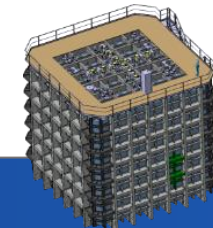
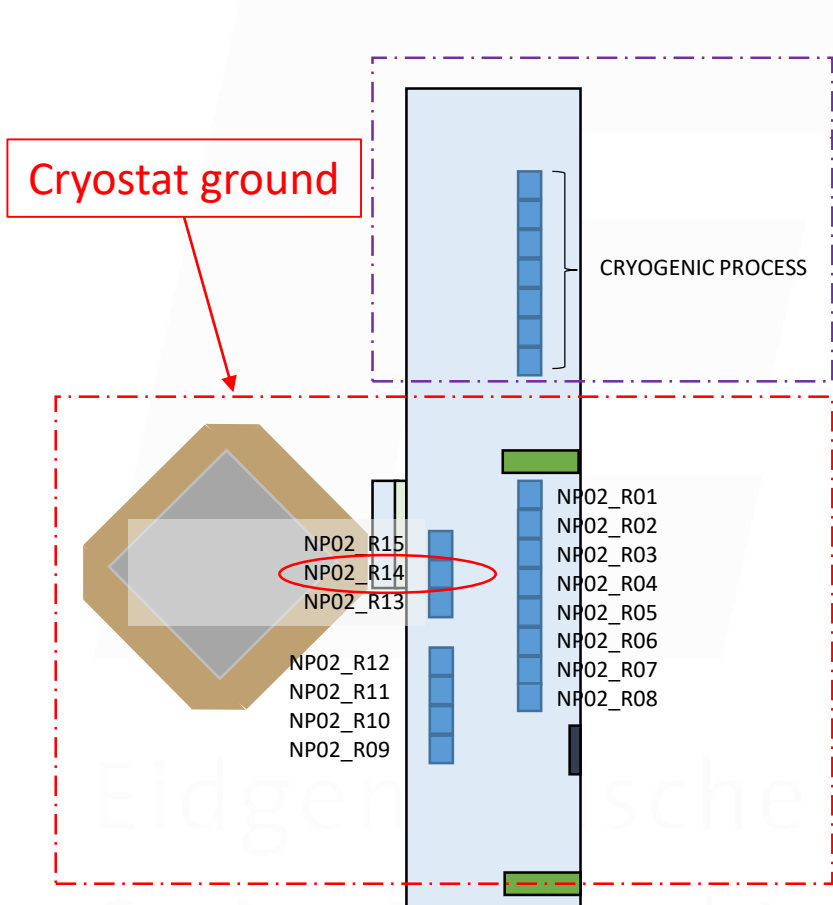


## Light readout rack design (DRAFT version 2)

Cyril DRANCOURT, Dominique DUCHESNEAU, Inés GIL, Thorsten LUX, Sébastien MURPHY, Yann-Axel RIGAUT, Antonio VERDUGO



## Position for NP02\_R14

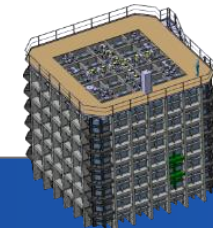


Blg. ground

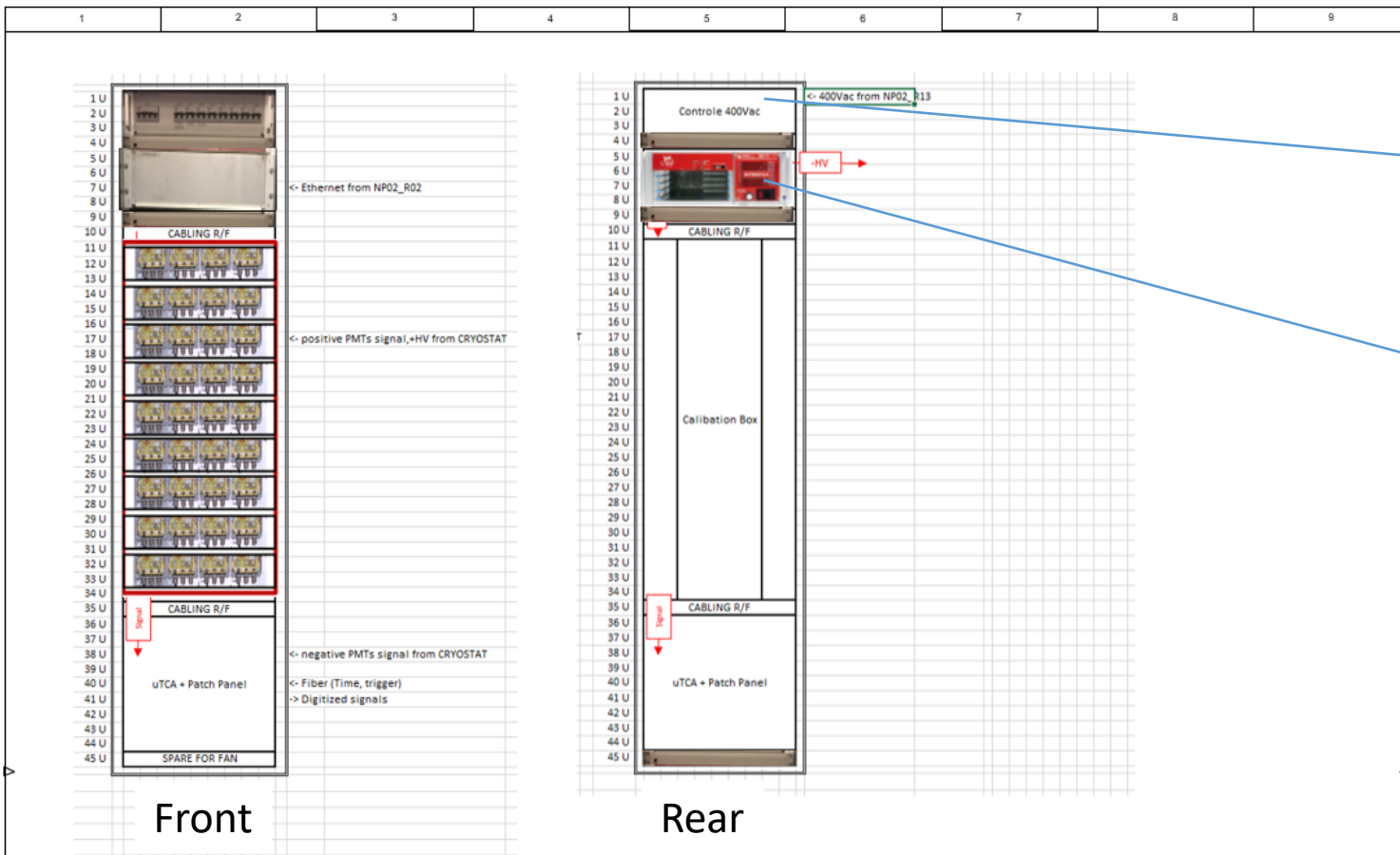
Here are lists of racks which will normally be all situated on the grounding of the cryostat:

Num.	G	Technical Name	Name	Category	Function	Consumption
Rack 01		NP02_R01	GEN - Allim	General	Power distribution for PCS, General, DCS and DSS (400Vac, 220Vac, and 24Vdc) - Filters, UPS, redundancy and analysis are also installed in this rack to ensure protect	20kVA
Rack 02		NP02_R02	GEN - Com	General	This rack is composed by switch, computers, keyboard, screen; it allowed to have an access to the control/security system and create a network	
Rack 03		NP02_R03	MOT - 01	CRP Motorisatio	CRP Motorisation system	20kVA
Rack 04		NP02_R04	MOT - 02	CRP Motorisatio	CRP Motorisation system	
Rack 05		NP02_R05	PCS - Main	PCS	Main cRIO controller for PCS (Rack A, B, C & D); it collect every data from PCS and allowed to avoid multi-cabling system	
Rack 06		NP02_R06	Interface	General	Level Meter system + Spare for electronics system	
Rack 07		NP02_R07	DSS	DSS	cRIO controller dedicated to safety (interlock, logic...)	
Rack 08		NP02_R08	DCS	DCS	Power distribution for HV (PMTs, FFS, GRID, LEMS...) it will be composed by to CAEN chassis and HV filter boxes	
Rack 09		NP02_R09	PCS - A	PCS	Proximity rack - Resistive measurement (Thermometer and resistive chain) 1/2	
Rack 10		NP02_R10	PCS - B	PCS	Proximity rack - Resistive measurement (Thermometer and resistive chain) 2/2	
Rack 11		NP02_R11	PCS - C	PCS	Proximity rack - Heaters & LEDs control / Pressure measurement	
Rack 12		NP02_R12	PCS - D	PCS	Proximity rack - Heaters & LEDs power / insulation transformer for Raspberry power	
Rack 13		NP02_R13	DAQ - CRO	DAQ	CRT + power distribution for DAQ + Communication	20kVA
Rack 14		NP02_R14	DAQ - PMTs	DAQ	Light readout	
Rack 15		NP02_R15	DAQ - CRT	DAQ	Charge readout	
Rack 16		NP02_R16	Cathode	DCS	Rack system design by Heinzinger (power supply for cathode)	

Key point: it will be necessary to pay attention in interconnected btw racks and outside

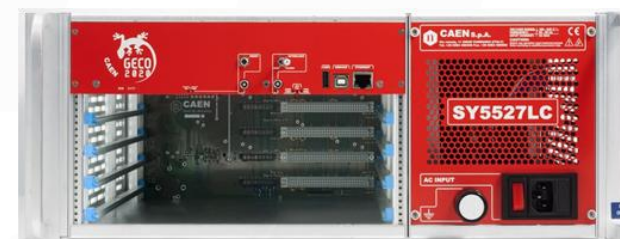


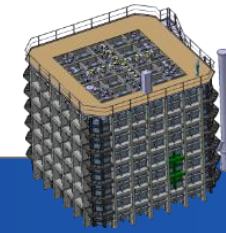
Draft for NP02\_R14



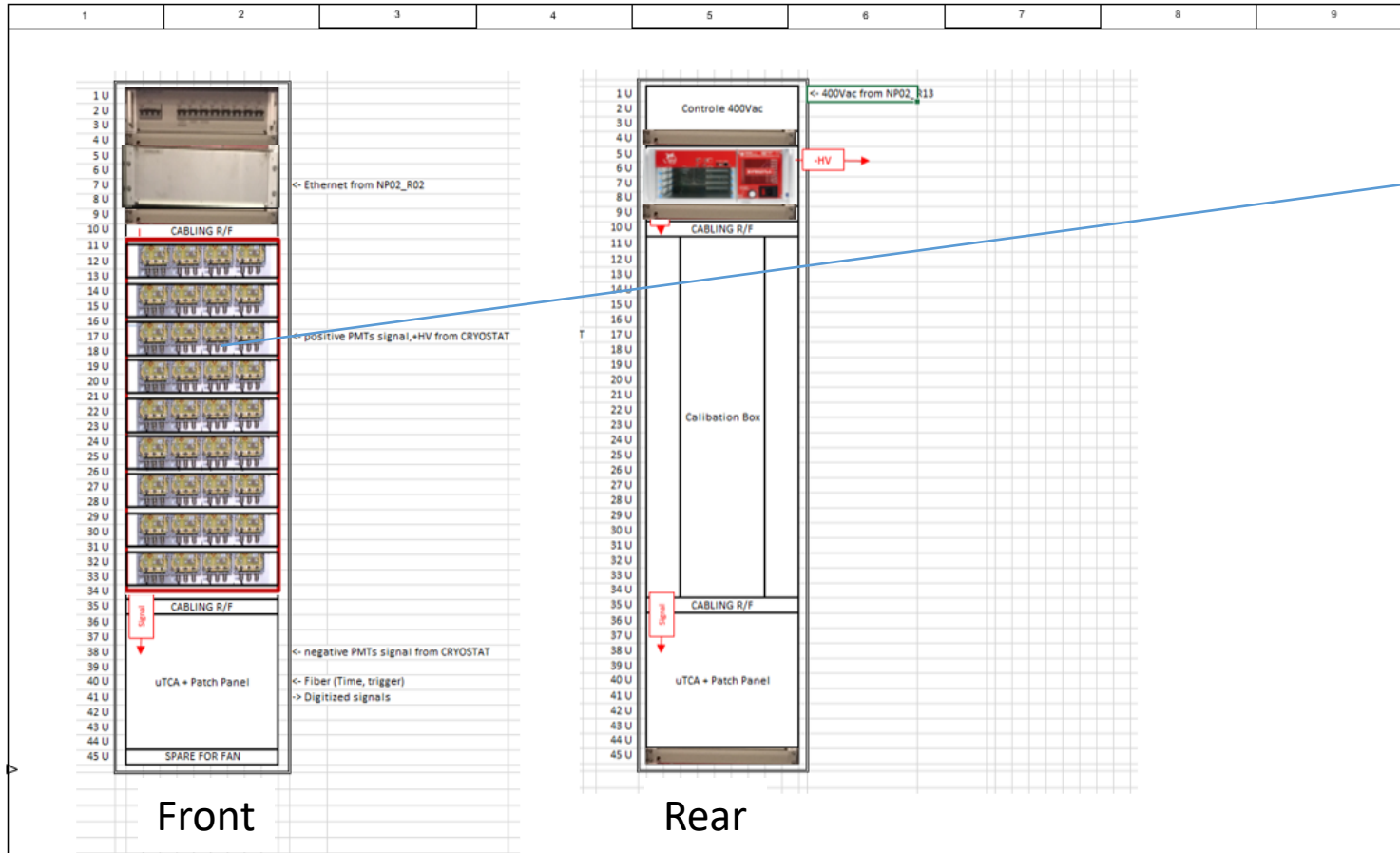
Power Distribution into the rack (to supply CAEN PS, Calibration box and uTCA).

