411	-29
318	328	328	422	94
406	461	461	355	-106
377	437	437	402	-35
454	434	454	437	-17
321	381	381	479	98
495	549	549	428	-121
497	553	553	393	-160
435	488	488	464	-24
462	500	500	445	-55
496	549	549	426	-123
550	550	550	408	-142
441	489	489	425	-64
448	497	497	441	-56
381	444	444	388	-56
451	462	462	426	-36
407	412	412	394	-18
357	389	389	407	18
314	348	348	322	-26
327	340	340	322	-18
380	366	380	362	-18
391	369	391	362	-29
436	489	489	403	-86
434	490	490	403	-87
444	500	500	442	-58
394	440	440	380	-60
463	493	493	410	-83
502	551	551	368	-183
496	551	551	403	-148
379	432	432	437	5
447	495	495	506	11
438	496	496	471	-25
498	556	556	406	-150
324	378	378	449	71
495	563	563	413	-150
442	502	502	435	-67
293	340	340	507	167
415	467	467	471	4
367	419	419	392	-27

POWER CABLES ROUTING (WIP):

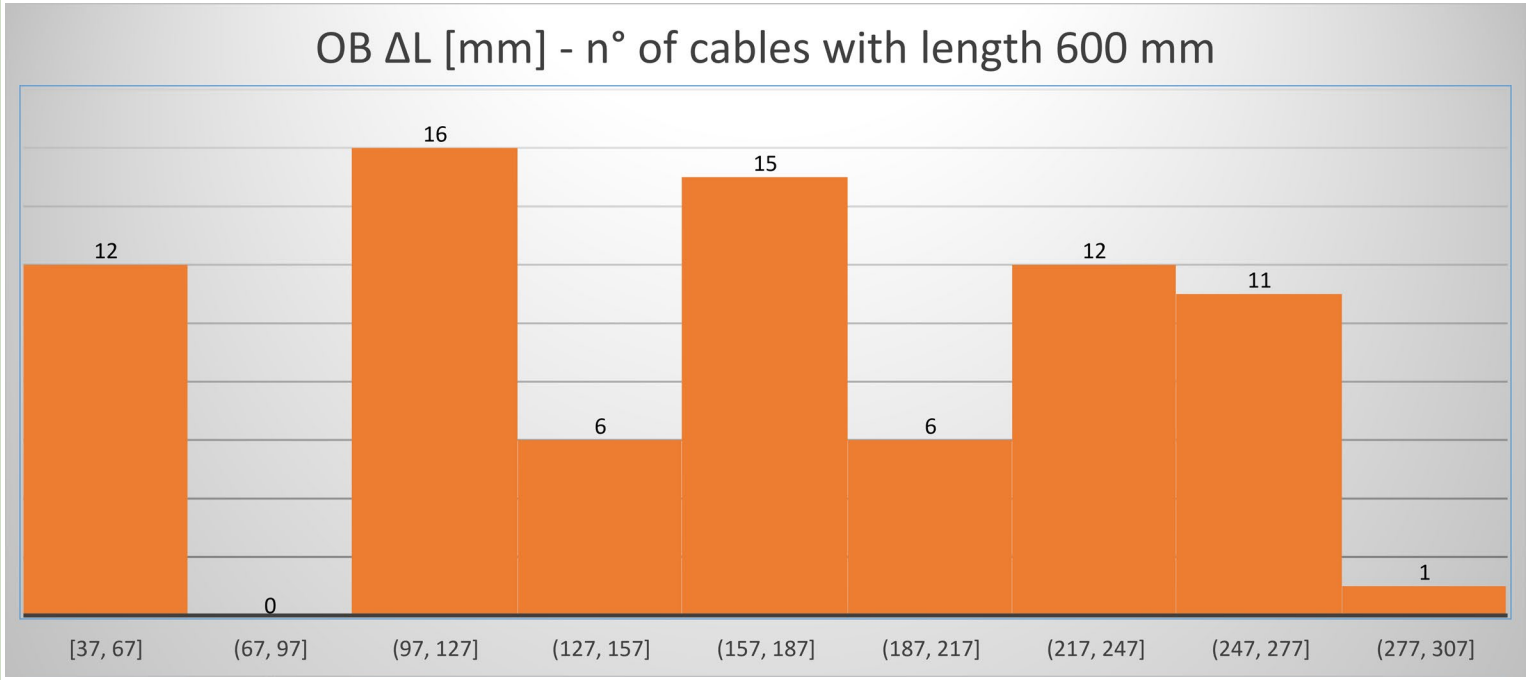
- **Last cross check with open/close configuration. Maximum delta: – 160 mm (red)**
- **Red: increase length inside PP1. Green: extra length managed on trolley**

OB HV/LV ROUTING DESIGN

ΔL with lengths modelled (PP1 side)



ΔL with same standard length on Mockup (PP1 side)



POWER CABLES ROUTING :

- **To simplify, in the prototype we used 700 mm standard length for power cables.**
- **For the histogram i used the same length 600 mm for all the power cables inside PP1 volume to match to compatibility with the lengths on trolley. It works.**
- **$\Delta L \leq 0$: increase length inside PP1.**
- **$\Delta L > 0$: extra length managed on trolley.**

