

Status of cables MB and RB

(between detectors and towers)

MU Integration

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Fabio Montecassiano
INFN PD @ CERN PH/CMM

Status of cables

I'm going to cover the following points

- . **Status of PRR**
- . **Definition of materials**
- . **Procurement of cables**
- . **Cutting Lengths' status**

Definition of materials

- Concerning **MB** and **RB**, there are still some open question
 - **DT Fibers** aren't fully defined
NEXT THURSDAY there will be a WORKSHOP in which should be chosen the kind of fiber (ARMORED or with PLASTIC TUBE) and its routing (RADIAL or UNDER MAB)
 - The connector at minicrate side of the DT's RO cables (**MB.CA.ro**) is under discussion. It has to be checked against interference with FE cables.
 - **LV Connectors** proposed by **CAEN** for *EASY LV* sys.
Do they will available in time for manufacturing of cables ?

Status of PRR procedure – RB and MB cables

- **HV cables** (about **12%** of the total BARREL cables)

Both HV cables for MB and RB **was approved and checked doing the fire test.**

- **LV cables (9%)**

MB.LV.fe	(2.5%, DT's FE):	Approved, Fire test passed.
RB.LV.fe-#	(4%, RPC's FE):	Approved, Fire test passed.
MB.LV.mc	(2.5%, DT's minicrate):	Documents are inside EDMS. Fire test to be done.

- **Optical Fibers (5%)**

MB.OF.ttc-mc	(2.5%, DT's ttc):	Fire test to be done.
MB.OF.sc	(2.5%, DT's slow ctrl):	Approved, Fire test passed .. but it could be changed

- **Signal cables (72%)**

RB.CA.sgn	(50%, RPC's trigger):	Documents are inside EDMS. Fire test to be done
MB.CA.tr & ro	(10%, DT's TR & RO):	MB.CA.tr can be put under PRR. Connectors for MB.CA.ro are still under discussion.

Cables passed the Fire test at TIS.

RB.CA.dcs-# & t-sens (7%):	They changed few weeks ago, now from NOVACAVI. Documents almost done. Fire test to be done
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MB.CA.sc (2%):	Under working now, comes from CERN STORE.
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MB.CA.veto (3%):	CERN STORE DOESN'T SUPPLY ANYMORE THIS.
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Asked an offert to NOVACAVI for a multicable.

Procurement of cables – RB and MB cables

- **HV cables (12%)** for both MB and RB was procured and delivered at CERN.
- **LV cables (9%).**
 - MB.LV.fe (2.5%): **Already procured and delivered at CERN.**
 - RB.LV.fe-# (4%): **Already procured and delivered at CERN.**
 - MB.LV.mc (2.5%): *Aachen soon will place order to NOVACAVI.*
Delivery time is about **6 weeks** for the **FULL PRODUCTION.**
- **Optical Fibers (5%)**
 - MB.OF.ttc-mc (2.5%) } **THESE ARE NOT FULLY DEFINED.**
 - MB.OF.sc (2.5%) } Furthermore *They will need cutting lengths* in order to place the order to **UNIFIBRE.**
Delivery time is *4 weeks* for the SECTOR TEST Q.TY.
- **Signal cables (72%)**
 - RB.CA.sgn (50%): Ordered from KABELWERK and NOVACAVI for the sector test.
 - MB.CA.tr & ro (10%): Bologna ordered this from DAETWYLER.
They need space to store a big amount of cable (38 km)
 - RB.CA.dcs-# & t-sens (7%): INFN is ordering in these days.
They will be delivered at beginning of **Feb. '05**
 - MB.CA.sc (2%): Already procured the q.ty from CERN STORE for the SECTOR TEST.
 - MB.CA.veto (3%): **NOT FULLY DEFINED**

STATUS of MB and RB cables

Cable name	Supplier	Respons. person	% length	PRR status	Order status (full prod.)	Delivering time		Manufacture time (working weeks)		
						sect test	full prod.	sect test	1 wheel	5 wheels
MB.LV.mc	NOVACAVI	Willmott	2.3	not tested	ordering ¹⁾	6 w (full prod.)		2 w	not specified	not specified
MB.LV.fe	INTERCOND	Pegoraro	2.3	done	delivered	delivered	delivered	2 w @ ISR	3 w @ ISR	12w @ ISR
MB.HV	KERPEN	Borsato	6	done	delivered	delivered	delivered	done	done	done
MB.OF.ttc-mc	UNIFIBRE	Bellato	4	not def.	not ordered ²⁾	4 w (with con.)	6 w (with con.)	delivered with connectors		
MB.OF.sc	UNIFIBRE	Bellato	4	done but ..		4 w (with con.)	6 w (with con.)	delivered with connectors		
MB.CA.sc	CERN STORE	Bellato	1.5	CERN store	not ordered ³⁾	delivered	6 w (worst)	2 w @ PD		
MB.CA.veto-5	NOVACAVI	Bellato	4	not tested	not ordered ⁴⁾	6 w (full prod.)		2 w @ PD		
MB.CA.tr	DAETWYLER	Odorici	7.8	tested	ordered	begin. of Feb. '05 (full prod.)		2 w @ ?		6 w @ DAETWYLER
MB.CA.ro			7.8	tested						

