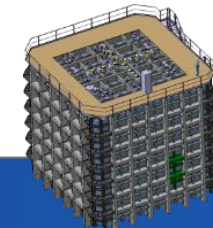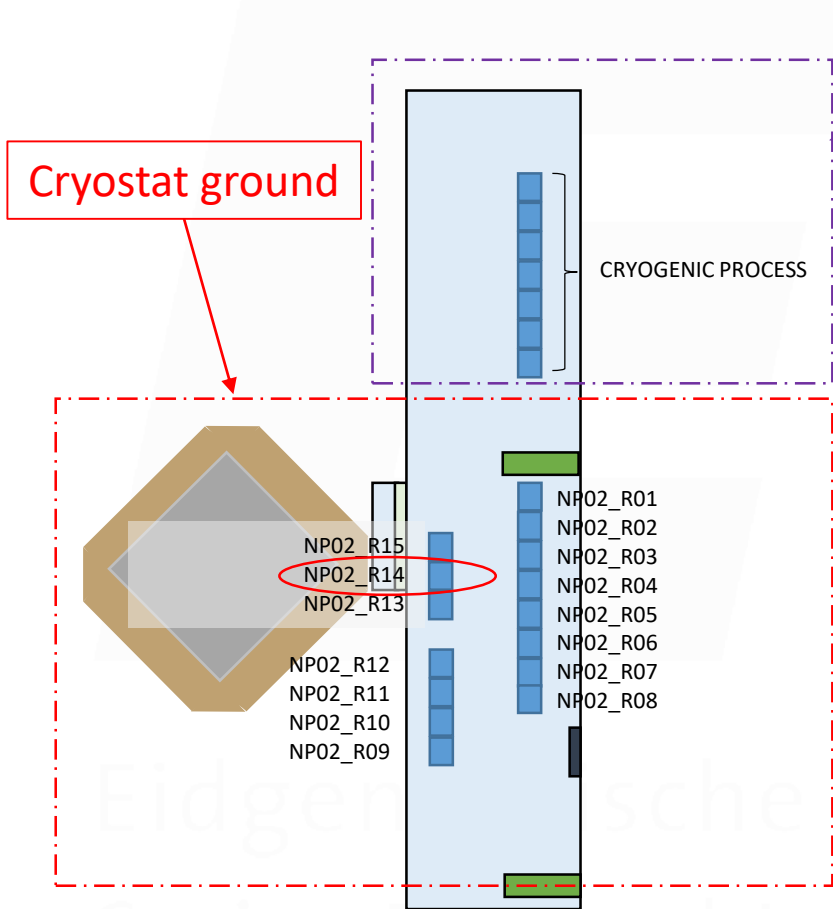# Light readout rack design (DRAFT version)

