

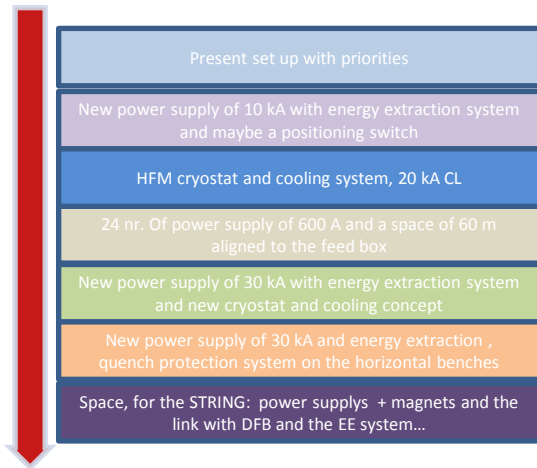
# **TESTING POSSIBILITIES @ CERN**

Marta Bajko

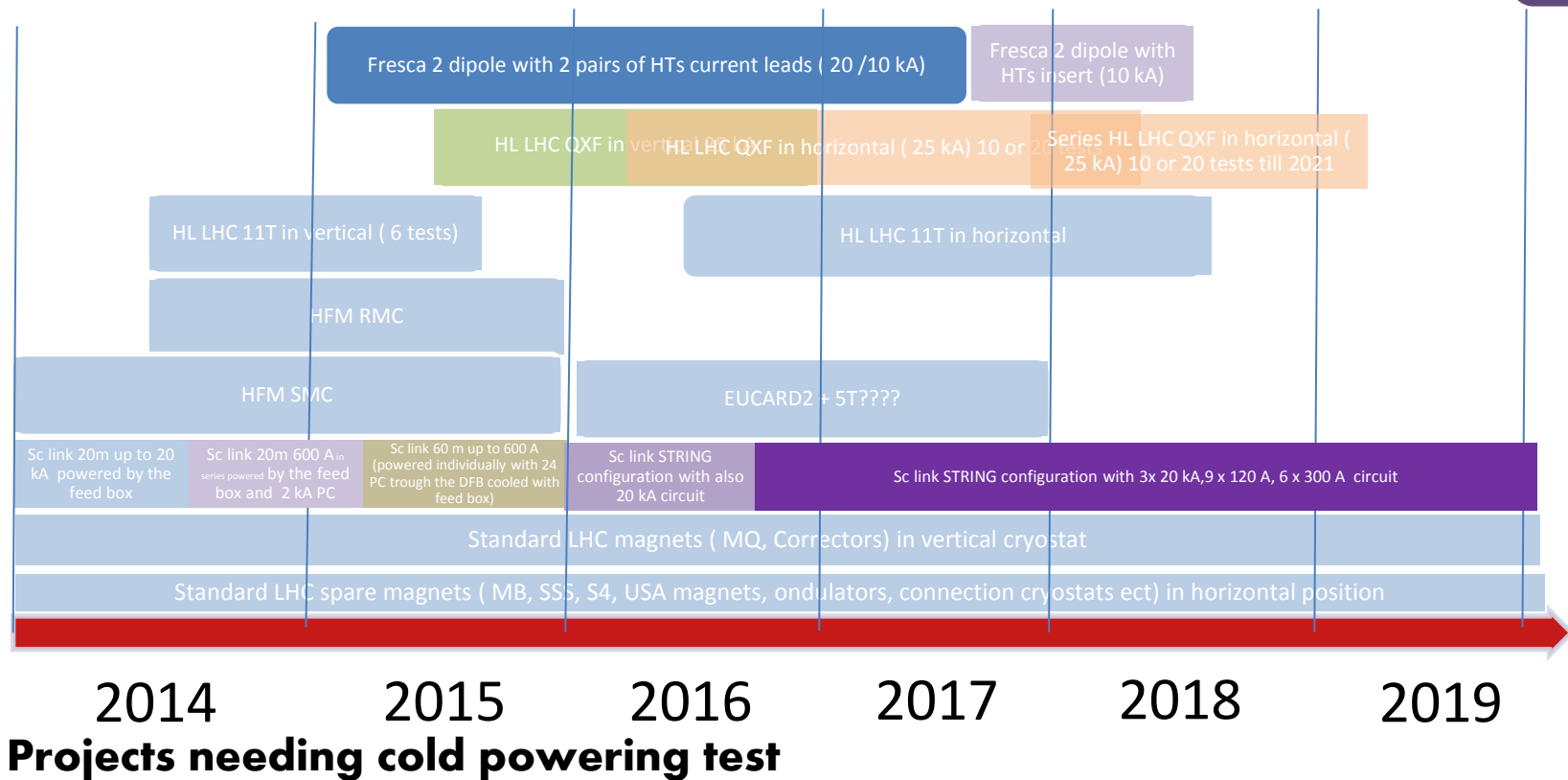
WP10. EUCARD 2

Task 4 - HTS Magnet Tests,  
26<sup>th</sup> of November 2014

## Evolution need of the set up



HL LHC string with 100 m of Sc link cooled with feed box and powered by DFB  
 (6x 3 kA  
 9x 120 A  
 1 x 11 kA  
 2 x 25 kA)  