RB.LV.fe-8	NOVACAVI	Ranieri	2.8	done	delivered	delivered	delivered	3 w	3 w	5 w
RB.LV.fe-12	NOVACAVI	Ranieri	0.5							
RB.HV	NOVACAVI	Ranieri	6	done	delivered	delivered	delivered	3 w	3 w	5 w
RB.CA.sgn	NOVACAVI	Ranieri	43	not tested	CERN tender	20.12.04	20 [Km/m]	3 w	3 w	6 w
RB.CA.dcs-6	NOVACAVI	Piccolo	3.2	not tested	ordering ⁵⁾	begin. of Feb. '05 (full prod.)		3 w	4w @ ? (tbv)	6 w @ CPE
RB.CA.dcs-9			0.6							
RB.MCA.t-sens			3.2							

WORST CASE CUTTING LENGHTS TIME LIMIT (respect schedule 4.10.04 AB)	4 w (DT fibers) end Jan. '05	> 6 w (DT fibers) end Feb. '05	> 12 w (MB.LV.fe)
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REMARKS

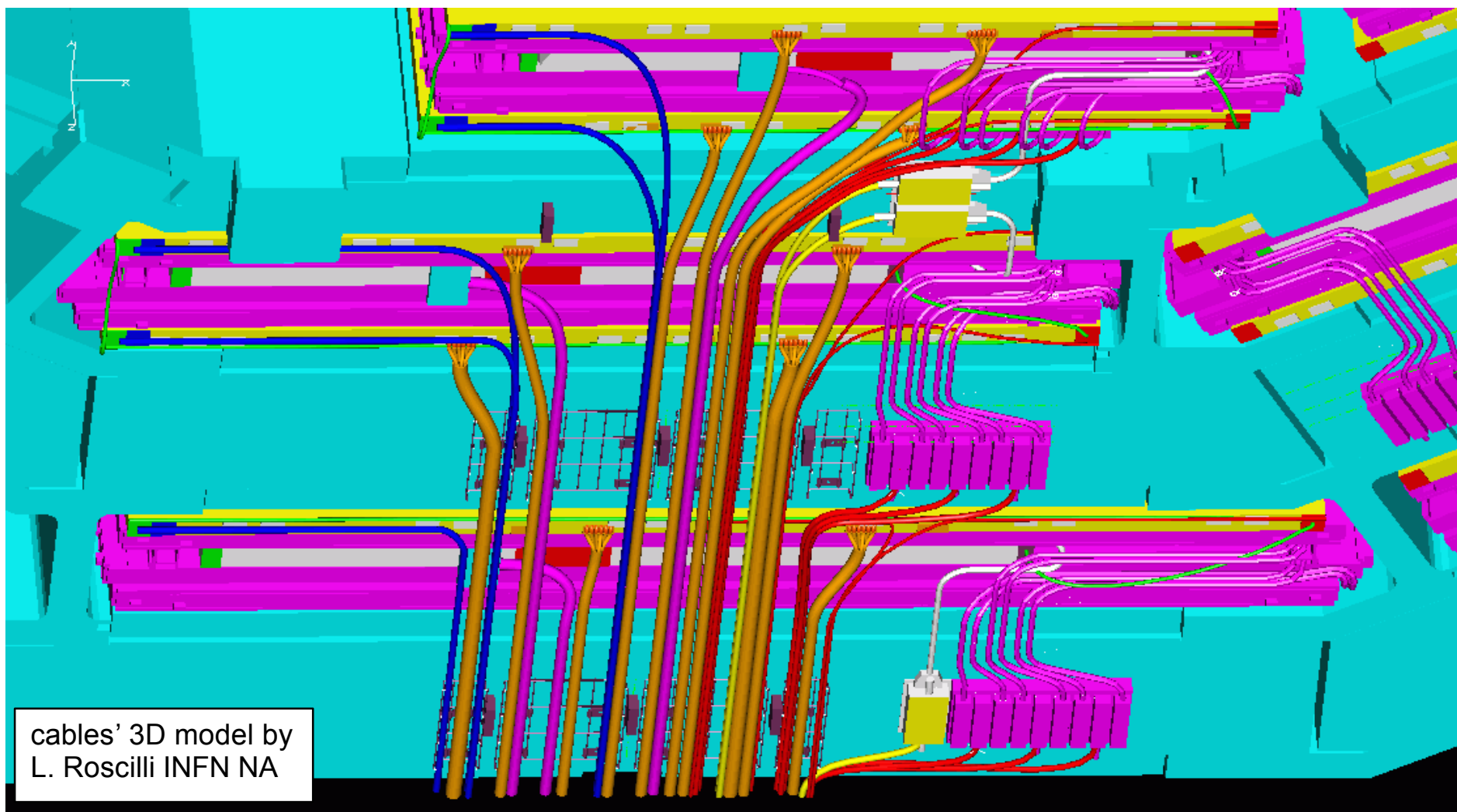
- 1) Aachen is waiting the new NOVACAVI's offert (old was expired) from MADRID. The offert should be ready in few days.
- 2) THU. 9, DEC. there will be a workshop in which should be chosed the kind of fiber (ARMORED or with PLASTIC TUBE) and its routing (RADIAL or UNDER MAB)
- 3) It's confirmed to be a CERN STORE cable. Next days I will ask for the PRR procedure.
- 4) Not yest fully defined. Goods news during this CMS weeks.
- 5) Just the time to complete the INFN internal administative procedure, few days.