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

Blg. ground

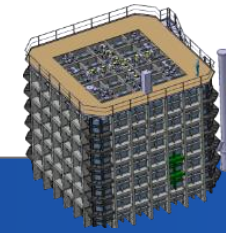Cryostat ground

CRYOGENIC PROCESS

NP02_R15
NP02_R14
NP02_R13

NP02_R12
NP02_R11
NP02_R10
NP02_R09

NP02_R01
NP02_R02
NP02_R03
NP02_R04
NP02_R05
NP02_R06
NP02_R07
NP02_R08

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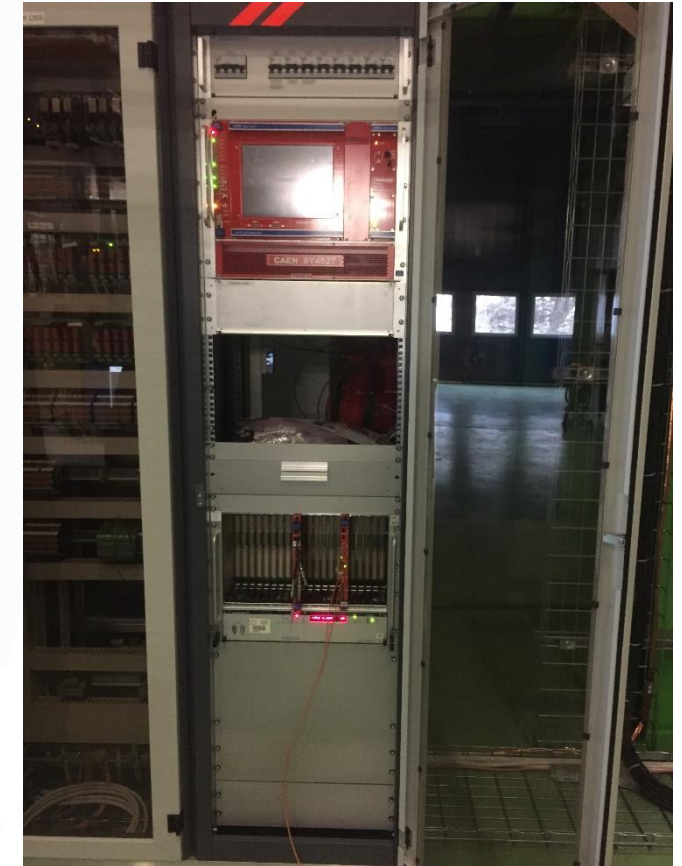
Unité de Hauteur : U=44.45mm
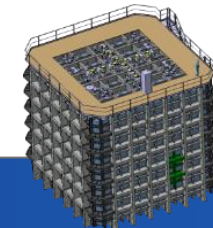Unité de largeur : TE=5.08mm

All the installation will be standardized into rack 19" (45U).
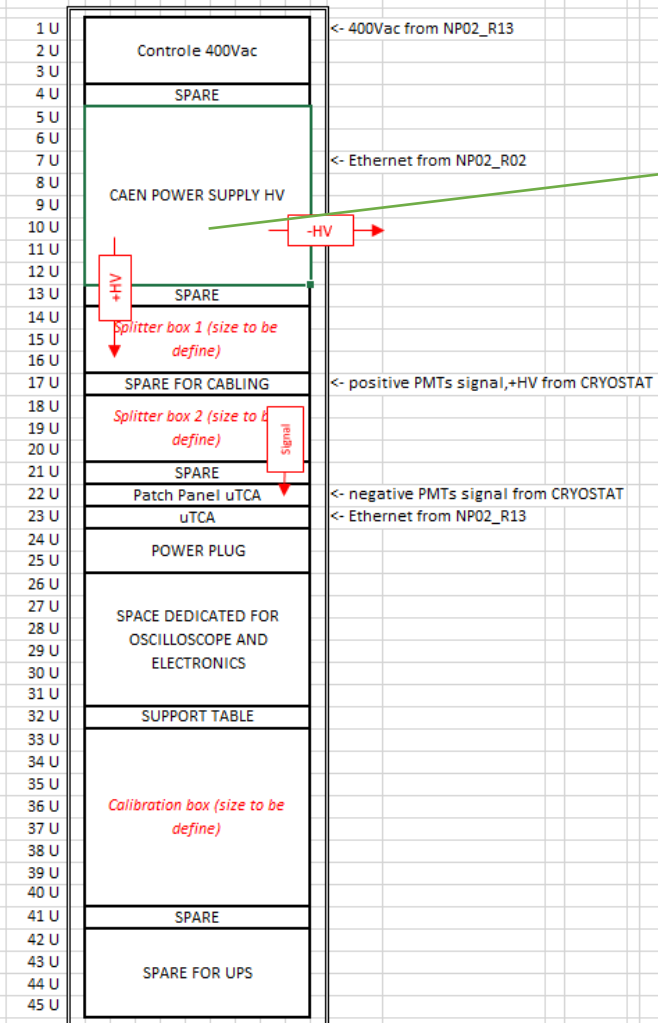
Input/Output for the rack:
- 400Vac (NP02_R13)
- Ethernet from Slow Control network (NP02_R02)
- PMTs signal and HV (TANK_INS_1 et TANK_INS_2)
- Ethernet from DAQ network (NP02_R13)