 45m including D1  
 550 mm diameter



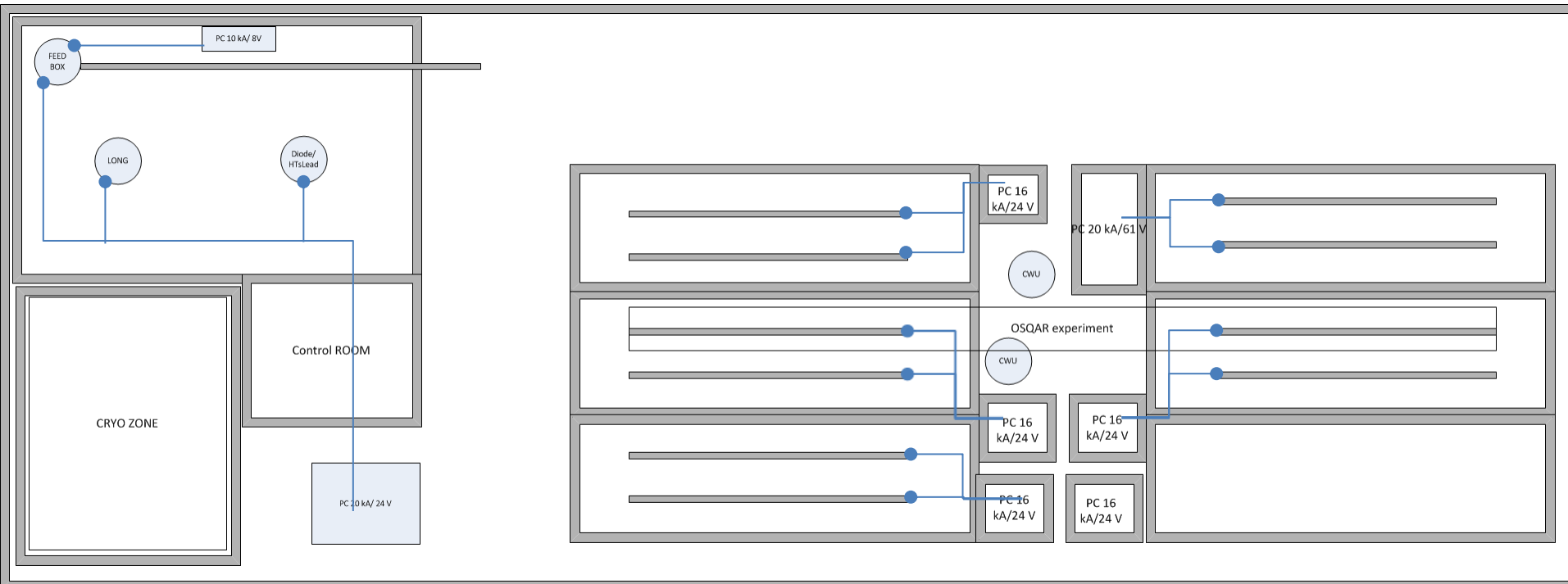
# SM18 Superconducting Magnet Test Facility as in 2013

What to test?  
**CLo:** MQ1, MQXC1, SMC3b, SMC\_11T1  
**CD/CCL:** Diodes, 13 kA and 6 kA LHC Leads  
**SFB:** Sc link  
**HB:** Osqar magnets, 1MB

6 kW cryo plant

2 vertical cryostats: LONG and DIODE  
1 Feed box x 20 kA  
20 kA, 2 kA, 600 A PC