Cutting Lengths for ext. wheels – RADIAL LENGTHS 1/4

- **Radial ZpL and ZpR layouts**, which define radial path for layers 1,2 and 3 are **almost ready**. Lorenzo ROSCILLI (INFN NA) is now particularizing these layouts taking in account the MB4 of **YB2 S10 and S11**. After he will be able to produce a table with all the radial lengths and the offsets respect the conventional point on the iron external corner.
- It's not possible to make a real separation between cables of different groups.
- **HO cables accomodated in the radial layouts** (very close to the layer 1 channel, $\sim 8 \text{ cm}^2$)
- **DT fibers below the mabs**. It will be discussed in details next **THURSDAY 9 DEC** among Alignment group, fibers responsible and integration engineers.
- **Still to be done**
 - The cross check for all position of minicrate and its connectors, holes on carter, split board... The source of all these info is PD, so the check should be done there. I asked Lorenzo to export a dwg with these infos to be checked.
 - **ZmL and ZmR** layouts and their particularizations to layer 4
 - The table with lengths and offsets

Cutting Lengths for ext. wheels – RADIAL LENGTHS

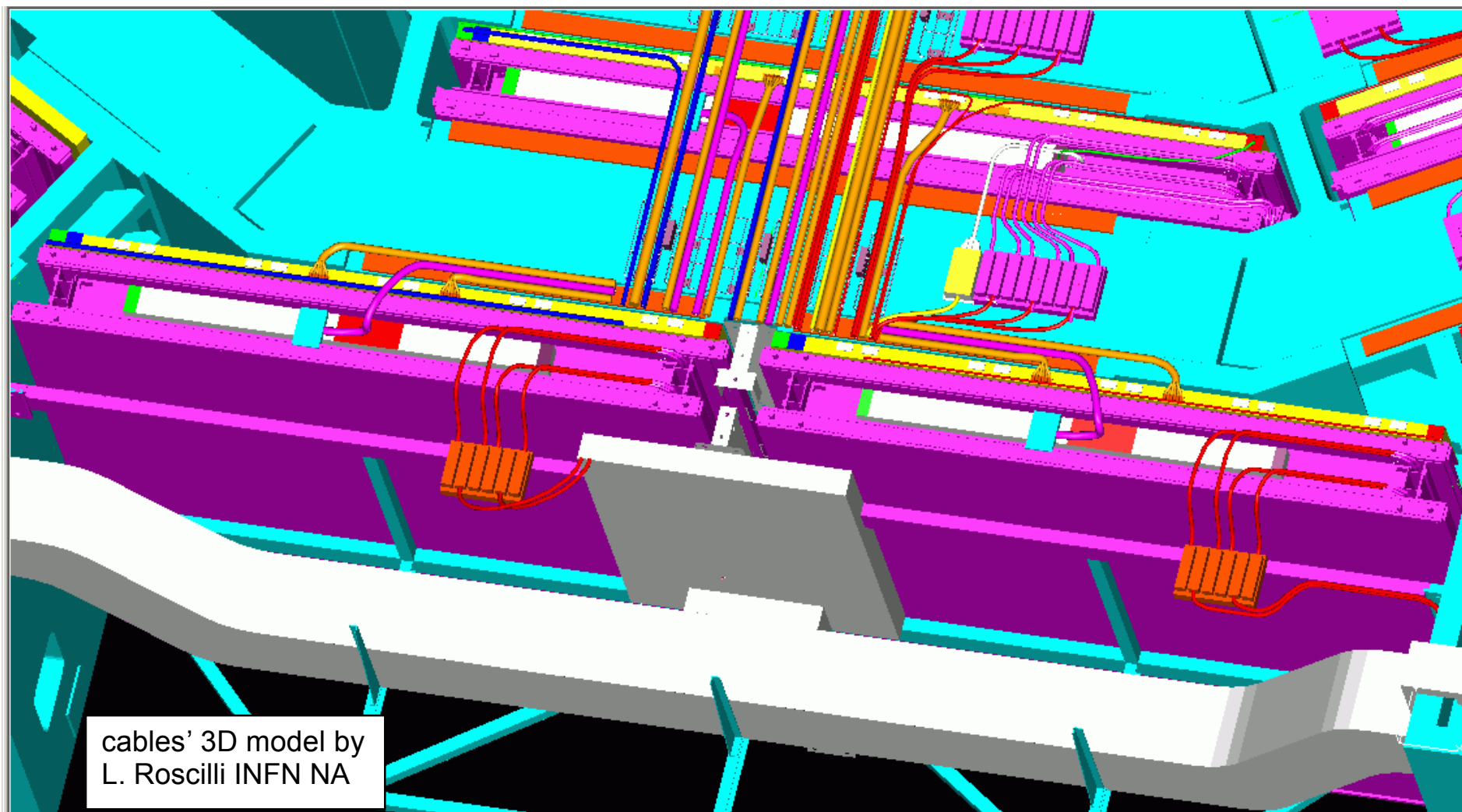
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YB+2 Sector 10 (ZpL layout)