CAEN power supply controlled by DCS (ethernet)





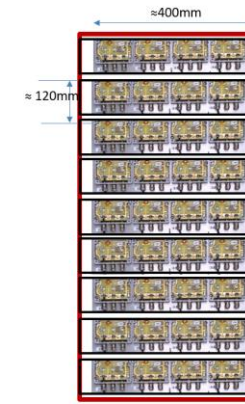
Draft for NP02\_R14



Special design from CIEMAT for splitters

25U  
1080mm asked, normalized to 1111.25mm (25U).

Splitters placement options



Each single splitter box is 98mm x 64mm x 26mm.

We can mount the splitters on aluminum plates by rows (4 splitters by row) and mount these plates inside rack.

As they are mounted on individual plates (4 splitters per plate) they can be placed on the front and/or on the back of the rack to save space.

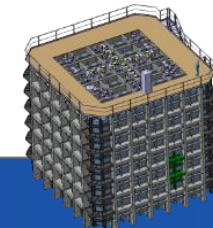
For example: All the splitters (36) on one side of the rack distributed in 9 plates will require about 9 x 12cm = 108cm (vertically)

Other option is to put 20 splitters (about 60cm height) on one side of the rack and 16 splitters (or also 20 with 4 spares) on the other.

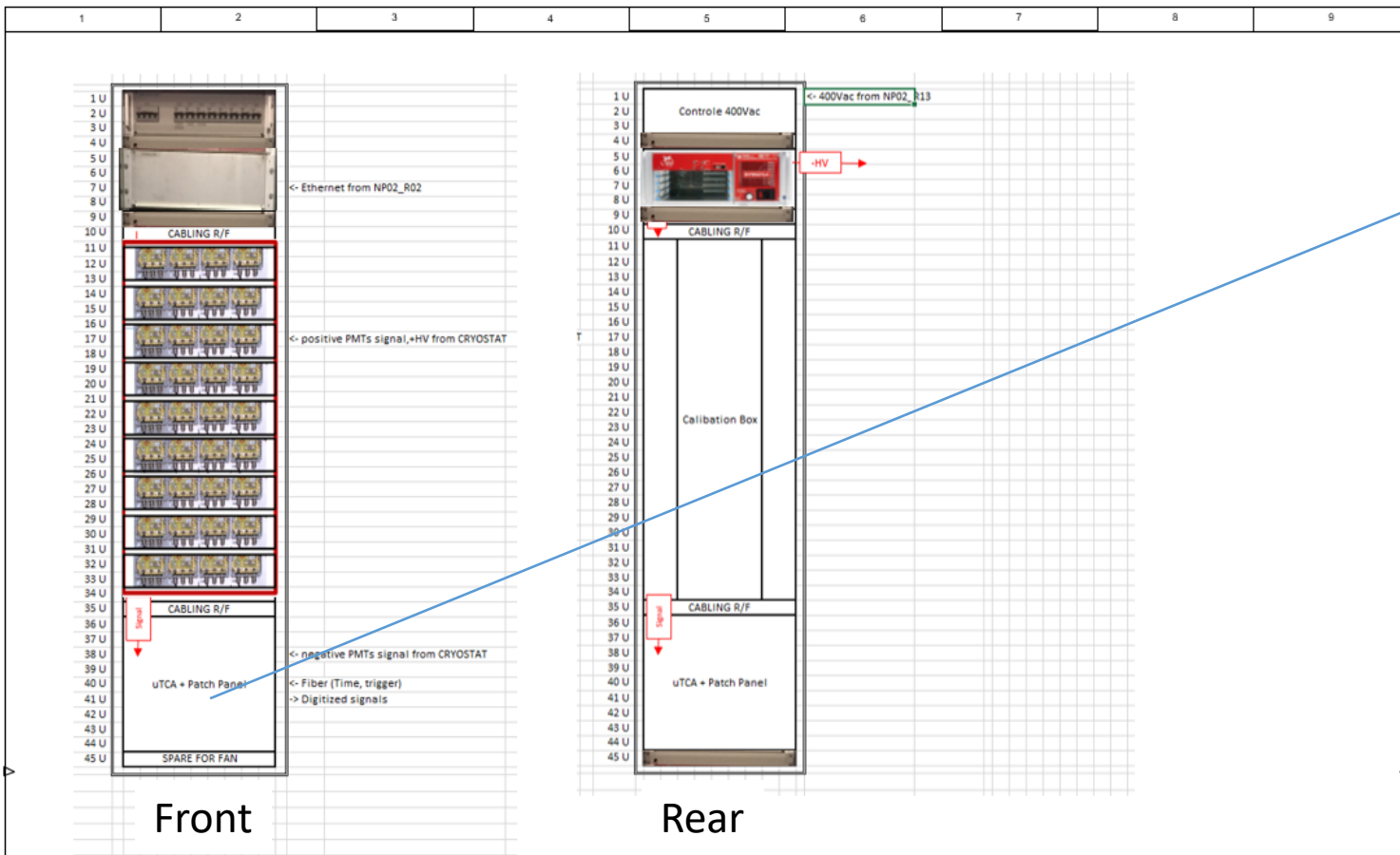
I think, it's not necessary to waste space with the spares, as they are mounted on individual boxes, they can be stored in other place or mount them only if needed.

