

Torino hardware status

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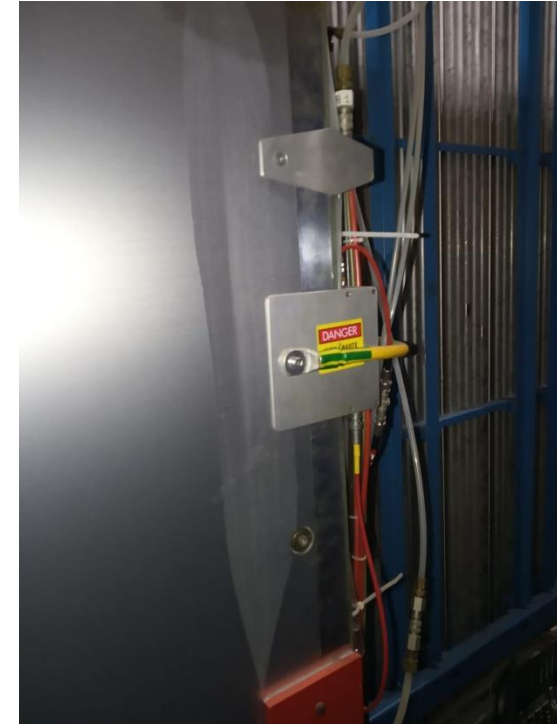


MWPCs Mylar repair preparation

- We have confirmed that the Mylar aging is more diffuse than we initially thought
- Up to 6 chambers could need the exchange of Mylar



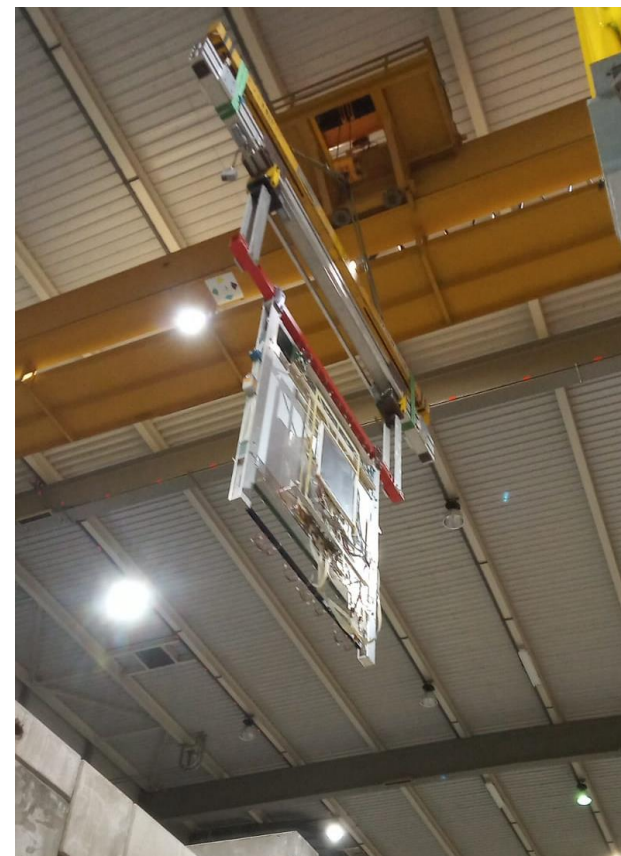
9/3/2019



- Presently we are looking on a criteria to decide on which chambers we will make the intervention.
- Probably we could try to see on one chamber what are the conditions that lead to the failure and use decide afterwards the chambers to repair

MWPCs Mylar repair preparation

- We will be able to start working on the chambers in the beginning of 2020 when the clean area is expected to become available for the intervention
- Big part of the work in 2020 would be in parallel with the Richwall repair operations this is a complication from the manpower point of view



- We will need to have all the material for the operations by the end of 2019 to start the preparation.