Draft for NP02_R14

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

<- 400Vac from NP02_R13

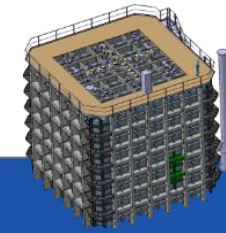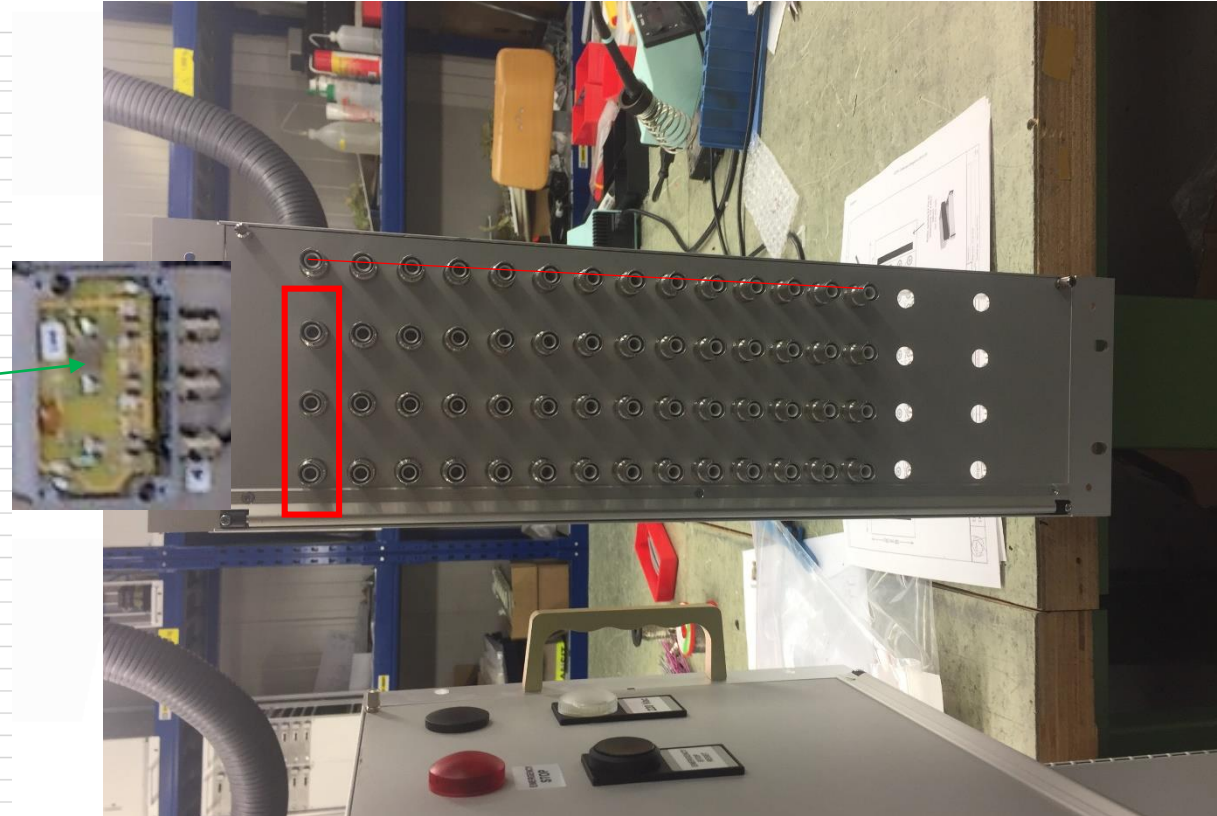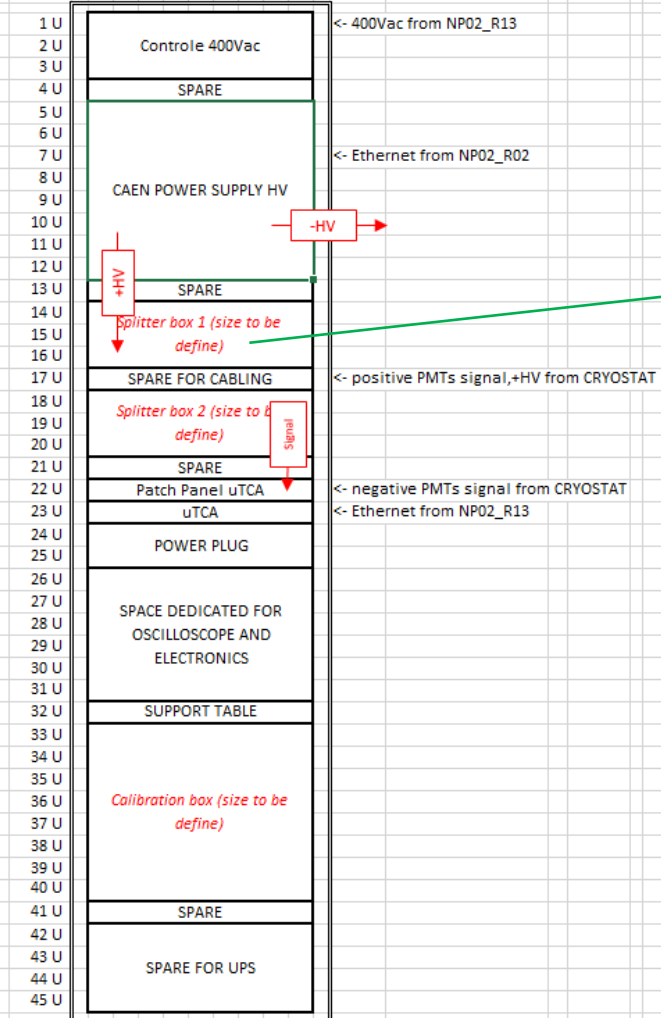|	
1 U	
2 U	Controle 400Vac
3 U	
4 U	SPARE
5 U	
6 U	
7 U	<- Ethernet from NP02_R02
8 U	CAEN POWER SUPPLY HV
9 U	
10 U	-HV
11 U	
12 U	+HV
13 U	SPARE
14 U	Splitter box 1 (size to be define)
15 U	
16 U	
17 U	SPARE FOR CABLING <- positive PMTs signal,+HV from CRYOSTAT
18 U	
19 U	Splitter box 2 (size to be define) Signal
20 U	
21 U	SPARE
22 U	Patch Panel uTCA <- negative PMTs signal from CRYOSTAT
23 U	uTCA <- Ethernet from NP02_R13
24 U	POWER PLUG
25 U	
26 U	
27 U	SPACE DEDICATED FOR
28 U	OSCILLOSCOPE AND
29 U	ELECTRONICS
30 U	
31 U	
32 U	SUPPORT TABLE
33 U	
34 U	
35 U	
36 U	Calibration box (size to be define)
37 U	
38 U	
39 U	
40 U	
41 U	SPARE
42 U	
43 U	SPARE FOR UPS
44 U	
45 U	