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	G-OB-L3-R01-B-A-SP-4-OP-7	G-OB-L4-R09-B-A-SP-4-DC-10
		2	2	8
G-OB-L2-B15-A-SP-1-OP-1	G-OB-L2-B16-A-SP-1-OP-1	3	3	7
		G-OB-L3-R04-B-A-SP-4-OP-8	4	6
G-OB-L2-B15-A-SP-2-OP-2		G-OB-L3-R05-B-A-SP-4-OP-8	5	G-OB-L4-R05-B-A-SP-4-DC-10
		6	6	G-OB-L4-R04-B-A-SP-4-DC-10
G-OB-L2-B15-A-SP-2-OP-3	G-OB-L2-R06-B-A-SP-4-DC-8	7	7	3
	5	G-OB-L3-R08-B-A-SP-4-OP-8	G-OB-L3-R08-B-A-SP-4-OP-7	2
G-OB-L2-B14-A-SP-1-OP-1	4	G-OB-L4-R09-B-A-SP-4-OP-8	G-OB-L4-R04-B-A-SP-4-OP-8	G-OB-L4-R01-B-A-SP-4-DC-10
	3	8	3	
	2	7	2	
G-OB-L2-B14-A-SP-2-OP-2	G-OB-L2-R01-B-A-SP-4-DC-8	6	G-OB-L4-R01-B-A-SP-4-OP-8	
G-OB-L2-B14-A-SP-2-OP-3	G-OB-L2-R01-B-A-SP-4-DC-7	G-OB-L4-R05-B-A-SP-4-OP-8	G-OB-L4-R09-B-A-SP-4-DC-11	
	G-OB-L2-R05-B-A-SP-4-DC-7		8	G-OB-L4-R04-B-A-SP-3-DC-9
G-OB-L2-B13-A-SP-2-OP-3	4		7	3
	3	G-OB-L4-B25-A-SP-1-OP-1	6	2
G-OB-L2-B13-A-SP-2-OP-2	G-OB-L2-R02-B-A-SP-4-DC-7	G-OB-L4-B25-A-SP-2-OP-2	5	G-OB-L4-R01-B-A-SP-3
	G-OB-L3-B19-A-SP-1-OP-1	G-OB-L4-B25-A-SP-2-OP-3	G-OB-L4-R05-B-A-SP-4-DC-11	G-OB-L4-R09-B
G-OB-L2-B13-A-SP-1-OP-1	G-OB-L3-B19-A-SP-2-OP-2	G-OB-L4-B24-A-SP-2-OP-3	G-OB-L4-R04-B-A-SP-4-DC-11	G-OB-L
	G-OB-L3-B19-A-SP-2-OP-3	G-OB-L4-B24-A-SP-2-OP-2	3	
G-OB-L2-B12-A-SP-2-OP-3	G-OB-L3-B18-A-SP-2-OP-3	G-OB-L4-B24-A-SP-1-OP-1	2	
	G-OB-L3-B18-A-SP-2-OP-2	G-OB-L4-B23-A-SP-2-OP-3	G-OB-L4-R01-B-A-SP-4-DC-11	
G-OB-L2-B12-A-SP-2-OP-2	G-OB-L3-B18-A-SP-1-OP-1	G-OB-L4-B23-A-SP-2-OP-2		
	G-OB-L3-B17-A-SP-2-OP-3	G-OB-L4-B23-A-SP-1-OP-1	G-OB-L4-R04-B-A-SP-3-DC	
G-OB-L2-B12-A-SP-1-OP-1	G-OB-L3-B17-A-SP-2-OP-2	G-OB-L4-B22-A-SP-2-OP-3	3	
	G-OB-L3-B17-A-SP-1-OP-1	G-OB-L4-B22-A-SP-2-OP-2	2	
G-OB-L2-B11-A-SP-2-OP-3	G-OB-L3-B16-A-SP-2-OP-3	G-OB-L4-B22-A-SP-1-OP-1	G-OB-L4-R01-B-A-SP-3-DC-8	
	G-OB-L3-B16-A-SP-2-OP-2	G-OB-L4-B21-A-SP-2-OP-3	G-OB-L4-R04-B-A-SP-3-OP-5	G-OB-L4-R09-B-A-SP-3-DC-8
G-OB-L2-B11-A-SP-2-OP-2	G-OB-L3-B16-A-SP-1-OP-1	G-OB-L4-B21-A-SP-2-OP-2	3	G-OB-L4-R08-B-A-SP-3-DC-8
	G-OB-L3-B15-A-SP-2-OP-3	G-OB-L4-B21-A-SP-1-OP-1	2	7
G-OB-L2-B11-A-SP-1-OP-1	G-OB-L3-B15-A-SP-2-OP-2	G-OB-L4-B20-A-SP-2-OP-3	G-OB-L4-R01-B-A-SP-3-OP-5	6
	G-OB-L3-B15-A-SP-1-OP-1	G-OB-L4-B20-A-SP-2-OP-2	G-OB-L4-R09-B-A-SP-3-OP-5	G-OB-L4-R05-B-A-SP-3-DC-8
G-OB-L2-B10-A-SP-2-OP-3	G-OB-L2-R06-B-A-SP-3-OP-3	G-OB-L4-B20-A-SP-1-OP-1	G-OB-L4-R08-B-A-SP-3-OP-5	
	G-OB-L2-R05-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-2-OP-3	G-OB-L4-R07-B-A-SP-3-OP-5	
G-OB-L2-B10-A-SP-2-OP-2	G-OB-L2-R04-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-2-OP-2	6	
	G-OB-L2-R03-B-A-SP-3-OP-3	G-OB-L4-B19-A-SP-1-OP-1	5	
G-OB-L2-B10-A-SP-1-OP-1	G-OB-L2-R02-B-A-SP-3-OP-3	G-OB-L3-R08-B-A-SP-3-OP-5	G-OB-L3-R08-B-A-SP-3-OP-6	
	G-OB-L2-R01-B-A-SP-3-OP-3 DC6	7	7	
G-OB-L2-B09-A-SP2-OP-3	G-OB-L2-R01-B-A-SP-3-OP-3 DC5	6	6	
	G-OB-L2-R02-B-A-SP-3-OP-3	G-OB-L3-R05-B-A-SP-3-OP-5	G-OB-L3-R05-B-A-SP-3-OP-6	
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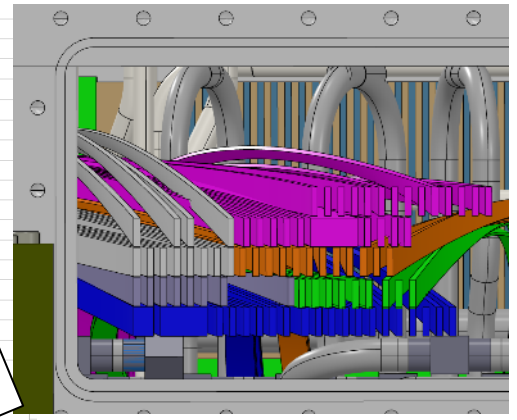
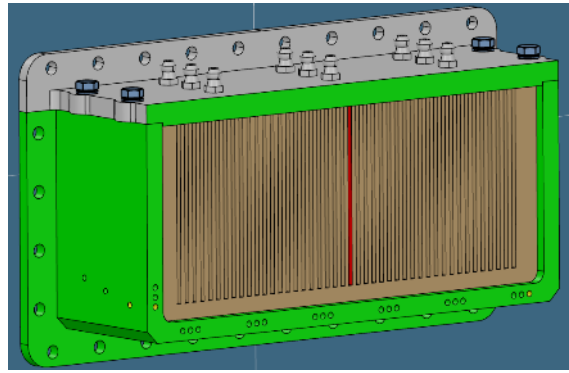
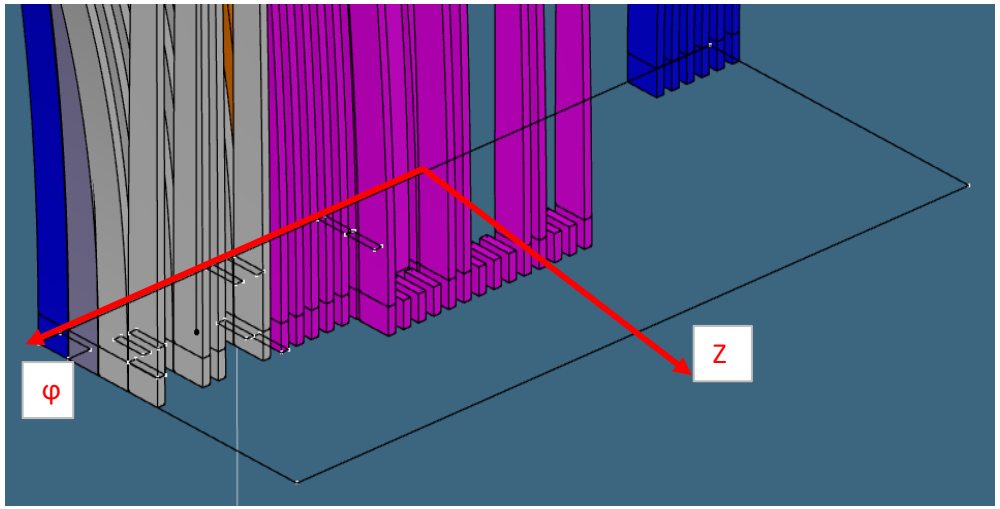
	G-OB-L2-R04-B-A-SP-3-OP-3	3	3	
G-OB-L2-B09-A-SP1-OP-1	G-OB-L2-R05-B-A-SP-3-OP-3	2	2	
	G-OB-L2-R06-B-A-SP-3-OP-3	G-OB-L3-R01-B-A-SP-3-OP-5	G-OB-L3-R01-B-A-SP-3-OP-6	