In the drawing I've left some space between plates to pass the cables from the back (if needed).

One option: all the 36 Splitters on 9 plates  
All on the same side of the rack  
Space required: 485(rack width) x 1080mm (red rectangle)



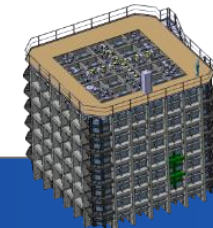
Draft for NP02\_R14



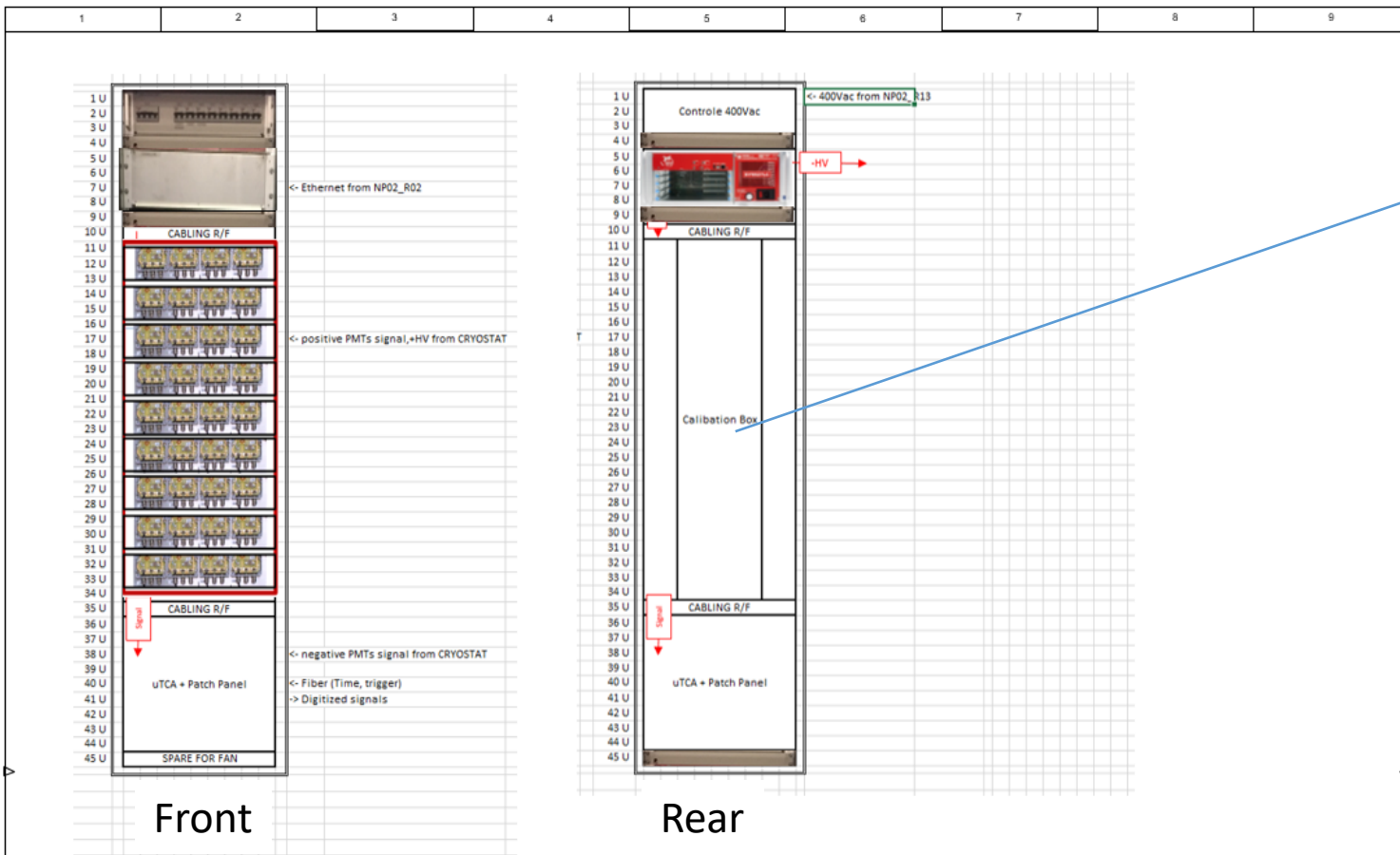
uTCA changed from 1U to 9U (because of the WR card design by INPL). The patch panel will be integrate directly inside for having more space.



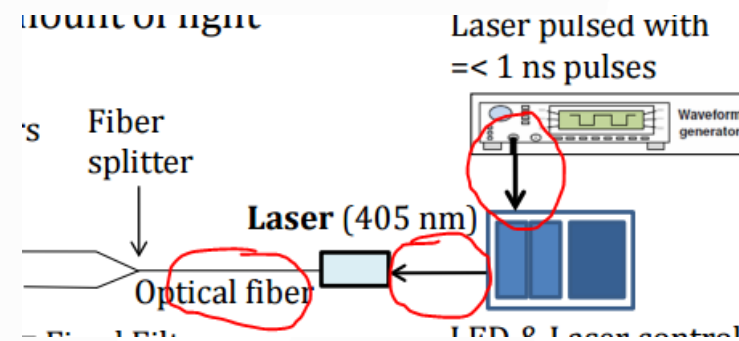
Schroff 11850-015 (8U)



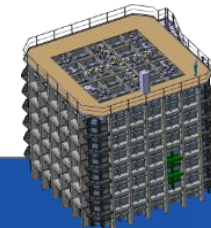
Draft for NP02\_R14



So only space free for calibration is the space behind splitters (don't forget cable traying on the side).