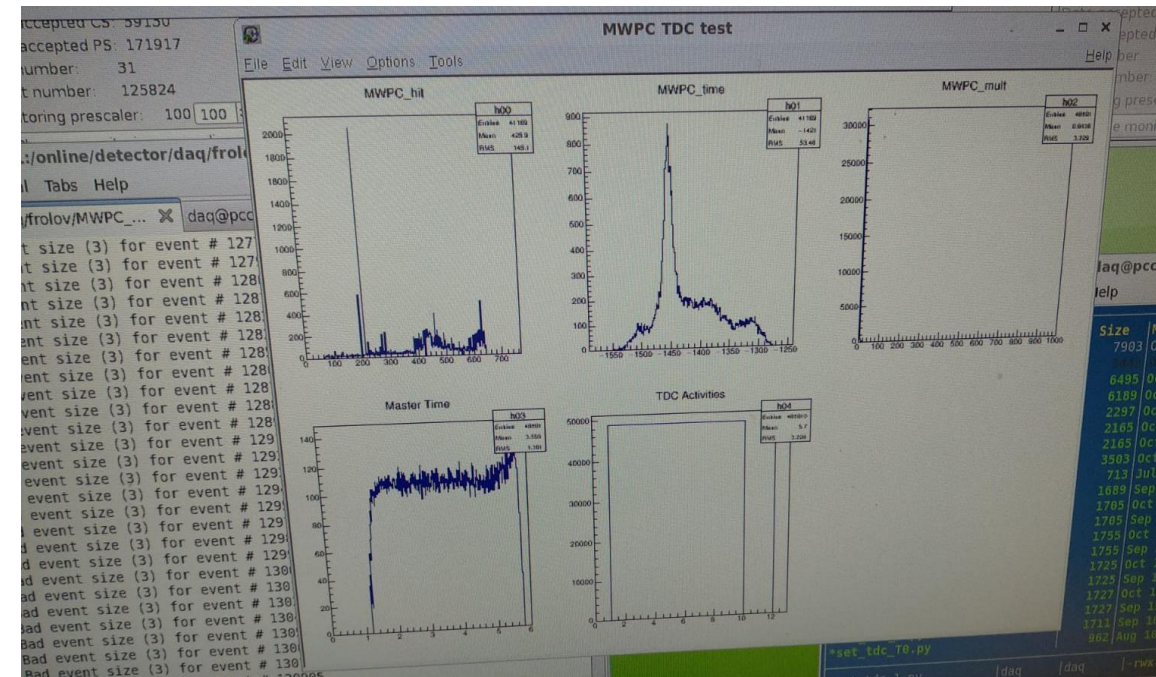
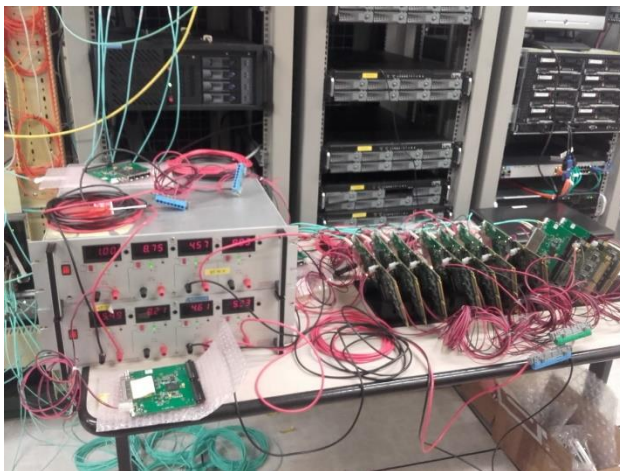
MWPCs Mylar repair preparation

A tentative planning could look as following:

- ❑ 12.19 end of the refurbishment of the stretching machine
- ❑ 09-12.19 decision on the chambers to be repaired
- ❑ 01.20 removal of the selected chambers from the spectrometer and movement into the Clean area
- ❑ 12-02.20 preparation of Mylar rolls for the “first group” (2-4 max) of chambers
- ❑ 03-04.20 repair operations (“first group”)
- ❑ 05-06.20 reinsertion of the chambers into the spectrometer