Frozen. According with Martin Janda







Filling direction

Mapping DFT 6-7

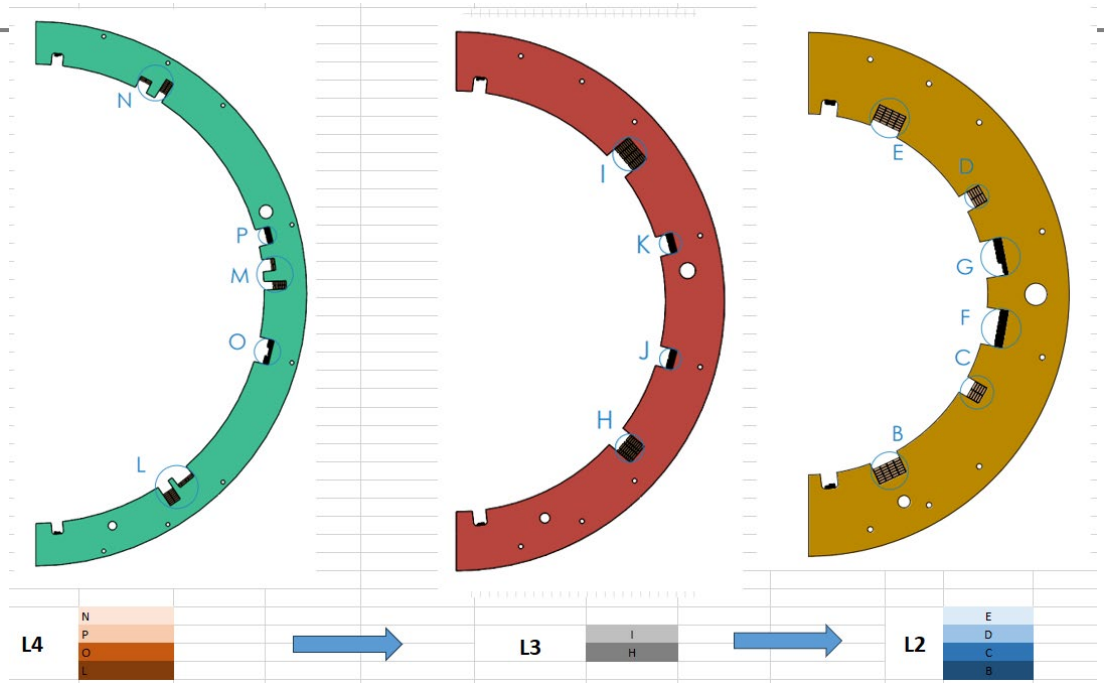
DFT 1-8 A SIDE

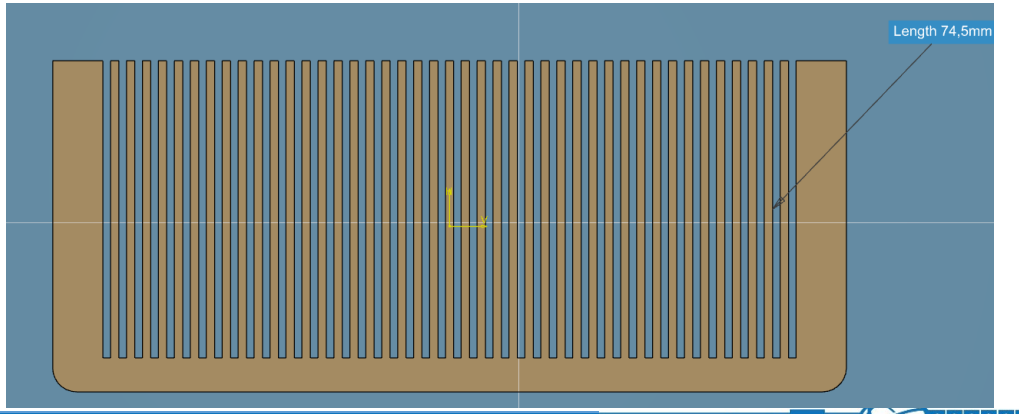
Barrel EC L4 EC L3

	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						G-EC-L2_R11_N-C-SP2		G-EC-L2_R11_N-C-SP2			
19	G-OB-L4-B01-A-SP-1-OP-1	G-EC-L4_R09_N-C-SP2		G-EC-L2_R05_N-C-SP2		G-EC-L2_R05_N-C-SP2		G-EC-L2_R10_N-C-SP2		G-EC-L2_R10_N-C-SP2			
20	G-OB-L4-B01-A-SP-2-OP-2	G-EC-L4_R08_N-C-SP2		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-L4_R09_N-C-SP1		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-L4_R08_N-C-SP1		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-OB-L4-B28-A-SP-1-DC-1			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-OB-L4-B28-A-SP-2-DC-2			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	G-OB-L4-B28-A-SP-2-DC-3			G-EC-L2_R06_N-C-SP1		G-EC-L2_R06_N-C-SP1		G-EC-L2_R06_N-C-SP1		G-EC-L2_R06_N-C-SP1			
30	G-OB-L4-B27-A-SP-1-DC-1			G-EC-L3_R08_N-C-SP2									
31	G-OB-L4-B27-A-SP-2-DC-2	G-EC-L4_R07_N-C-SP2		G-EC-L3_R07_N-C-SP2									
32	G-OB-L4-B27-A-SP-2-DC-3	G-EC-L4_R06_N-C-SP2		G-EC-L3_R06_N-C-SP2									
33	G-OB-L4-B26-A-SP-1-DC-1	G-EC-L4_R05_N-C-SP2		G-EC-L3_R05_N-C-SP2									
34	G-OB-L4-B26-A-SP-2-DC-2	G-EC-L4_R04_N-C-SP2		G-EC-L3_R04_N-C-SP2									
35	G-OB-L4-B26-A-SP-2-DC-3	G-EC-L4_R03_N-C-SP2		G-EC-L3_R03_N-C-SP2									
36	G-OB-L3-B22-A-SP-1-OP-1	G-EC-L4_R02_N-C-SP2		G-EC-L3_R02_N-C-SP2									
37	G-OB-L3-B22-A-SP-2-OP-2	G-EC-L4_R01_N-C-SP2		G-EC-L3_R01_N-C-SP2									
38	G-OB-L3-B22-A-SP-2-OP-3	G-EC-L4_R07_N-C-SP1		G-EC-L3_R08_N-C-SP1									
39	G-OB-L3-B21-A-SP-1-OP-1	G-EC-L4_R06_N-C-SP1		G-EC-L3_R07_N-C-SP1									
40	G-OB-L3-B21-A-SP-2-OP-2	G-EC-L4_R05_N-C-SP1		G-EC-L3_R06_N-C-SP1									
41	G-OB-L3-B21-A-SP-2-OP-3	G-EC-L4_R04_N-C-SP1		G-EC-L3_R05_N-C-SP1									
42	G-OB-L3-B20-A-SP-1-OP-1	G-EC-L4_R03_N-C-SP1		G-EC-L3_R04_N-C-SP1									
43	G-OB-L3-B20-A-SP-2-OP-2	G-EC-L4_R02_N-C-SP1		G-EC-L3_R03_N-C-SP1									
44	G-OB-L3-B20-A-SP-2-OP-3	G-EC-L4_R01_N-C-SP1		G-EC-L3_R02_N-C-SP1									
45				G-EC-L3_R01_N-C-SP1									
46	φ	8,5	21,6	34,7		47,8		60,9		74			
47			13,1										
48													
49													