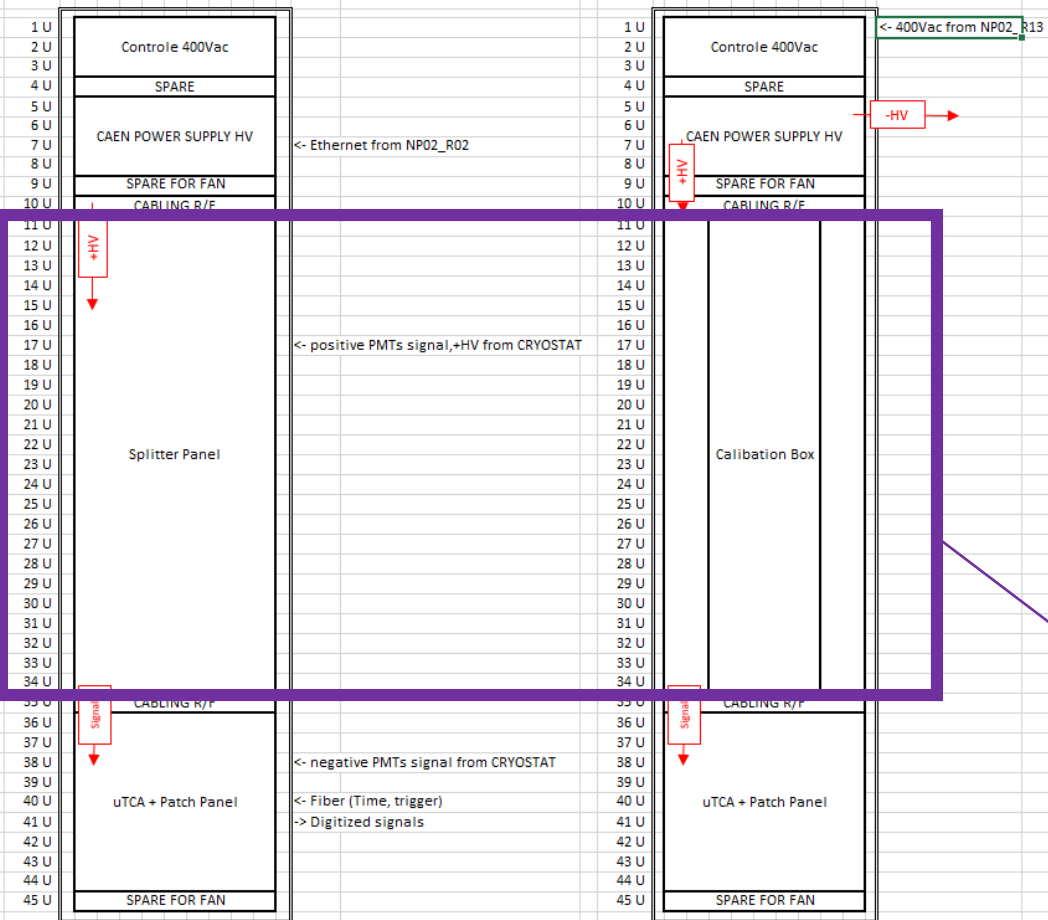


By discussing with Thorsten, we will may be need to add some deported box due to the laser attenuation (Proximity with flanges needed).



## Draft for NP02\_R14

Unité de Hauteur : U=44.45mm  
Unité de largeur : TE=5.08mm



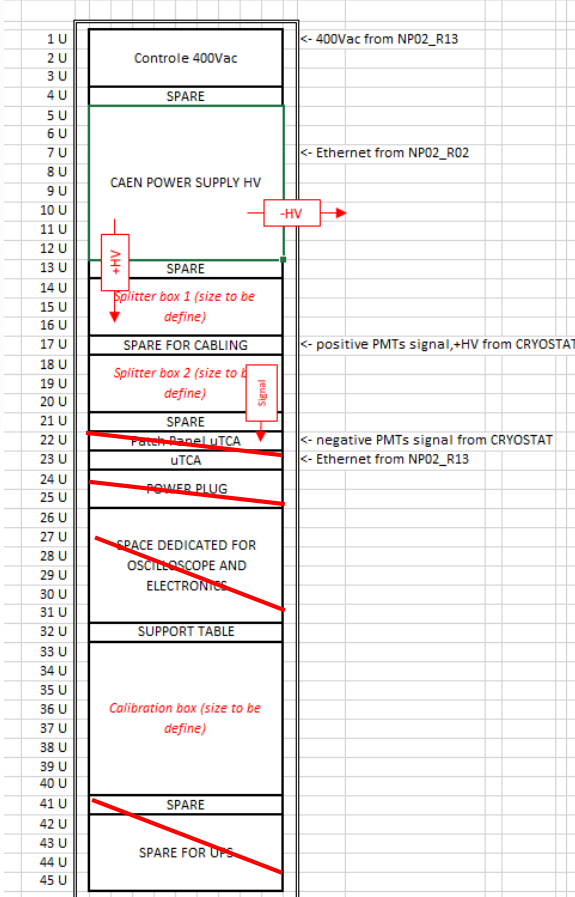
Front

Rear

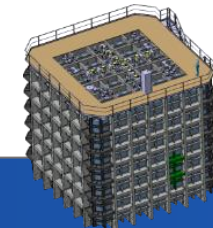
Since last time we have done some modifications and remove some parts to reserve space for splitting.

Part not done by CERN due to the specific design.