MWPCs iFTDC equipment

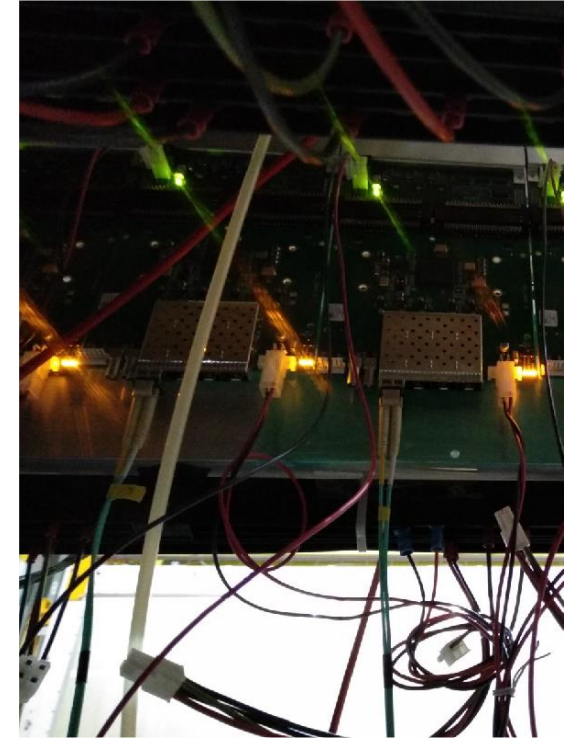
- The question of equipping a full chamber with the prototype electronics has to be answered soon
- The test we conducted in 2018 was successful if looking onto the online data but the complete efficiency analysis is lagging because of the need to modify the reconstruction software to adapt for the modified format



- This is also a question for the 2021 running in case we will have a full chamber with the new FEs we need to prepare the full integration of the software and hardware parts into the COMPASS environment

MWPCs iFTDC equipment

- We plan to finish the decoding modification in 2019
- Additional test may be conducted during the Dry run in October

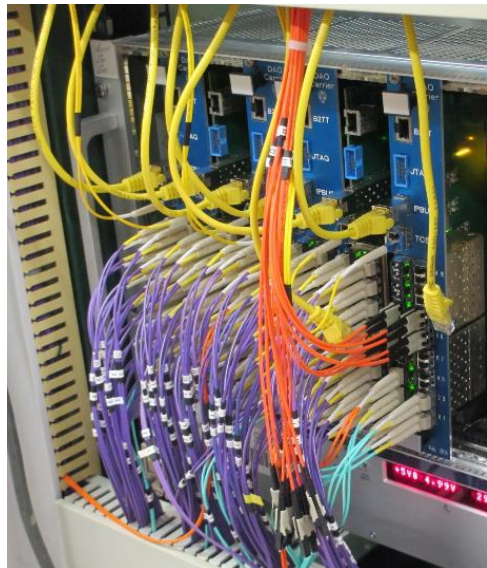
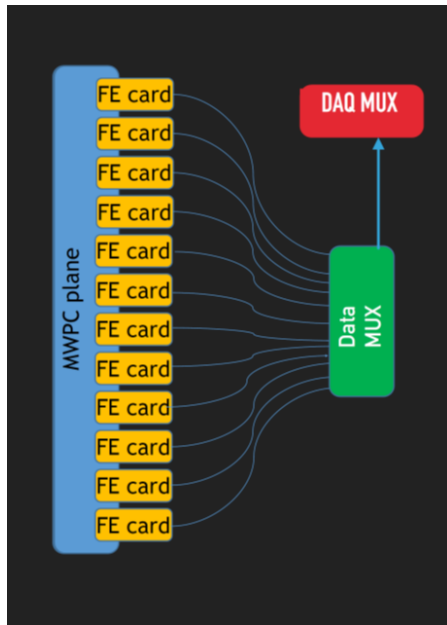
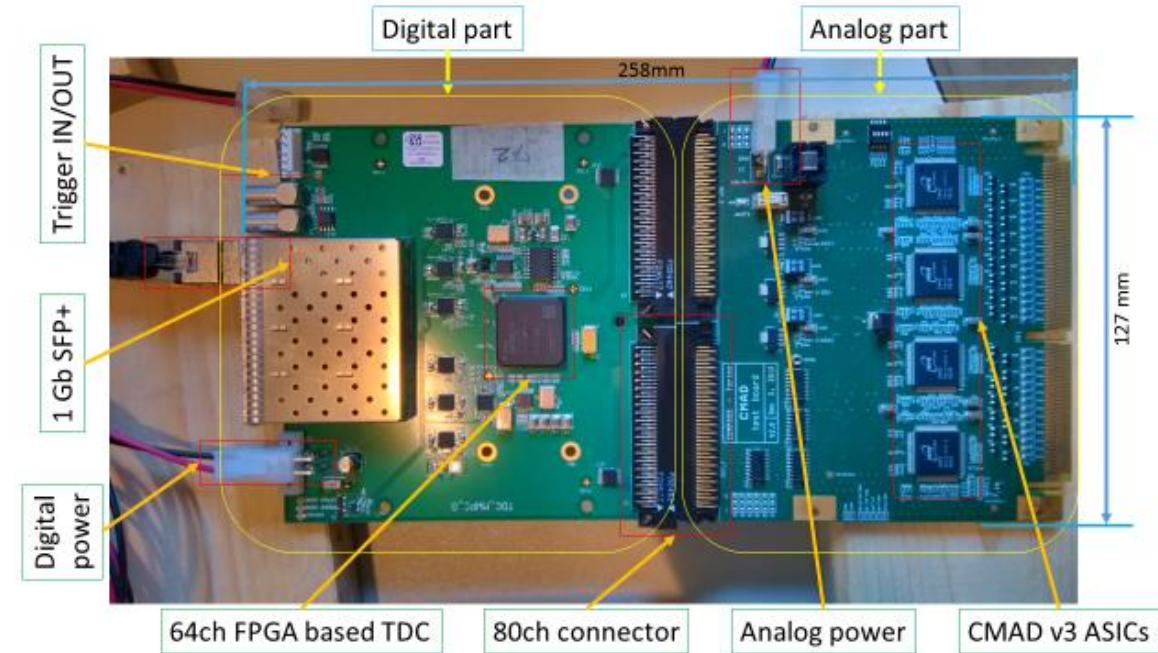