10 horizontal benches A,B,D,E,F  
1 x 20 kA/ 61 V PC  
4 x 16 kA/ 24 V PC



# SM18 Superconducting Magnet Test Facility as in 2014

What to test?  
**CLo:** MQ, MQXC2, RMC1, SMC\_11T2, HQ,  
 2 x 11T dipole, 1 x twin 11T dipole, TNA  
**CD/CCL:** Diodes  
**SFB:** Sc link  
**HB:** LHC Ondulator, new D1

6 kW cryo plant

3 vertical cryostats: LONG, DIODE, **LARGE**

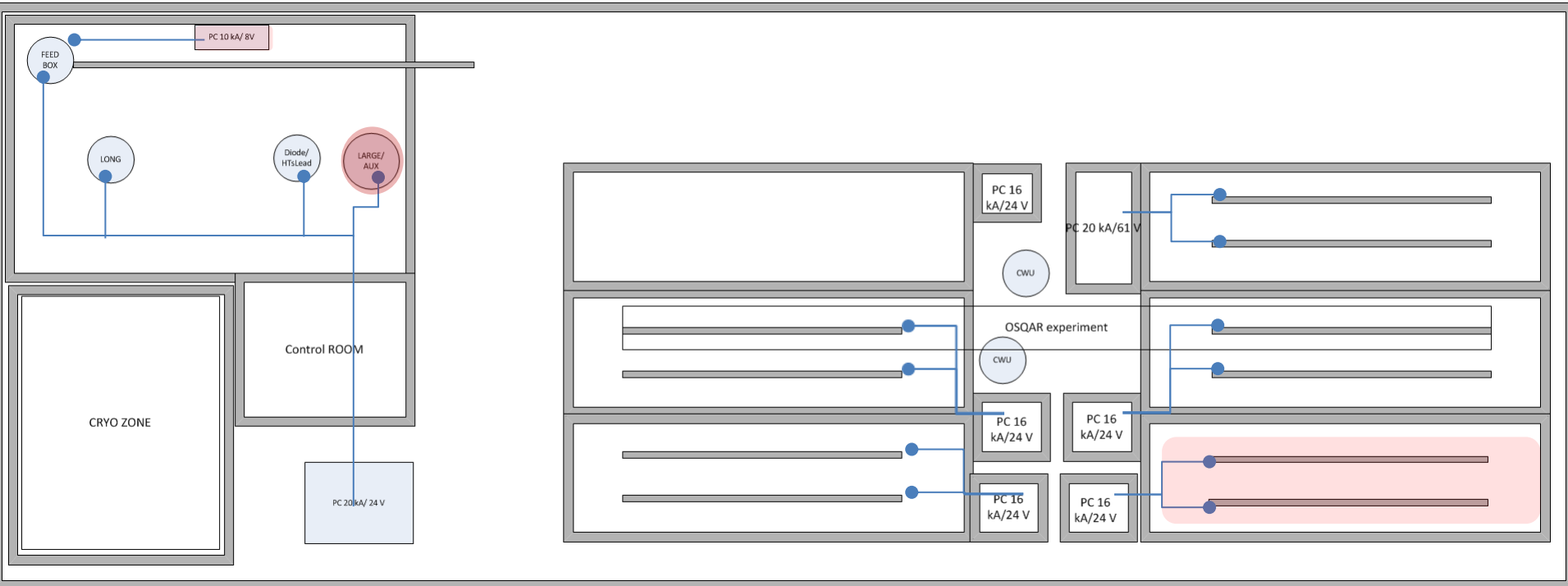
1 Feed box x 20 kA

20 kA, 2 kA, 600 A PC

10 horizontal benches A,B,**C**,E,F

1 x 20 kA/ 61 V PC

4 x 16 kA/ 24 V PC



# SM18 Superconducting Magnet Test Facility as in 2015

What to test?  
Clo:  
Cla:  
CD/CCL: Diodes  
SFB: Sc link  
HB: LHC spares

6 kW cryo plant ????