Unité de Hauteur : U=44.45mm  
Unité de largeur : TE=5.08mm



NP02\_R14  
DAQ - Light readout

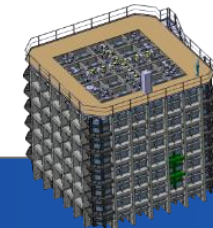


Draft for NP02\_R14

Back up

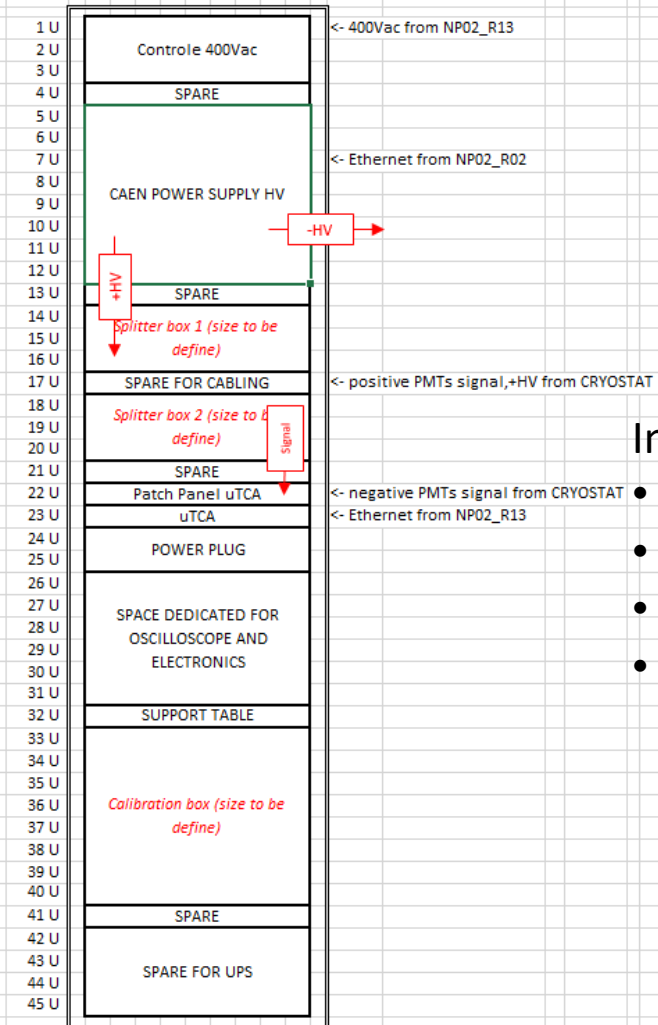
Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich





Draft for NP02\_R14

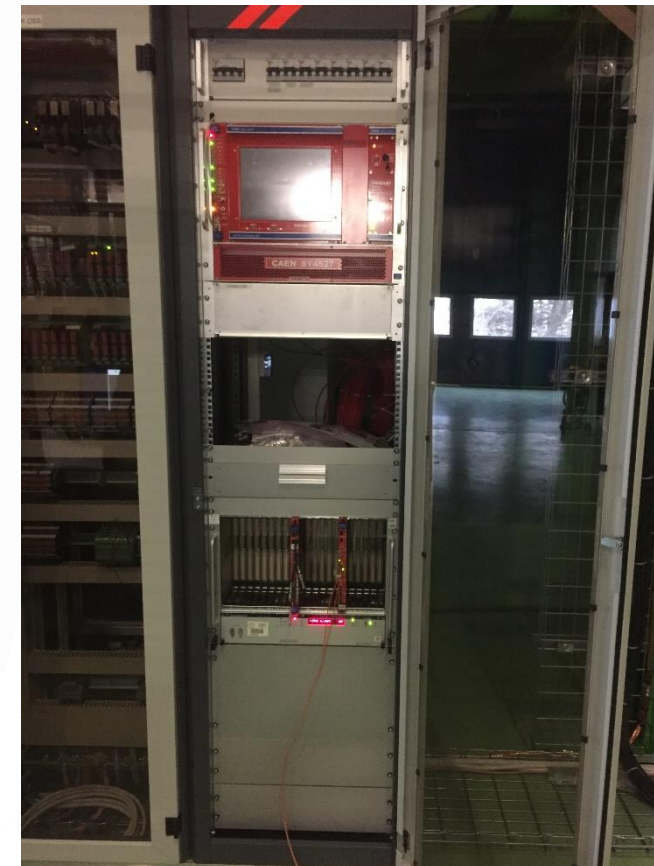
Unité de Hauteur : U=44,45mm  
Unité de largeur : TE=5,08mm

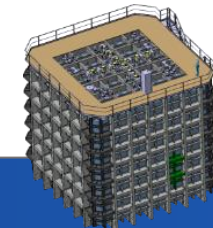


All the installation will be standardized into rack 19" (45U).

Input/Output for the rack:

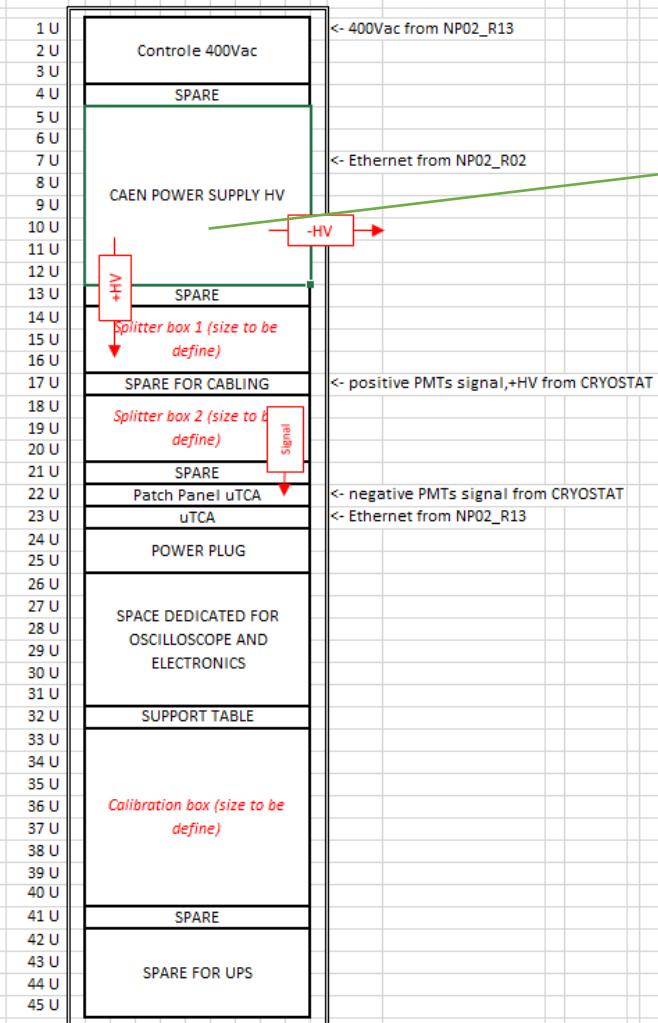
- 400Vac (NP02\_R13)
- Ethernet from Slow Control network (NP02\_R02)
- PMTs signal and HV (TANK\_INS\_1 et TANK\_INS\_2)
- Ethernet from DAQ network (NP02\_R13)