- Anyhow we need to decide if we want to equip a full chamber for the 2021 and 2022 running within the 2019 as the production, calibration and DAQ/software integration would take several months

MWPCs iFTDC equipment

The needed FEs in case of the upgrade:

- ❑ We will need to produce 24 digital FE cards + 2 spares
- ❑ We will need to produce 24 analog FE cards + 2 spares

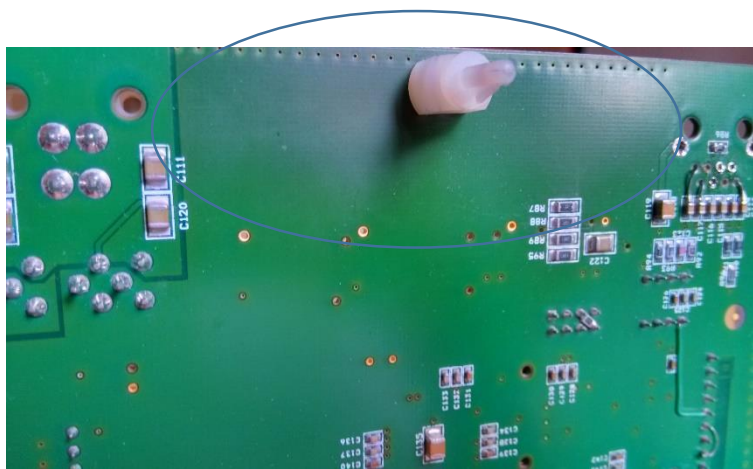


3 Multiplexer cards will be needed to bring the data into the DAQ

- Or as an alternative we could have some passive optical mux just behind the digital FEs, but this option was not tested yet

Cooling test

- We have decided to install a forced air cooling to the most densely surrounded chambers
- We have always observed high temperatures on the FE PCBs but it appears to become a problem after long operation of the FEs
- We have even some apparent local degradation of the PCBs in the hottest regions