Cutting Lengths for ext. wheels – RADIAL LENGTHS

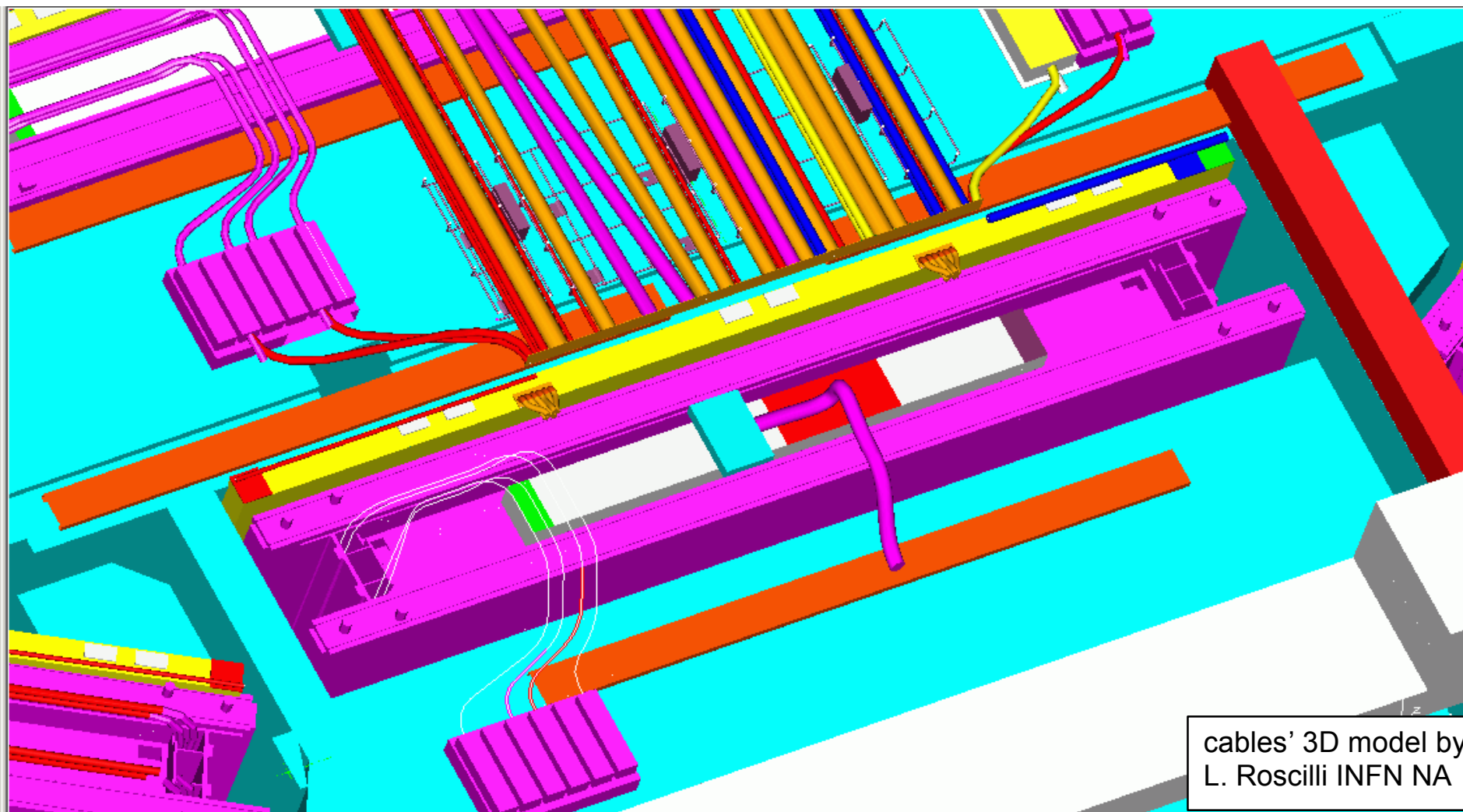
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YB+2 Sector 10, layer 4 details (ZpL layout)

Cutting Lengths for ext. wheels – RADIAL LENGTHS

4/4



YB+2 Sector 11, MB4/11 chamber inside foot (ZpR layout)

Cutting Lengths for ext. wheels – TOWERS' BALCONIES AND FEET PATCH PANEL

- **Lowest diving boards cannot be drilled as needed.**

We propose to lift up racks putting a base of about 25 cm. Anyway front access to the rack will be better if we will make holes on the - not structural part - of diving board.

- **To cut cables means to freeze the crate layout. No major modification will be possible after. Present assumption:**

- **AC/DC converters for LV power supplies** in the central balconies (ext. wheels)
(but last week RPC asked for 3 extra U/quadrant in order to accomodate the CAEN's AC/DC boxes inside the LV racks..Matteo is against..Carlos ?. this question is still open!)

In any case these boxes will be accessible only from front side.