Z

EC L2



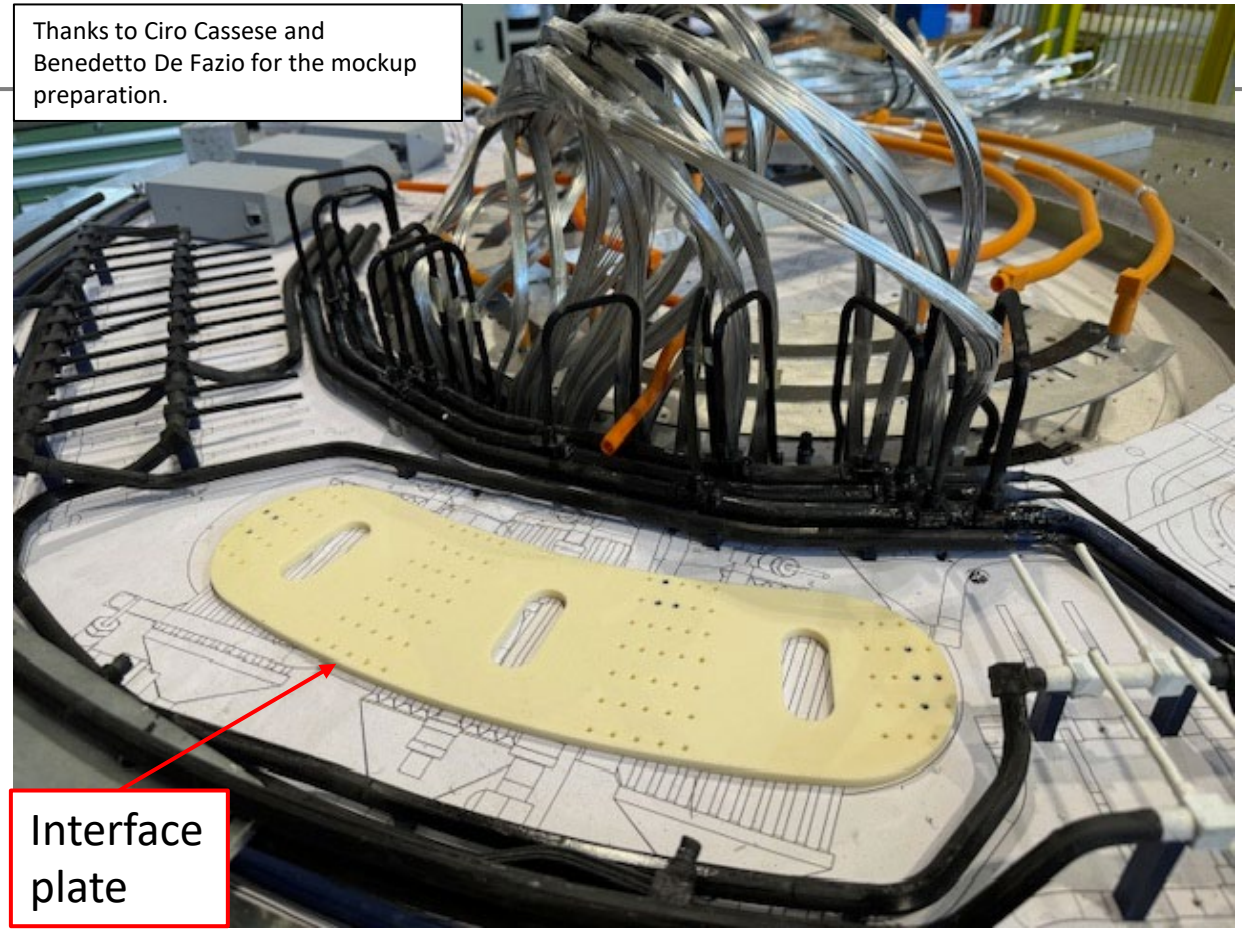


DFT 1-8:

- **Proposal of mapping.**
- **The filling in z-ϕ respect the integration sequence.**

MOCKUP STATUS

Thanks to Ciro Cassese and Benedetto De Fazio for the mockup preparation.

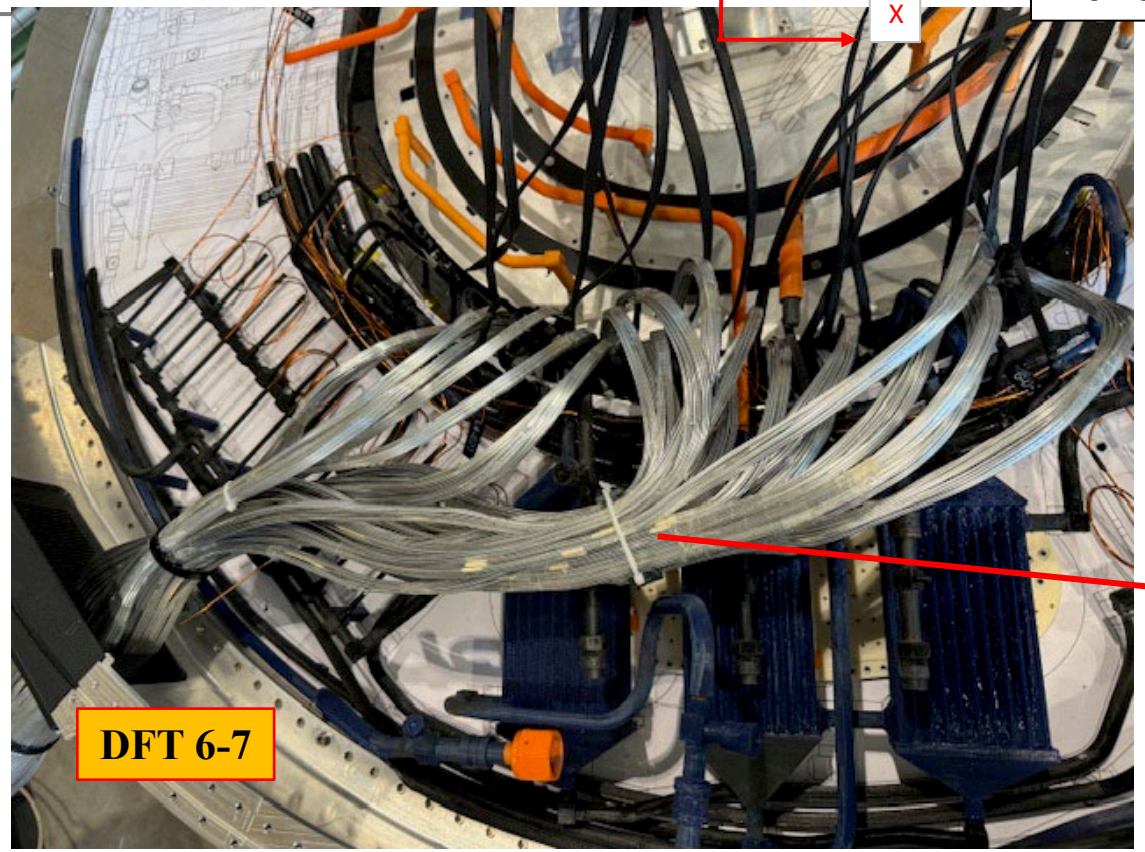


The assembly of the mockup followed the integration sequence.

<u>Step 1</u>:

- **Cooling pipes fixed. Work done by Beka Buadze.**
- **Interface plate on the bulkhead mounted.**

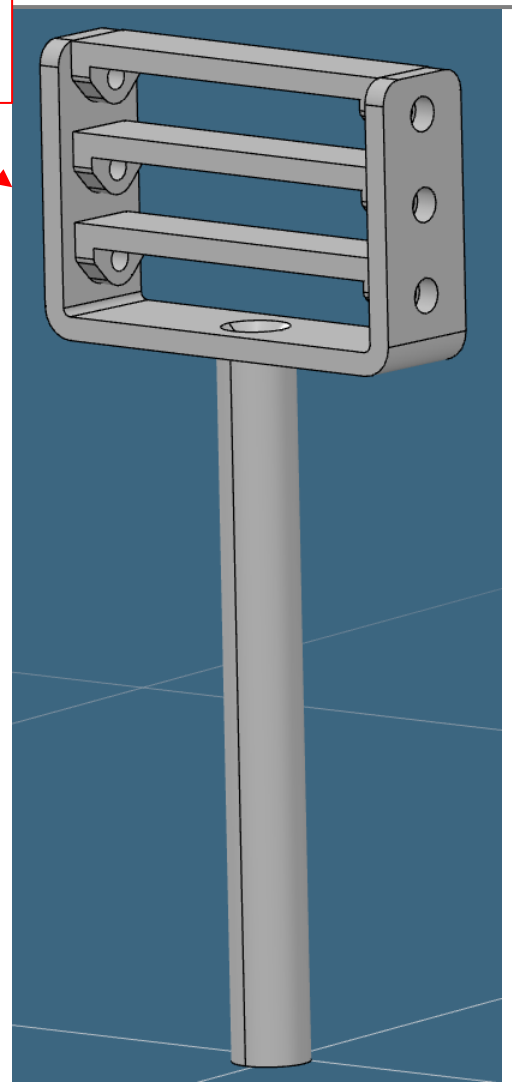
MOCKUP STATUS



Works done with Antonio Croce!