4 vertical cryostats:

LONG, DIODE, LARGE, LARGE and LONG, FReSca2

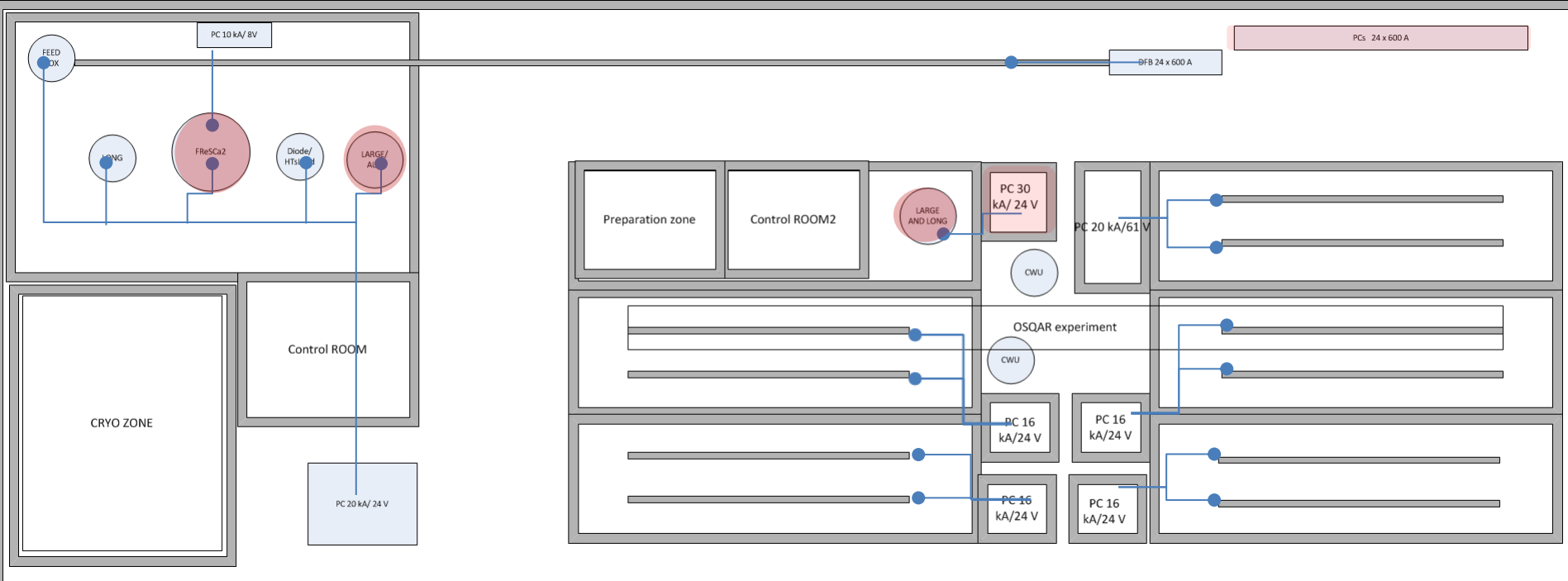
1 Feed box x 20 kA, 1 DFB x 600 A

20 kA, 30 kA, 10 kA, 24 x 600 A PC

10 horizontal benches A,B,C,E,F

1 x 20 kA/ 61 V PC

4 x 16 kA/ 24 V PC



# SM18 Superconducting Magnet Test Facility as in 2016

What to test?  
**ClO:**  
**Cla:**  
**CD/CCL: Diodes**  
**SFB: Sc link**  
**HB: LHC spares**