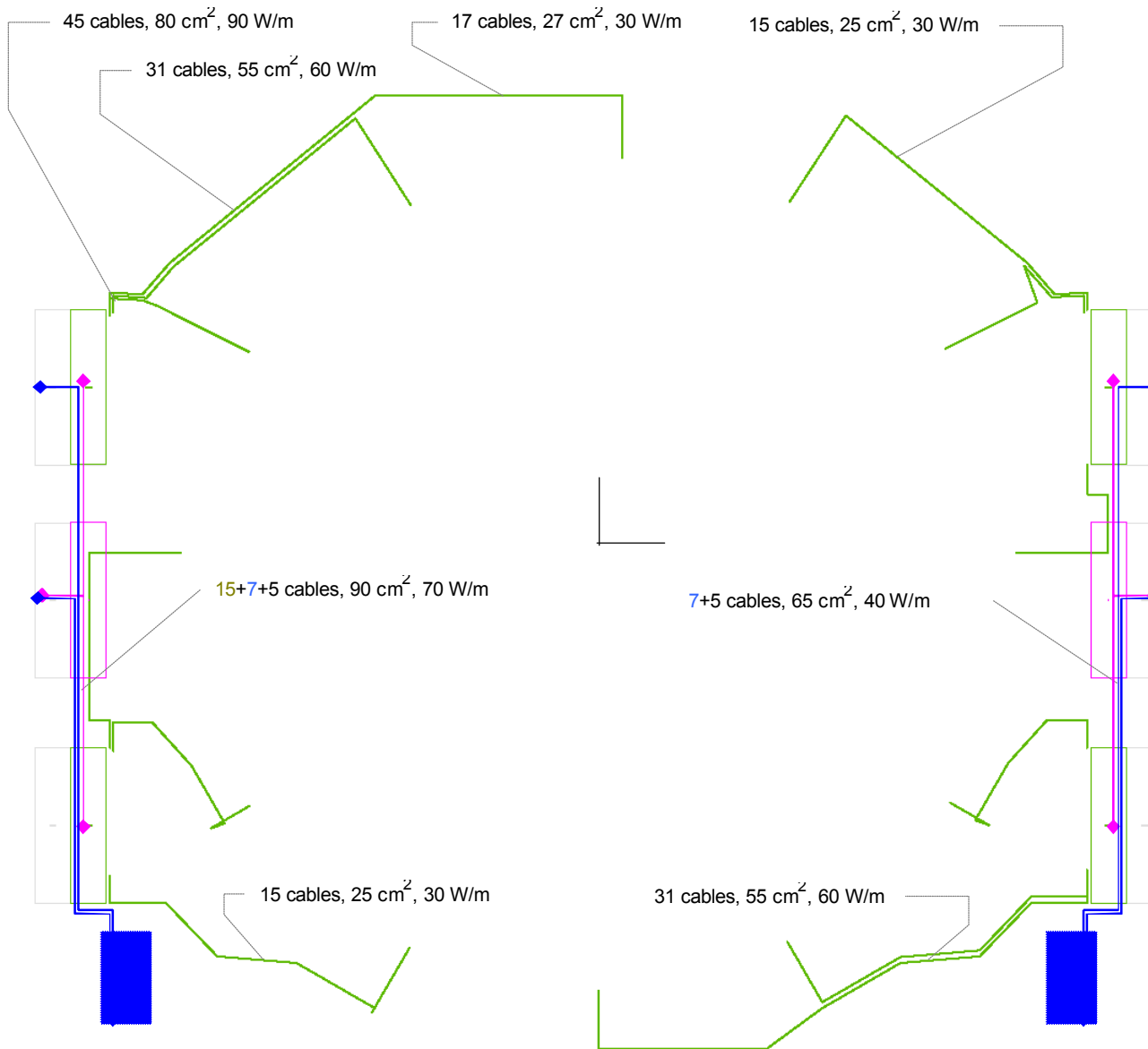
- **Some crates have already a well defined position inside racks, others not.**

- About lengths inside rack, 2 possibilities:
 - exact length (we need a CAD study, who can make this ?)
 - roughly worst approssimation
- Extra lengths about 1.5 m. To be stored
 - on 'mesh' below highest and middle diving boards
 - inside feet and below the racks' new base in the lowest diving boards
- Same for the feet patch panels

Cutting Lengths for ext. wheels — PERIPHERAL LENGTHS

- **Mechanical studies are now in progress for the feet area of external wheels (see Domenico presentation) and feet patch panels**
Their completion is critical in order to define cutting lengths
- **Highest sectors don't seem to need further particular studies.**
Anyway there it's needed some CAD study in order to extract lengths.
- **The requirements for the peripheral cables tray are**
 - . LV: about 200x100 mm² cooled
 - . HV: At least 250 x 100 mm²
 - . Copper signal and fibers: about 500 x 100 mm²

Routing and cutting lengths – LV full system



LV cables

PER 1 SECTOR

MB.LV.mc	4-5 cables,	15 cm ² ,	25 W/m
MB.LV.fe	4-5 cables,	7 cm ² ,	3 W/m
RB.LV.fe-8	5-6 cables,	4 cm ² ,	1.5 W/m
RB.LV.fe-12	1 cable,	1 cm ² ,	0.5 W/m

— **Worst total** 17 cables, 27 cm², 30 W/m

BETWEEN 2 BALCONIES

MB.LV.48v_ux	3 cables,	27 cm ² ,	22 W/m
RB.LV.48v_ux 1-2	2 cables,	18 cm ² ,	15 W/m

— **Worst total** 5 cables, 45 cm², 37 W/m

BETWEEN FOOT PPanels & BALCONY

— **MB.LV.hv_ux** 4-7 cables, 22 cm², 0.7 [W/m]

PACK FACTOR IS TO BE ADDED !