Interface flange
(glued on bulkhead)

CABLES
HOLDER



STEP 2

- **Heaters fixed. Works done by Beka Buadze.**
- **Routing OB data cables, fixing them cable holders → validate design, lenghts and services supports.**
- **Power cables connectorized. Placed on the top of piping and data routing.**

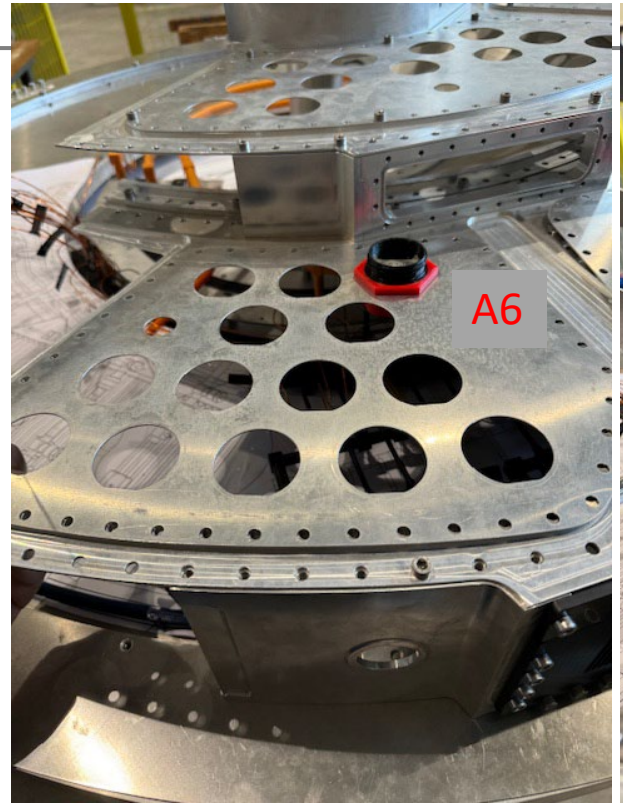
MOCKUP STATUS

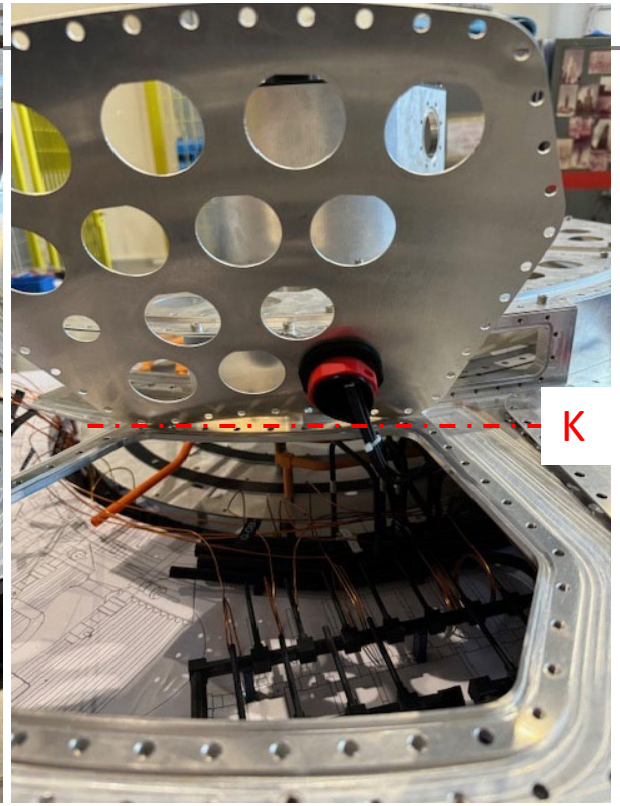
PP1 prototype made by Sandro Tomassini

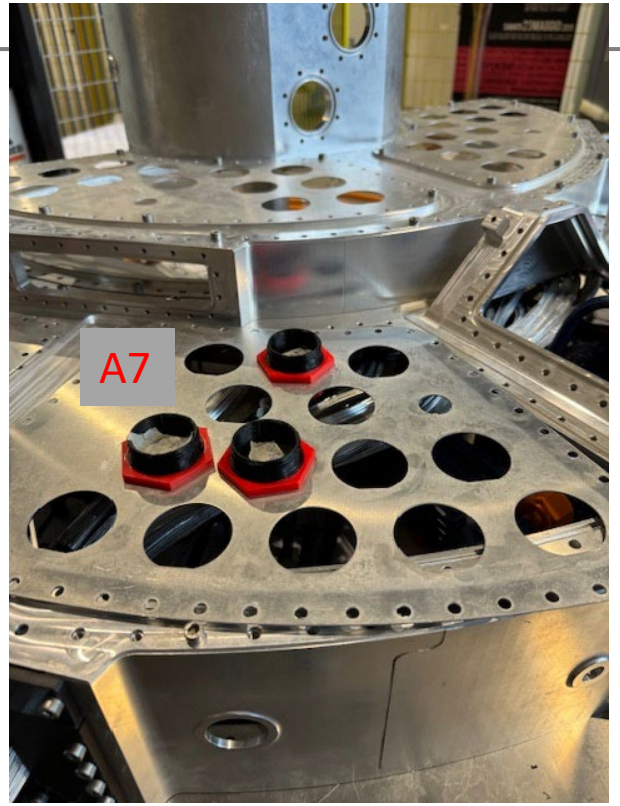
DETAILS:

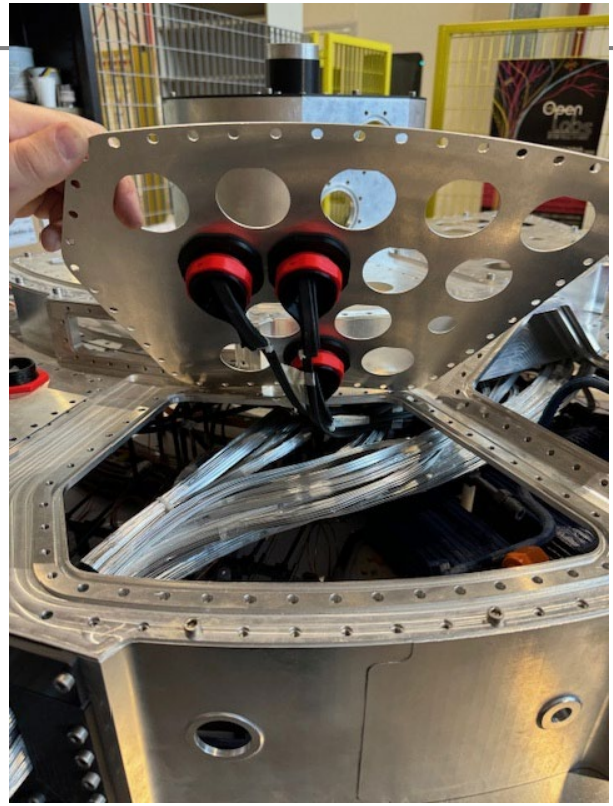
- **The PP1 allows the storage of the power bundles connectorized.**
- **It's possibile to use the interface flange as a multiple anchor point for fixing the power /data cables.**