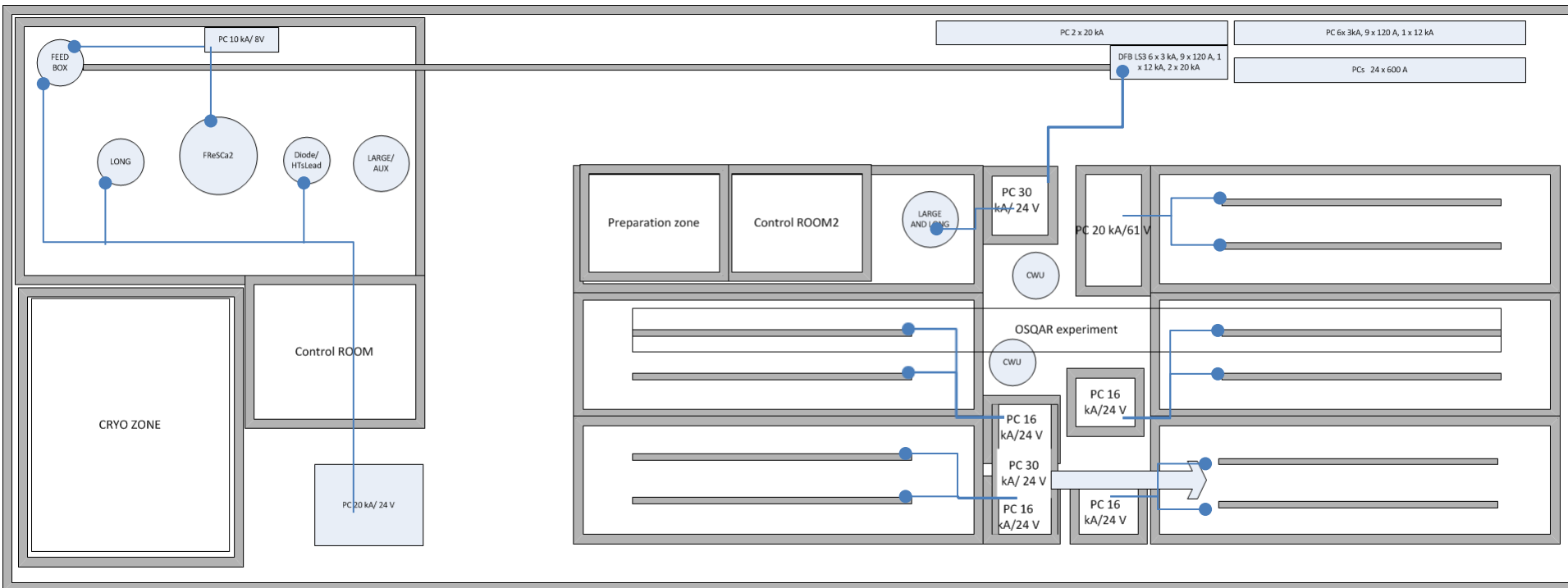
6 kW cryo plant????

5 vertical cryostats:

LONG, DIODE, **LARGE/LARGE** and **LONG, FReSca2**  
 1 Feed box x 20 kA, 1 DFB x 600 A, 1 DFB x LS3 Type  
 20 kA, **30 kA, 10 kA, 24 x 600 A PC, 20 kA not confirmed!**

10 horizontal benches A,B,C,E,F

1 x 20 kA/ 61 V PC  
 4 x 16 kA/ 24 V PC  
 1 x **30 kA/24 V**



# SM18 Superconducting Magnet Test Facility as in 2017

What to test?  
**ClO:**  
**Cla:**  
**CD/CCL: Diodes**  
**SFB: Sc link**  
**HB: LHC spares**

6 kW cryo plant????

5 vertical cryostats:

LONG, DIODE, **LARGE/LARGE** and **LONG, FReSca2**

1 Feed box x 20 kA, 1 DFB x 600 A, 1 DFB x LS3 Type

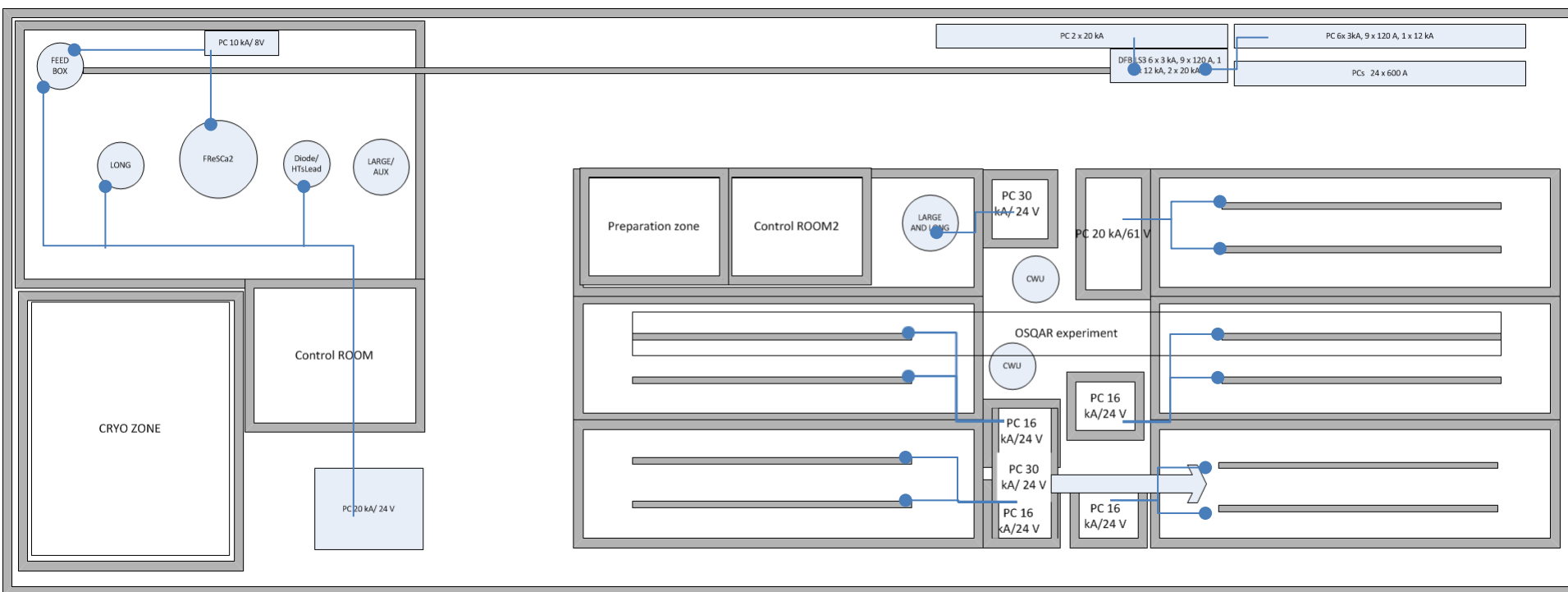
20 kA, **30 kA, 10 kA, 24 x 600 A PC, 20 kA not confirmed!!**

10 horizontal benches A,B,**C**,E,F

1 x 20 kA/ 61 V PC

4 x 16 kA/ 24 V PC

1 x **30 kA/24 V**



# SM18 Superconducting Magnet Test Facility as in 2018

What to test?

**ClO:**

**ClA:**

**CD/CCL: Diodes**

**SFB: Sc link**

**HB: LHC spares**

**STRING:**

6 kW cryo plant????

5 vertical cryostats:

LONG, DIODE, **LARGE/LARGE** and **LONG, FReSca2**

1 Feed box x 20 kA, 30 kA

10 horizontal benches A,B,C,E,F

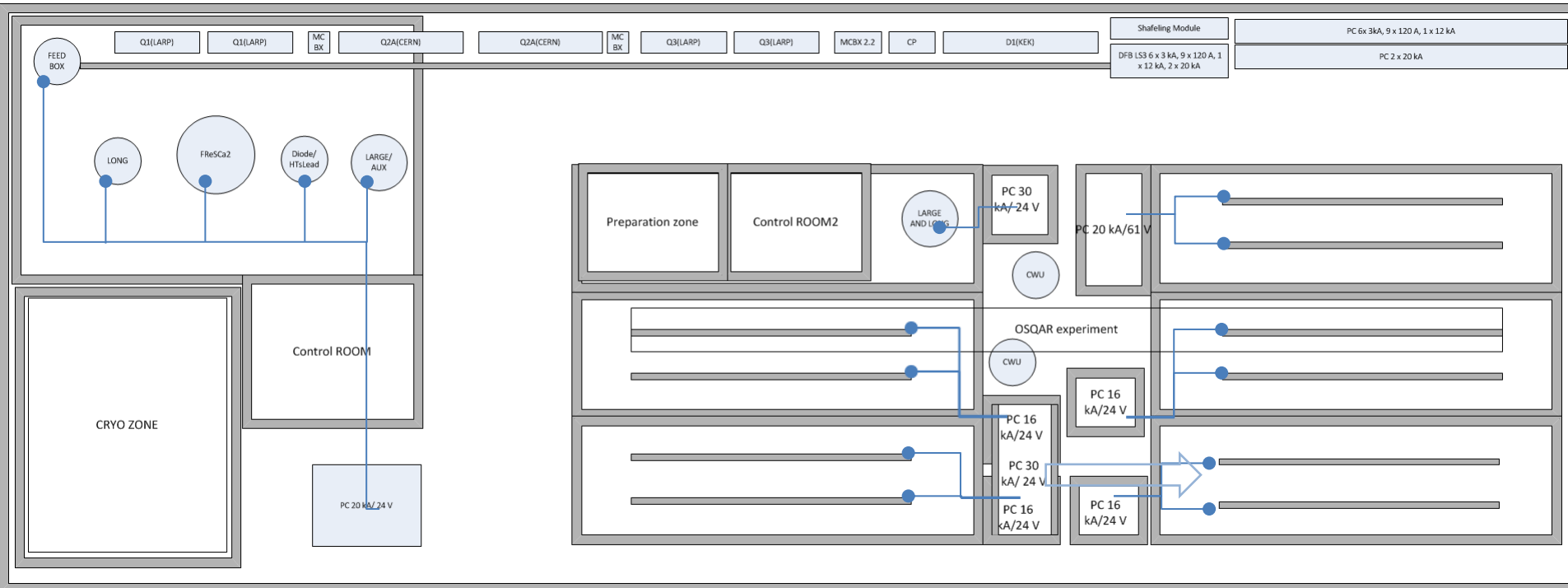
1 x 20 kA/ 61 V PC

4 x 16 kA/ 24 V PC

1 x **30 kA/24 V**

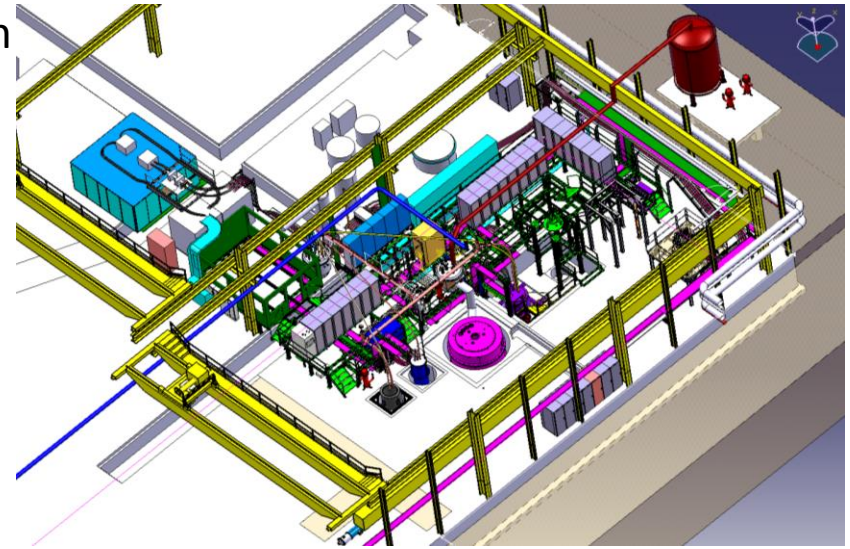
**STRING HL-LHC: 1 DFB x LS3 Type 6 x 3kA, 9 x**