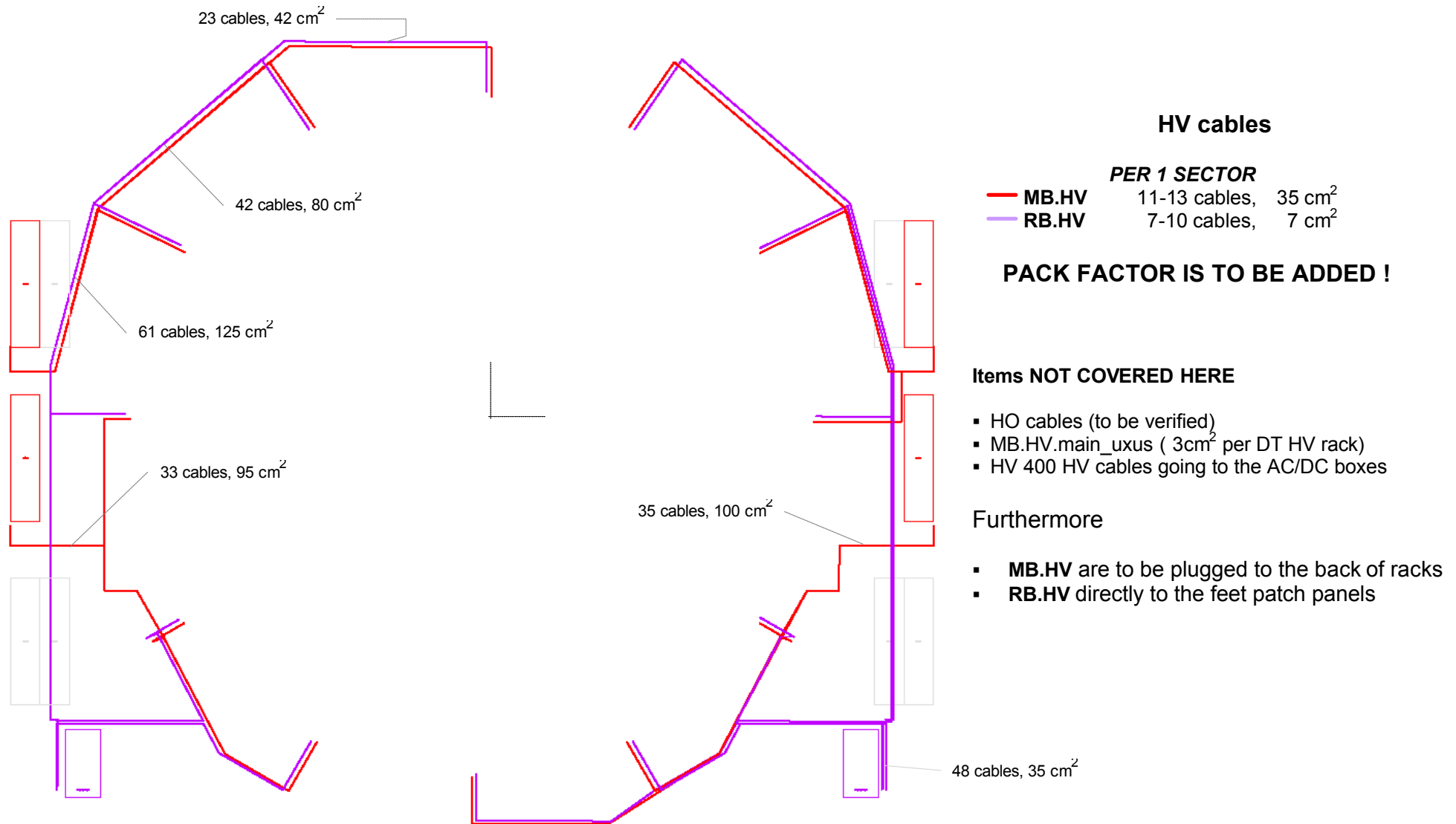
Items **NOT COVERED HERE** because their dissipation should be negligible respect the others above

- HO cables (to be verified)
- Alignment cables (Enrique confirmed this)
- The power 400Hz cables (Sergei confirmed this)