NP02_R14
DAQ - Light readout

8U

CAEN SY4527

SY5527LC

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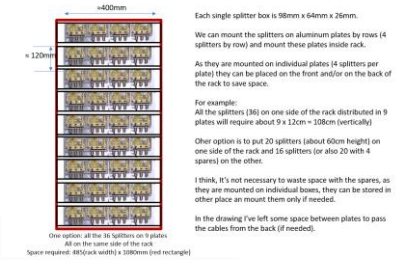
Unité de Hauteur : U=44.45mm
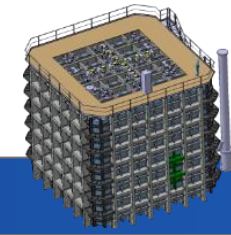Unité de largeur : TE=5.08mm

1 U	Controle 400Vac	<- 400Vac from NP02_R13
2 U		
3 U		
4 U	SPARE	
5 U		
6 U		
7 U	CAEN POWER SUPPLY HV	<- Ethernet from NP02_R02
8 U		
9 U		
10 U		-HV
11 U		
12 U	+HV	
13 U	SPARE	
14 U	Splitter box 1 (size to be define)	
15 U		
16 U		
17 U	SPARE FOR CABLING	<- positive PMTs signal,+HV from CRYOSTAT
18 U	Splitter box 2 (size to b define)	
19 U		Signal
20 U		
21 U	SPARE	
22 U	Patch Panel uTCA	<- negative PMTs signal from CRYOSTAT
23 U	uTCA	<- Ethernet from NP02_R13
24 U	POWER PLUG	
25 U		
26 U		
27 U	SPACE DEDICATED FOR OSCILLOSCOPE AND ELECTRONICS	
28 U		
29 U		
30 U		
31 U		
32 U	SUPPORT TABLE	
33 U		
34 U		
35 U	Calibration box (size to be define)	
36 U		
37 U		
38 U		
39 U		
40 U		
41 U	SPARE	
42 U		
43 U	SPARE FOR UPS	
44 U		
45 U		

NP02_R14
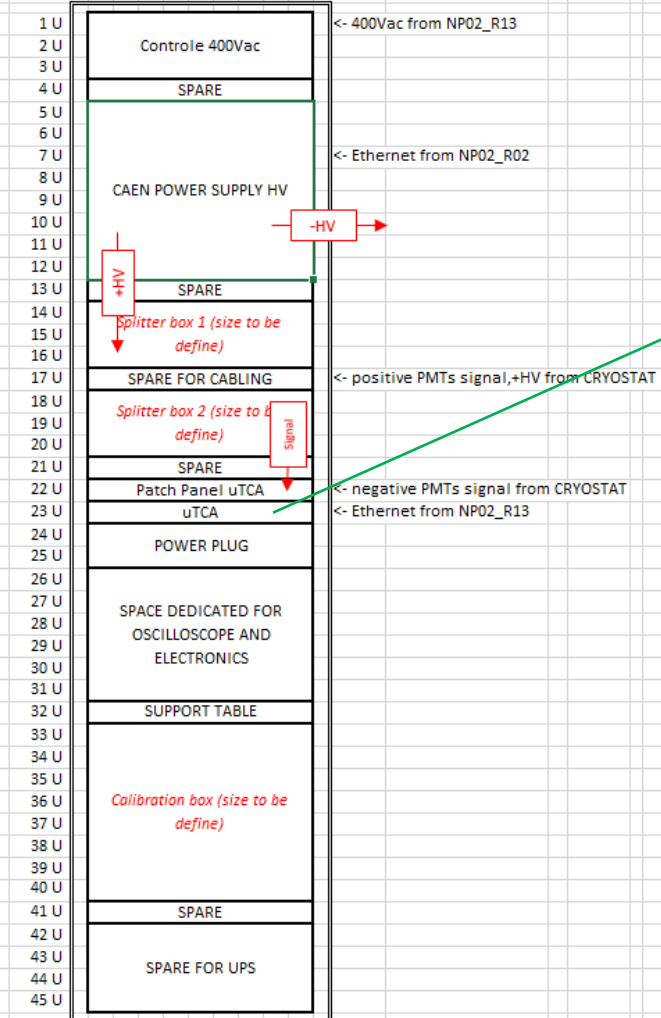DAQ - Light readout

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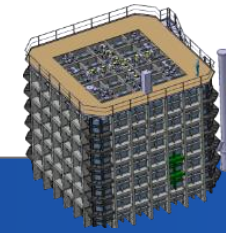
Unité de Hauteur : U=44.45mm
Unité de largeur : TE=5.08mm