**120 A, 1 x 12 kA, 2 x 20 kA and shuffling module**

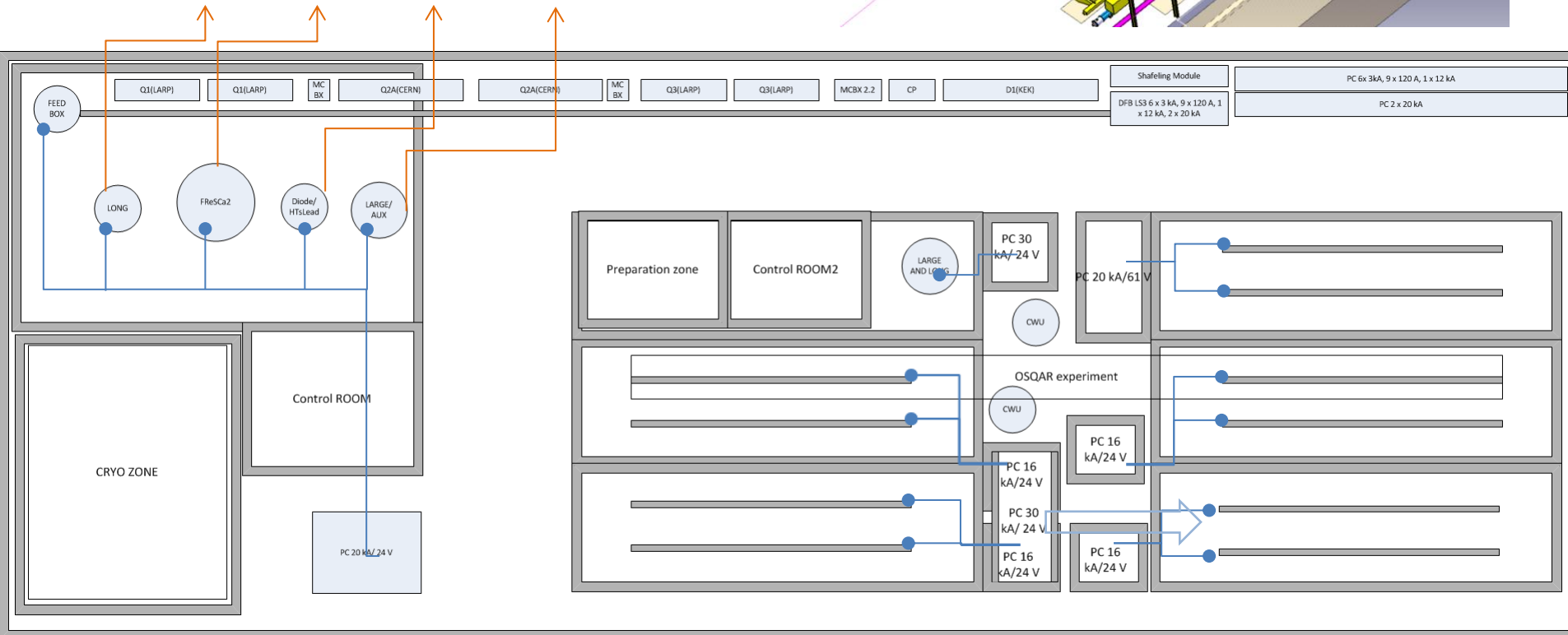




# SM18 Superconducting Magnet Test Facility as in 2018 Cryostat characteristics

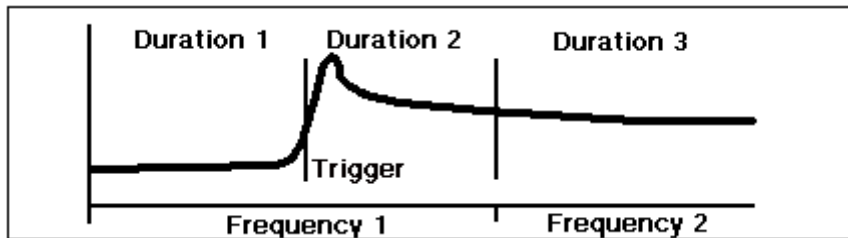


	LONG	HFM	Diode & HTs Lead	LARGE
Useful length (mm)	3800	2500	1600	1400
Useful diameter (mm)	600	1500	500	800
Main Volume (l)	7300/8100	4400+3200	1100	4500/5030
Working temp (K)	1.9 - 4.2	1.9 - 4.2	4.2 - 50	1.9 - 4.2
Max weight (t)	6	27-30	1.5	3
Nr of current leads	2 x 13 kA +	2 x 15 kA		2x 18 kA or
(conventional)	1 x 6 kA	2 x 20 kA	2 x 15 kA	4x 200 A +
				4 x 1200 A



## QUENCH DETECTION

The quench detection is planned to be made by using the existing POTAIM cards, configured for every particular test, with a threshold adjusted from case to case between 10 to 100 mV and with a verification time of about 10 ms or less.



### HARDWARE FOR QUENCH DATA ACQUISITION SYSTEM

- Type of cards: NI Multifunction DAQ
- Type of system: PXI, with Dual core CPU for redundancy feature (HF/MF should work independently of LF, and vice versa)
- Nr of +/-10V analog input channels for High Frequency signals (HF: up to 200 kHz / 16 bit resolution / 1mV precision): min 160
- Nr. of +/-10V analog input channels for Medium Frequency signals (MF: up to 5kHz) re-sampled, down from HF recording: min 160 – identical to HF
- Nr of +/-10V analog input channels for Low Frequency signals (LF: up to 1 kHz / 16 bit resolution / 1mV precision): 144 differential (the option of single-ended channels has been abandoned)
- Timing synchronisation card: GMT time
- Input filtering to reduce noise if necessary (will be developed by TE/MS-C-TF section)