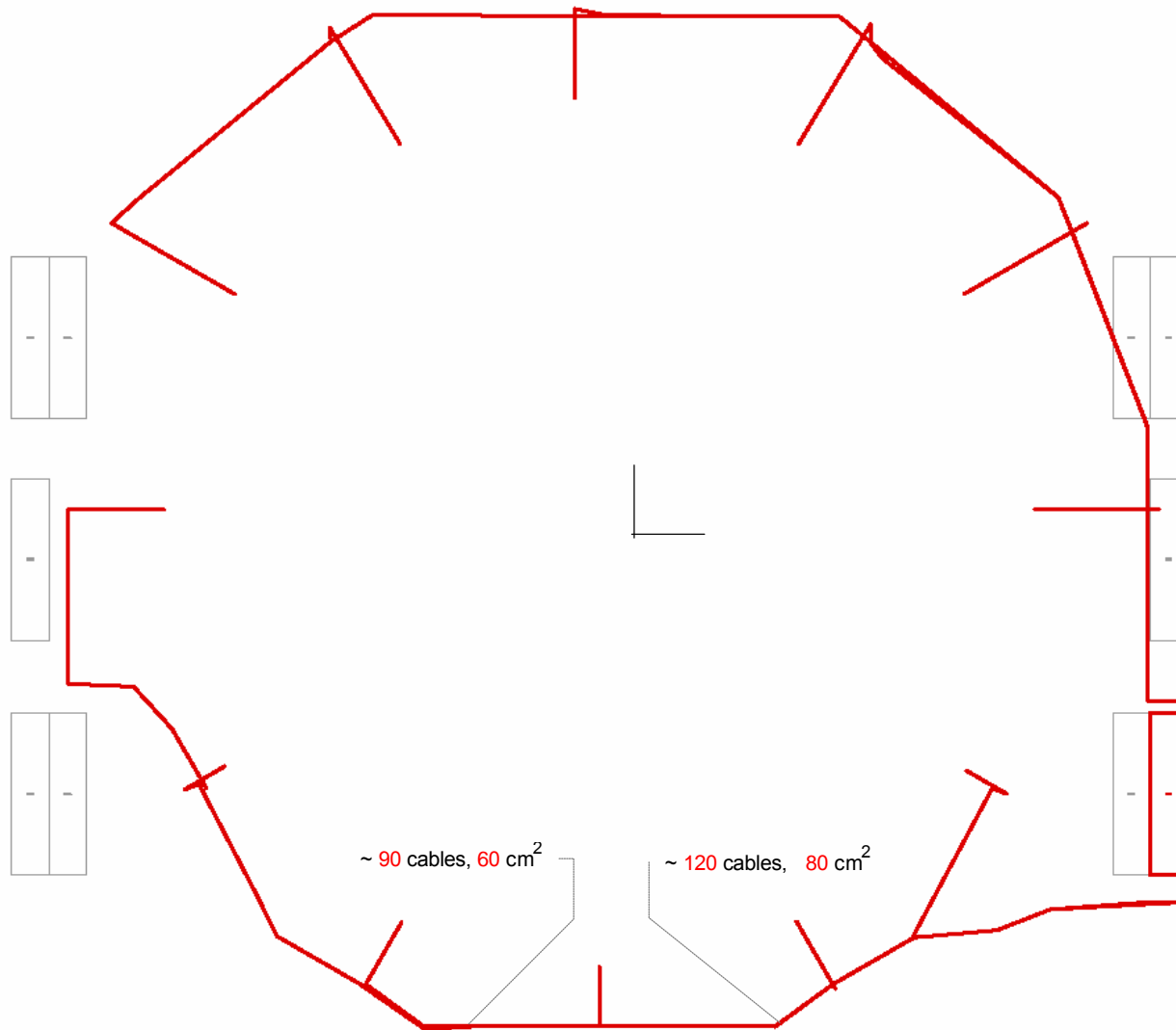
Furthermore, it's supposed that

- All cables are to be plugged to the front of racks
- Feet will be not cooled
- AC/DC boxes in the central balconies - inner side

Routing and cutting lengths – HV full system



Routing and cutting lengths – DT's TR, RO & sc



DT's TR, RO & sc cables

	<i>PER 1 SECTOR</i>
MB.CA.tr	8-10 cables, 5 cm ²
MB.CA.ro	8-10 cables, 5 cm ²
MB.OF.ttc-mc	4-5 cables, 5 cm ²
MB.OF.sc	4-5 cables, 5 cm ²
MB.OF.veto	1-2 cables, 3 cm ²
— Worst total	25-32 cables, 23 cm²