Draft for NP02\_R14

Unité de Hauteur : U=44,45mm  
Unité de largeur : TE=5,08mm

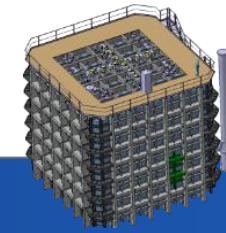


8U



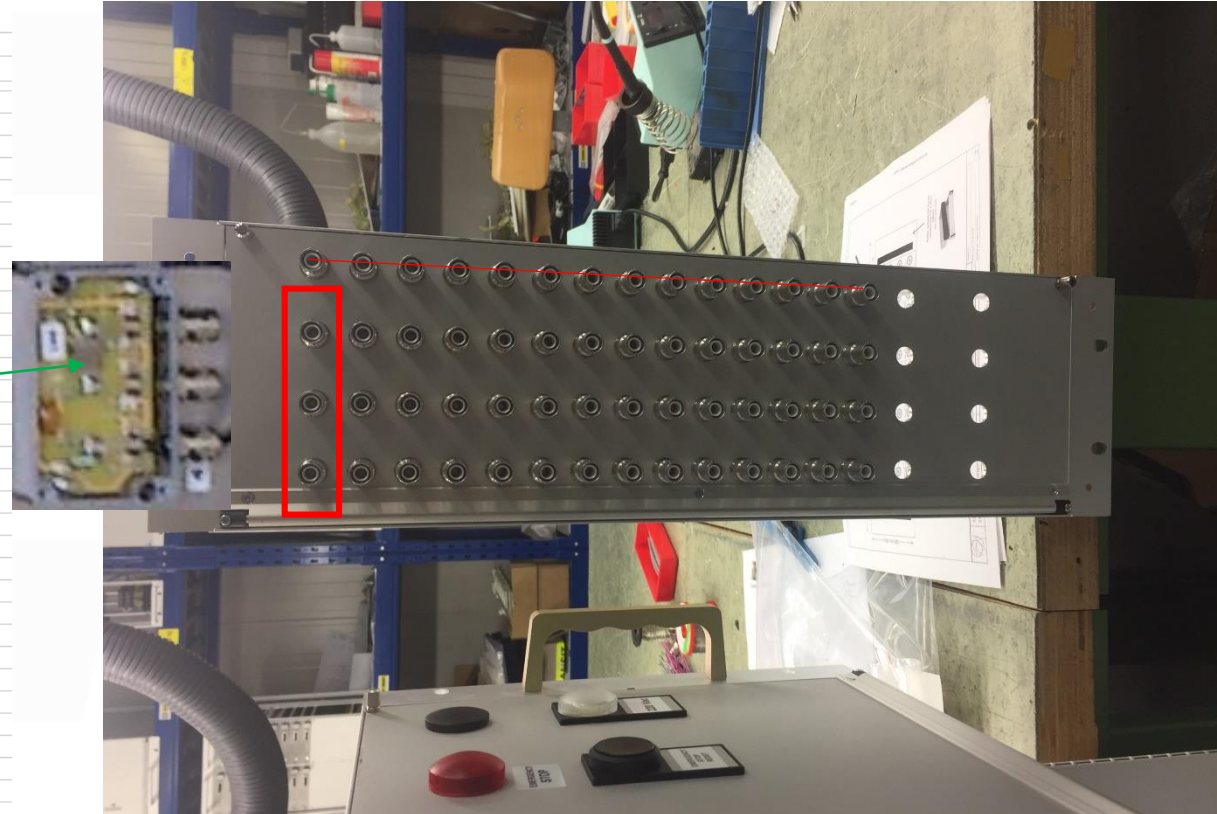
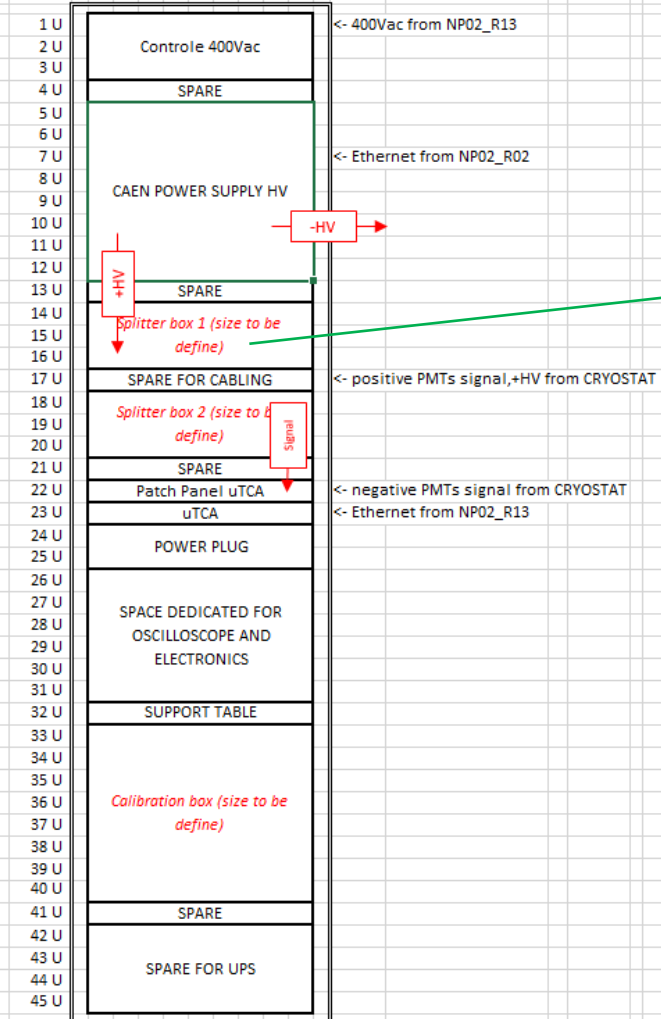
4U

At the level of the power supply HV, it was planned to use a mainframe CAEN SY4527 (8U) for the light readout rack and in the charge readout rack. Further to the proposal formulated by Cyril by email us also study the solution to use a smaller power supply (4U) but only dedicated to the light readout.