MOCKUP STATUS





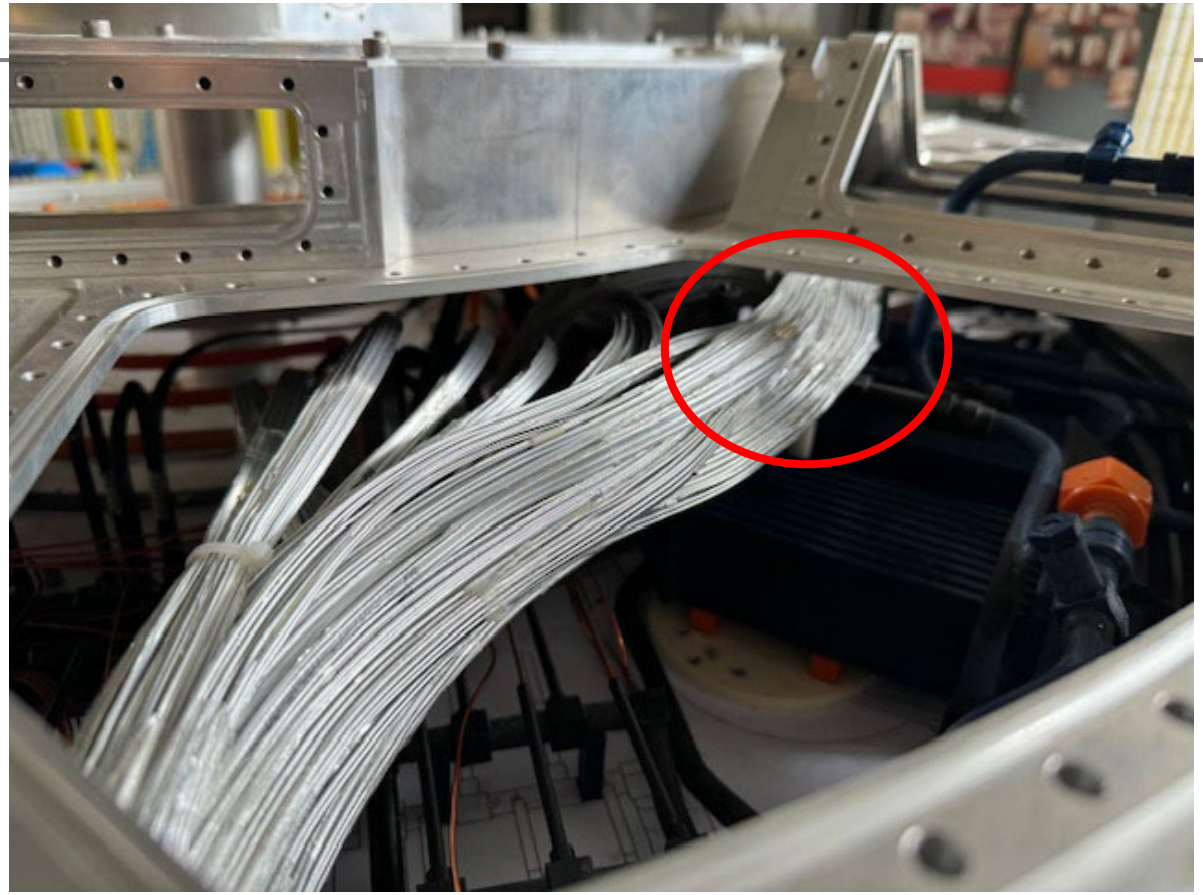




STEP 3:

- **Outer flange mounted.**
- **Fixing connector to the assigned position on panels.**
- **Tested the panels opening →rotation around the k axis.**
- **No anomalies detected.**

MOCKUP STATUS



DETAILS 2:

- **Data routing passed between pipes. Critical region!**
- **Possible stress on cables.**
- **Clearance for routing limited, in particular for the power cables.**

MOCKUP STATUS

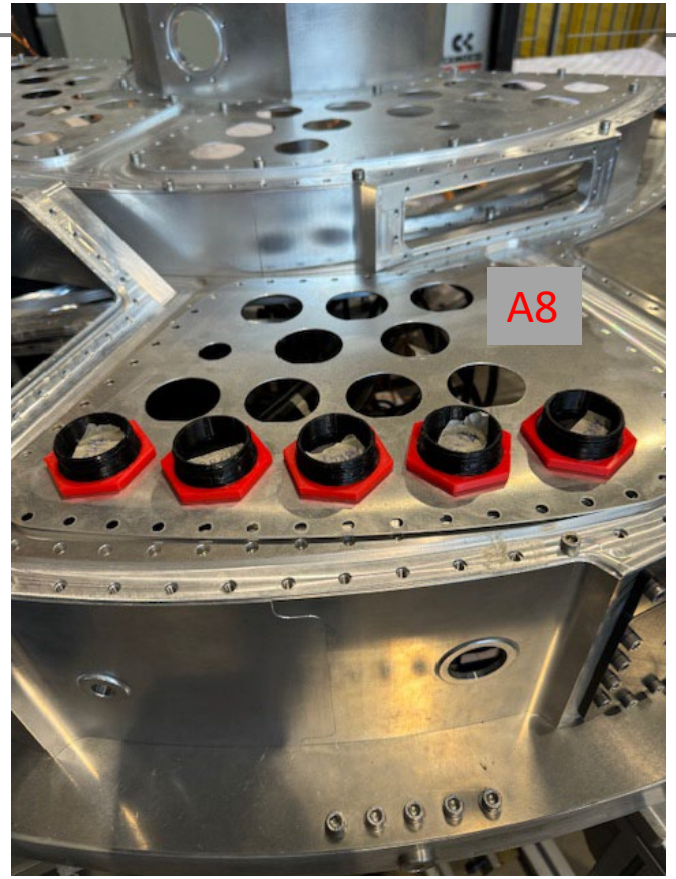
Q3

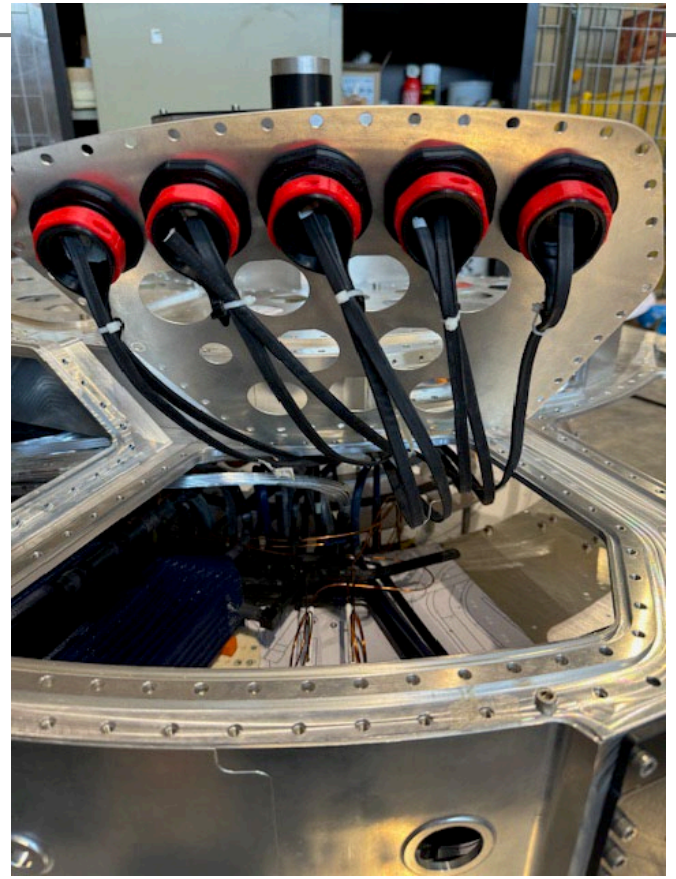
Q4

DETAILS 3:

- **PP1 internal view of all service populated for Q3 and Q4 view.**

MOCKUP STATUS



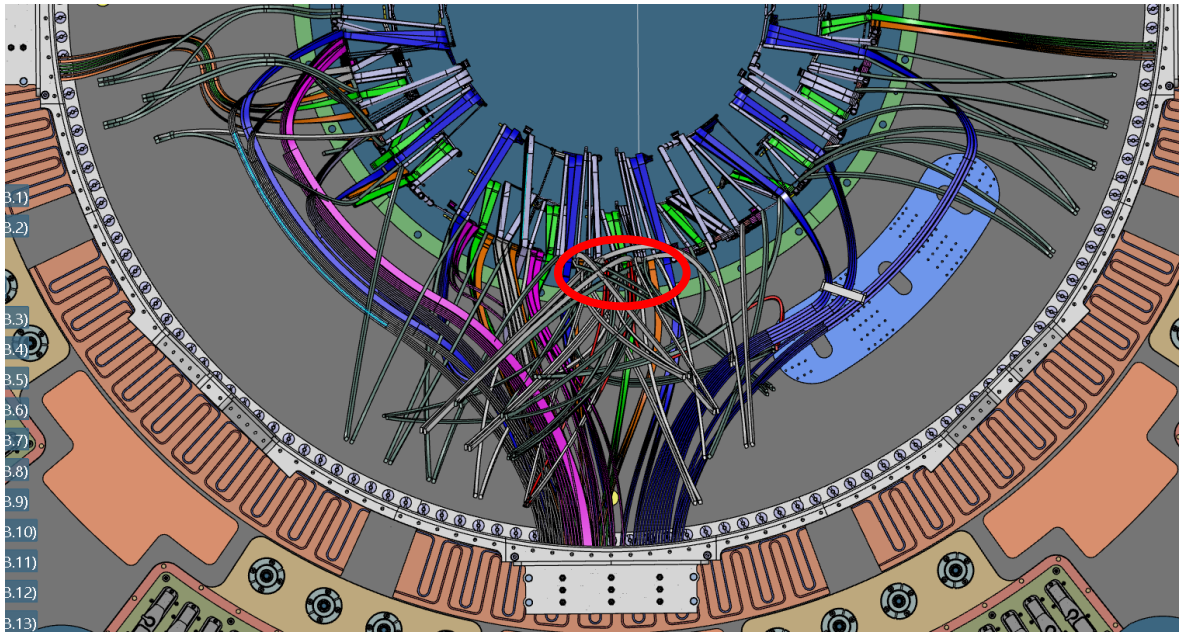


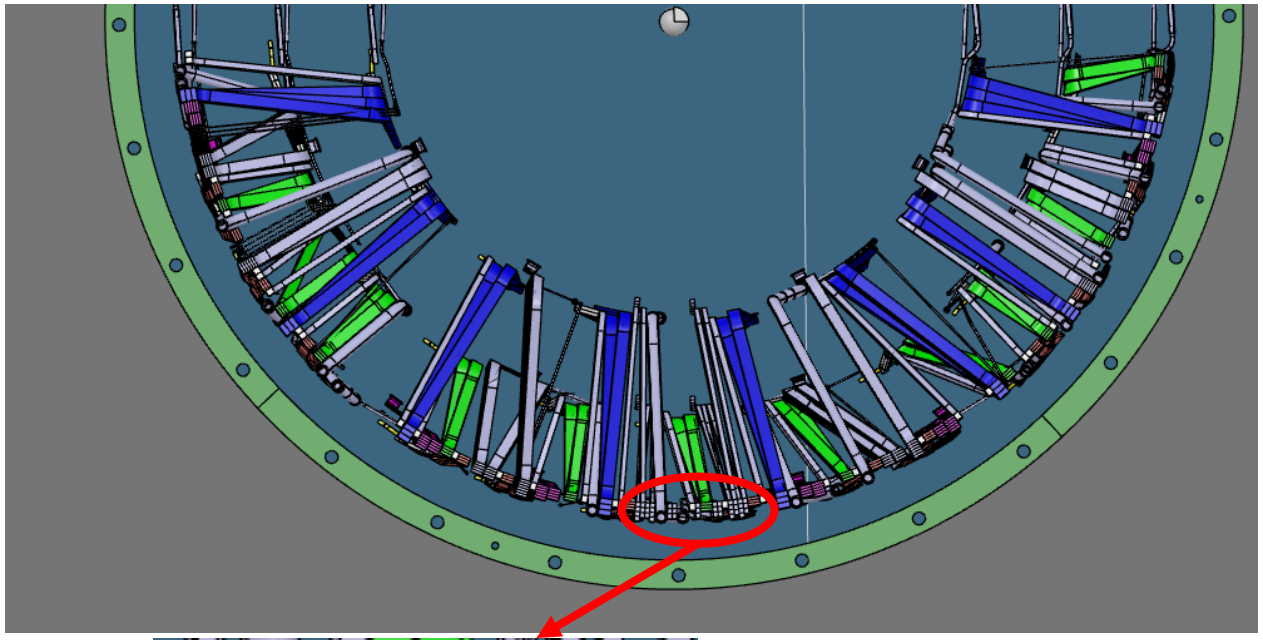
DETAIL 4:
- **PP1 Panel and global structure.**