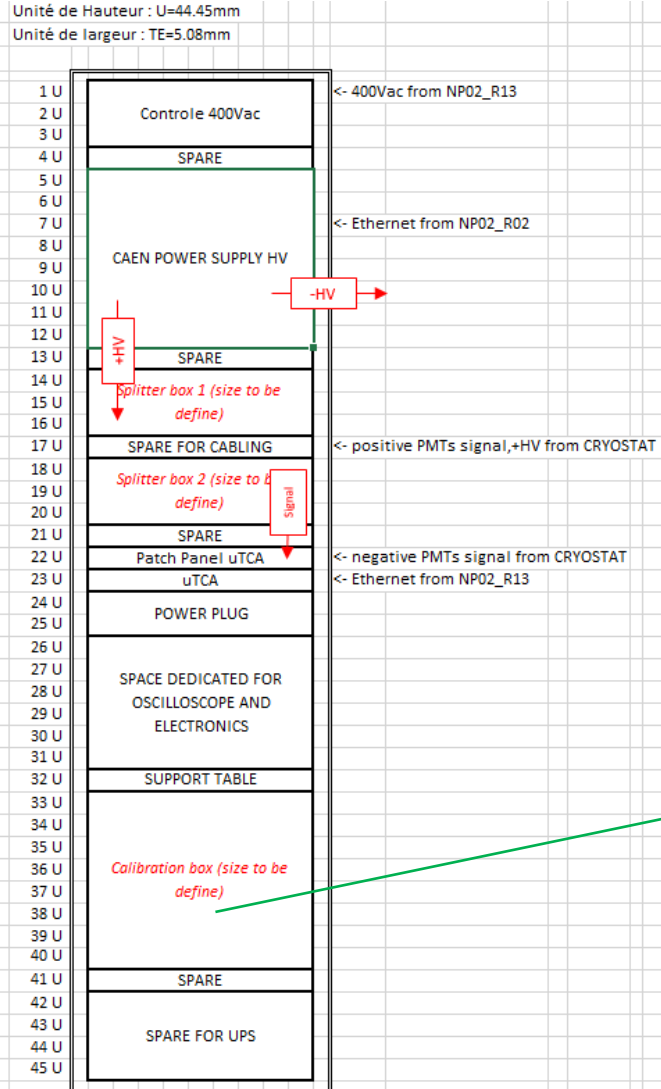|	
1 U	<- 400Vac from NP02_R13
2 U	Controle 400Vac
3 U	
4 U	SPARE
5 U	
6 U	
7 U	<- Ethernet from NP02_R02
8 U	CAEN POWER SUPPLY HV
9 U	
10 U	-HV
11 U	
12 U	+HV
13 U	SPARE
14 U	Splitter box 1 (size to be
15 U	define)
16 U	
17 U	SPARE FOR CABLING <- positive PMTs signal,+HV from CRYOSTAT
18 U	Splitter box 2 (size to be
19 U	define) Signal
20 U	
21 U	SPARE
22 U	Patch Panel uTCA <- negative PMTs signal from CRYOSTAT
23 U	uTCA <- Ethernet from NP02_R13
24 U	POWER PLUG
25 U	
26 U	
27 U	SPACE DEDICATED FOR
28 U	OSCILLOSCOPE AND
29 U	ELECTRONICS
30 U	
31 U	
32 U	SUPPORT TABLE
33 U	
34 U	
35 U	
36 U	Calibration box (size to be
37 U	define)
38 U	
39 U	
40 U	
41 U	SPARE
42 U	
43 U	SPARE FOR UPS
44 U	
45 U	

NP02_R14

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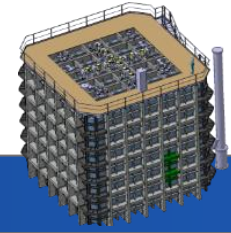
Unité de Hauteur : U=44.45mm
Unité de largeur : TE=5.08mm

Controle 400Vac	<- 400Vac from NP02_R13
SPARE	
	<- Ethernet from NP02_R02
CAEN POWER SUPPLY HV	
-HV	
+HV SPARE	
Splitter box 1 (size to be define)	
SPARE FOR CABLING	<- positive PMTs signal,+HV from CRYOSTAT
Splitter box 2 (size to be define) Signal	
SPARE	
Patch Panel uTCA	<- negative PMTs signal from CRYOSTAT
uTCA	<- Ethernet from NP02_R13
POWER PLUG	
SPACE DEDICATED FOR OSCILLOSCOPE AND ELECTRONICS	
SUPPORT TABLE	
Calibration box (size to be define)	
SPARE	
SPARE FOR UPS	

NP02_R14
DAQ - Light readout

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.

Any questions ?