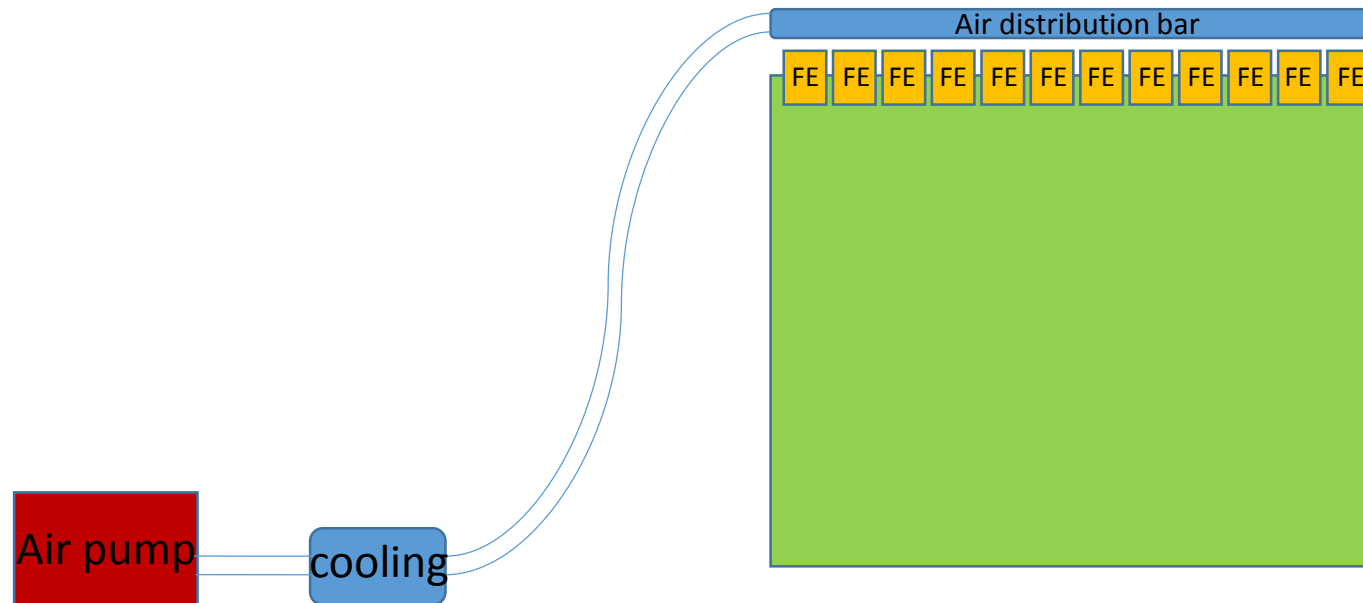


- We would like to conduct initially a test on single chamber and then decide if to replicate it

Cooling test

- We think to initially install a small size air cooling circuit on the PA3 chamber
- We could start it during the Dry run to see the resulting effect
- All the system would be build of commercial elements that we will assemble and operate

scheme:



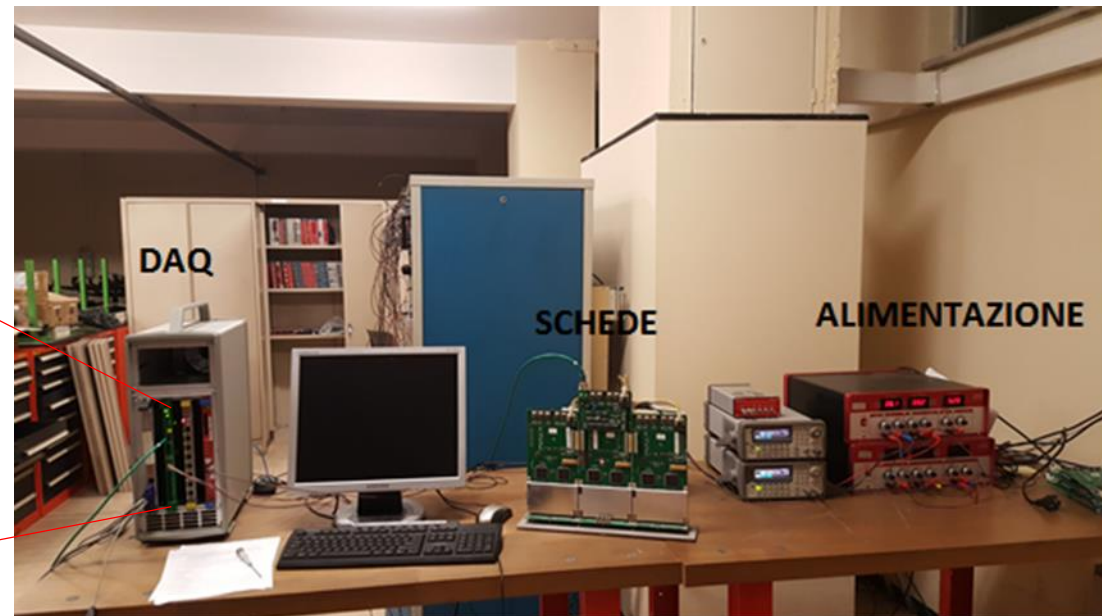
Cooling modification

Proposed schedule for a possible cooling installation:

- ❑ 11.19 – 02.20 test of a simplified system on one chamber
- ❑ 03 – 04.20 decision on the final scheme of the cooling
- ❑ 05 – 07.20 acquirement of the elements and first test in the lab
- ❑ 09 – 11.20 installation in the COMPASS spectrometer
- ❑ 12.20 – 02.21 integration into the slow control