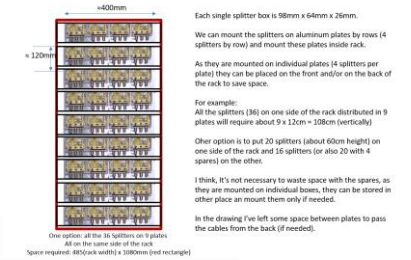


## Draft for NP02\_R14

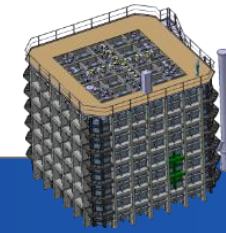
Unité de Hauteur : U=44.45mm  
Unité de largeur : TE=5.08mm



### Splitters placement options

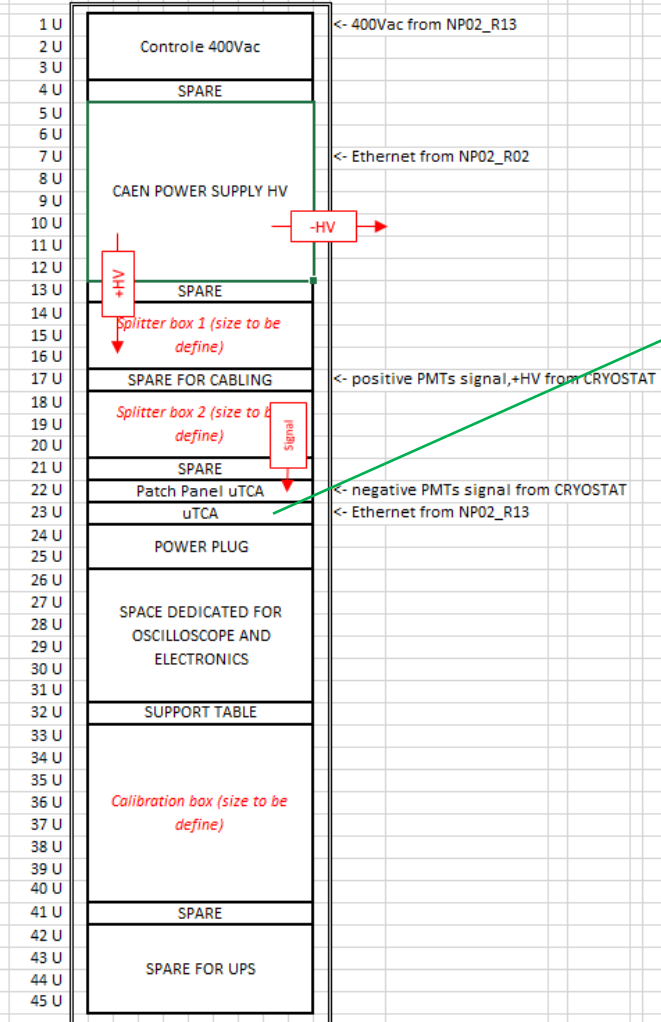


Here, an example of chassis for filters we have done for **3m x 1m x 1m** version. I need to discuss with Antonio for the integration. But it would be possible to equip 2 standardized chassis of 24 splitters (12 spares).



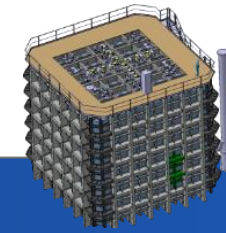
Draft for NP02\_R14

Unité de Hauteur : U=44,45mm  
Unité de largeur : TE=5,08mm

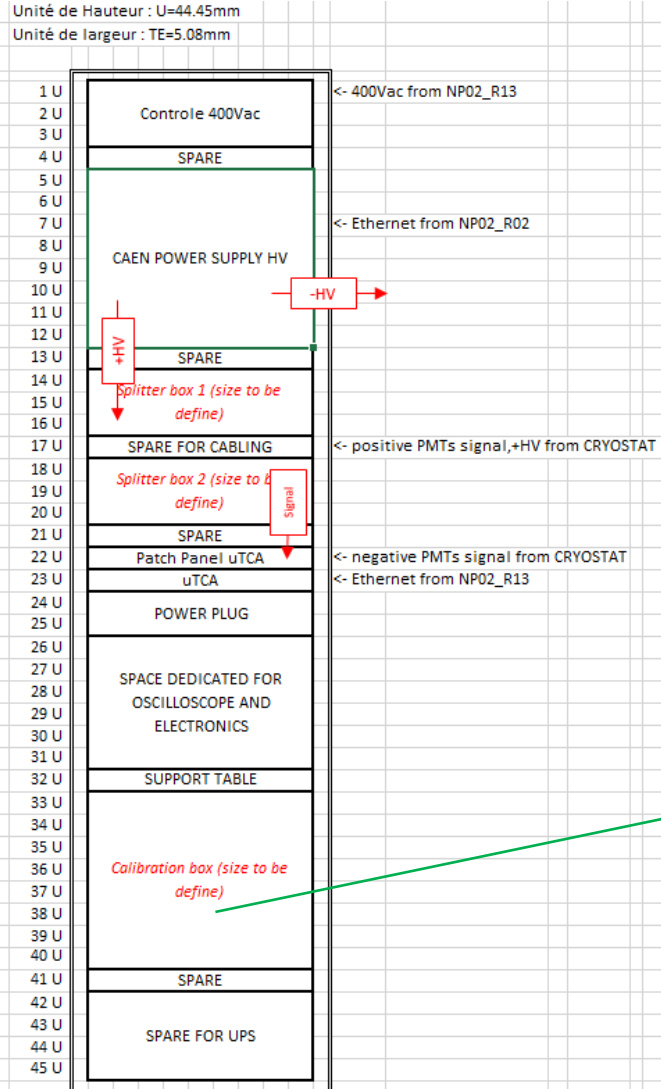


NATIVE-C1 - 1u 19' rack-mounted uTCA Chassis

After discussion with Cyril, splitters will be connected with a patch panel of a size of 2 or 3 U according to the setting-up. Then connected (with a special SAMTEC cable) to an uTCA of a size of one U which will be connected to the network DAQ dedicated to **NP02**.



Draft for NP02\_R14



Other:

The remainder of the space will be reserved for light calibration (currently in test and design by Thorsten) and in the material for test (possibility of power plug, oscilloscope...), the last available free spaces remain reserved for the installation of a small UPS in the case of a need for autonomy.