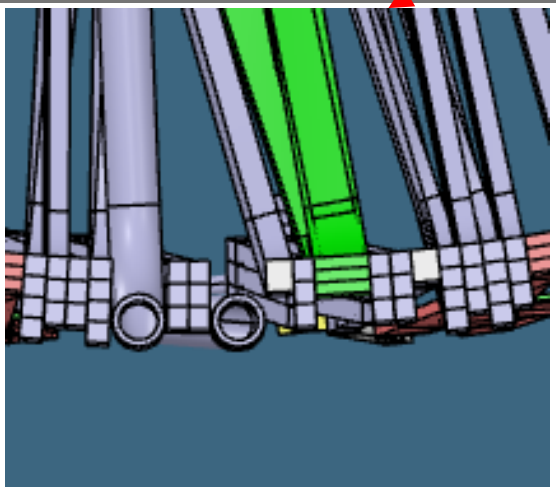
MOCKUP STATUS

PP1 stand made by Emilio Capitolo

MOCKUP STATUS



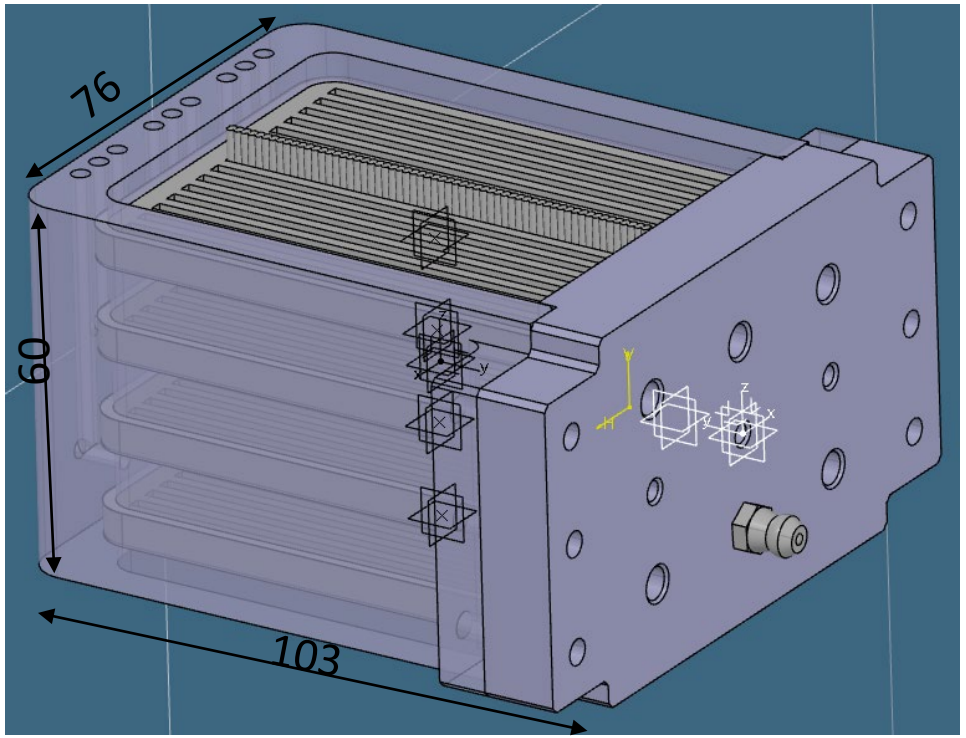


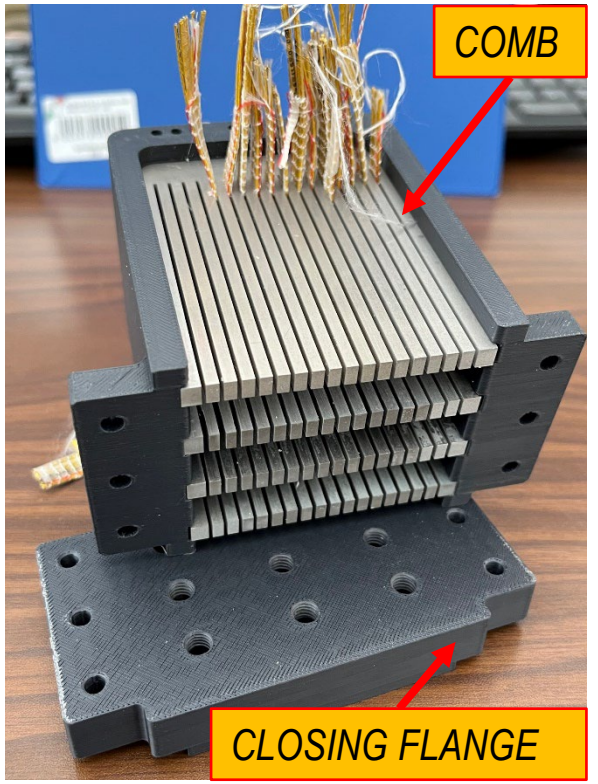


DETAIL 5:
OB H2 region marked, is not present in the mock up.

BACKUP SLIDES

Data Feedthrought Prototype

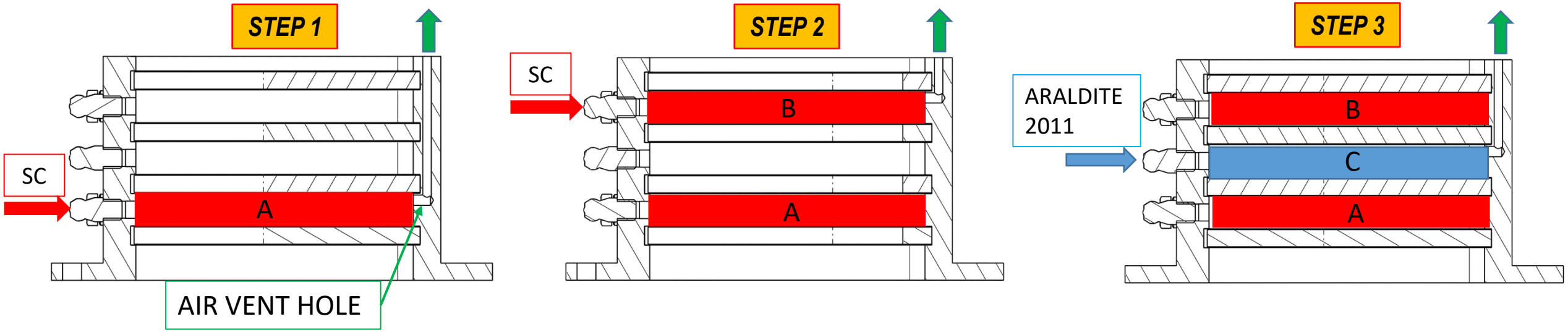




We improved the prototype of 1/3 of Outer Feedthrough:

- **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).**
- **Process and design will be applied to the full scale prototype.**

FILLING PROCESS

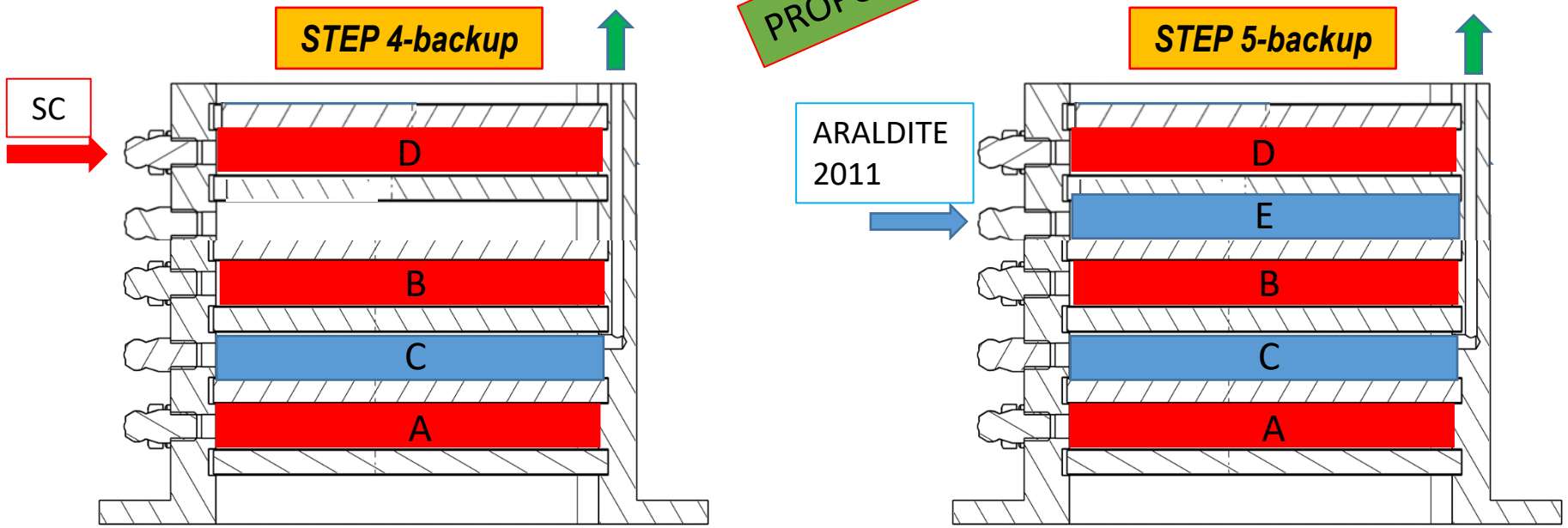


The filling process follows this step by step procedure:

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.**

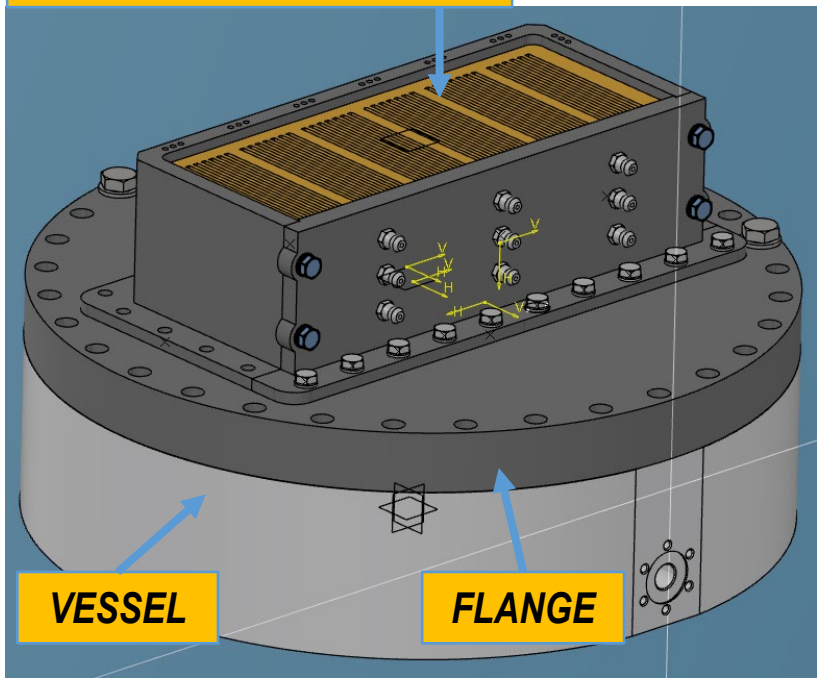
FILLING PROCESS-backup

PROPOSAL



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.

Data Feedthrought Prototype



Leak Test OS data feedthrought:

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