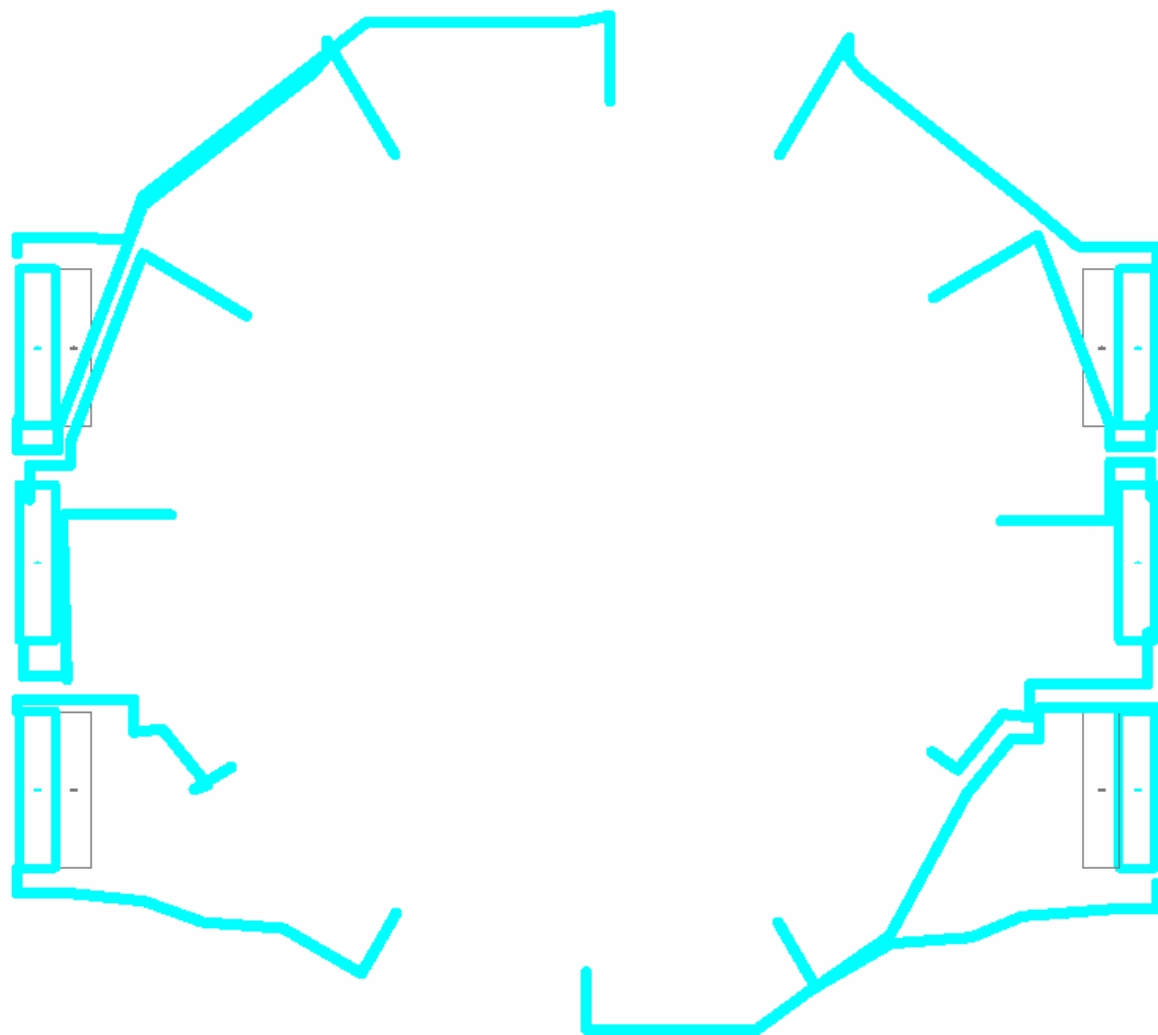
Items NOT COVERED HERE

- MB.HV.sc copper daisy-chain

Furthermore

- All cables with front access only (to be verified)
- MB.CA.veto is a multi-cable
- Optical fibers aren't finalized !
- The MB4/9 and MB4/11 have to wait
 - DT's TR, RO & sc cables
 - HO cables
 - Alignment cables
 before to be installed.

Routing and cutting lengths – RPC's trigger and DCS



RPC's trigger and dcs cables

PER 1 SECTOR

RB.CA.tr
RB.CA.dcs-6
RB.CA.dcs-9

— Worst total about 100 cables, 100 cm²

RB.CA.sgn's peripheral CABLES LENGTHS (from the ref. start point on MB3's iron corners **up to** the ref. end point at balconies)

WHEEL +2

Quadrant			Quadrant			Quadrant			Quadrant				Up to the balcony reference point		TOWER NEAREST USC55 (X>0)	
1	2	3	4	5	6	7	8	9	10 (short)	10 (long)	11	12	Length	TOP balcony		
	B -	T -											Correction			
													Remark			
													Corrected Length [mm]			
T -													Length	MIDDLE balcony		
													Correction			
													Remark			
													Corrected Length [mm]			
									B -				Length	BOTTOM balcony		
													Correction			
													Remark			
													Corrected Length [mm]			
													Length	Foot P. Panel		
													Correction			
													Remark			
													Corrected Length [mm]			
													Length	TOP balcony		
													Correction			
													Remark			
													Corrected Length [mm]			
													Length	MIDDLE balcony		
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													Correction			
													Remark			
													Corrected Length [mm]			
													Length	Foot P. Panel		
													Correction			
													Remark			
													Corrected Length [mm]			

Source
1
2
3
4
5
6
7

Correctionn applied
a S10 has 2 paths, 1 inside hole is shorter , the 2nd is on the foot's face, longer.
b
c
d
T cables enter from top
B cables enter from the bottom

Engineers
BS BALLY Stephane
DD DATTOLA Domenico
MF MONTECASSIANO Fabio
SM SMILJKOVIC Nebojsa
WM WENSVEEN Martinus

About releasing cutting Lengths for ext. wheels

- **Sector test** (all cables of 2 sectors - scheduled in March '05 – about 1 month)
 - IF** (Assumptions to be verified)
 - the worst manufacturing time as **4 weeks** (DT fibers)
 - RPC group will help in preparing theirs lengths (Davide 2 weeks at cern ?)
 - To transform all the mechanical studies (radial, peripheral, racks ..) into real cutting lengths we (me and the RPC person) will need at least **2 weeks** of work
 - Integration office (Faber, Bally, Jan Bos ...) will be available to perform a cross-check in short time using the EDMS procedure

THEN ALL THE MECHANICAL STUDIES IN THE FEET AREA AND THE RADIAL LENGTHS

HAVE TO BE COMPLETED BEFORE 15 JANUARY '05

This means that all the involved person (Domenico, Lorenzo, me) have to work really FULL TIME on these items. Support from **Integration office** and **home institutes** is needed

- **YB+2 installation** (scheduled in half May '05 – about 1 month) (**TO BE DISCUSED !**)
 - IF** (Assumptions to be verified)

- March '05 spent in the test installation – no others works will be possible
- the worst manufacturing time is 6 weeks per 1 wheel (DT Fibers)
- At least 3 weeks to produce the cutting list (FABIO + DAVIDE) from mech. studies.

THEN ALL THE MECHANICAL STUDIES IN ALL SECTORS

SHOULD BE COMPLETED BEFORE **15 FEBRUARY '05** (IS THIS POSSIBLE ?)

- extension of this work to all external wheels with further weeks of work.