MWPC FE refurbishment

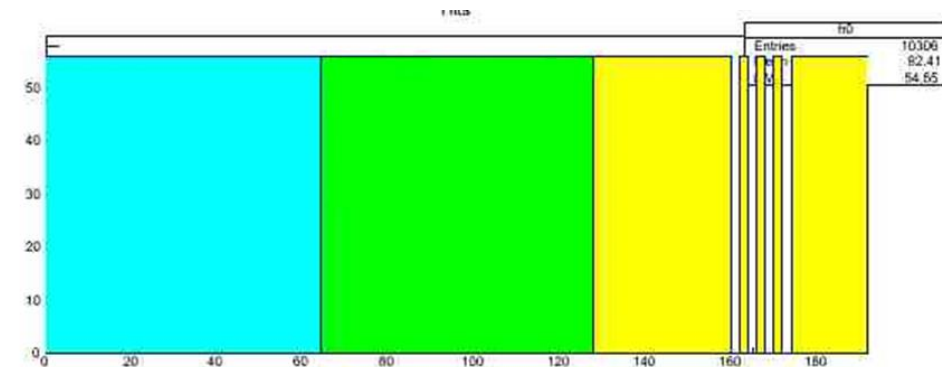
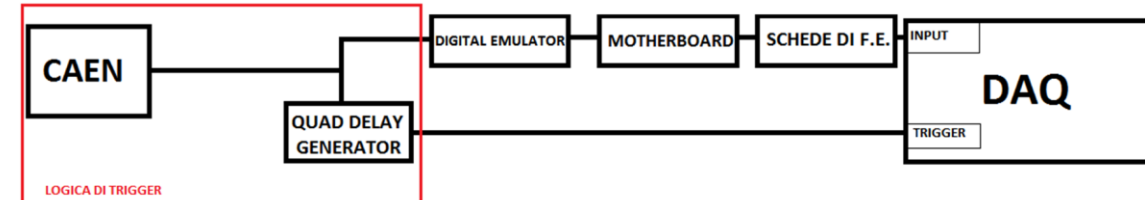
- We have accumulated over the last 2 years the FE cards that did show issues during the running periods
- Presently the spares number is running low and to ensure a good running in 2021 we need to reassemble the testing stand
- We will try to run the same equipment as two years ago but due to the failure of some equipment (produced in 1998) we need to evaluate the possibility of using the existing FPGA cards of the Richwall and adapting the software



MWPC FE refurbishment

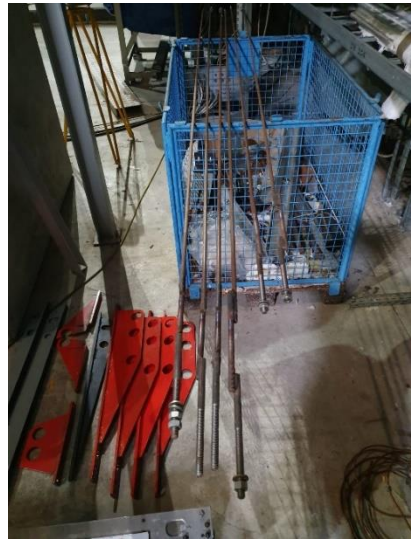
In case we would need to run a new test environment we will need:

- ❑ Modify the firmware of the GeSiCa cards used in the RO of the Richwall to work with MWPC data format and send data to the VME bus
- ❑ Setup the VME based acquisition system for pulse and trigger generation
- ❑ Write the software for the mini data acquisition system
- ❑ Adapt the data analysis to the new format



Richwall repair

- ✓ We proceed with the preparation for the full refurbishment of the detector
- ✓ Presently the detector is in the garage position with almost all the external cabling and infrastructure dismantled during July
- ✓ All the involved people comprising external support from Dubna and CERN has agreed on the preliminary schedule

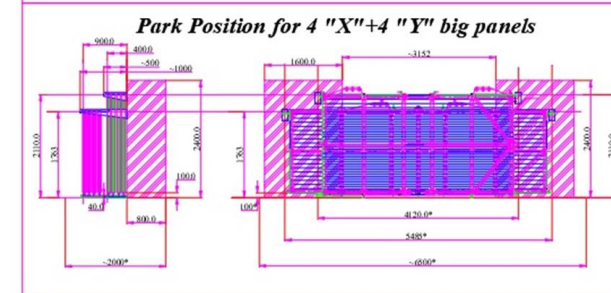
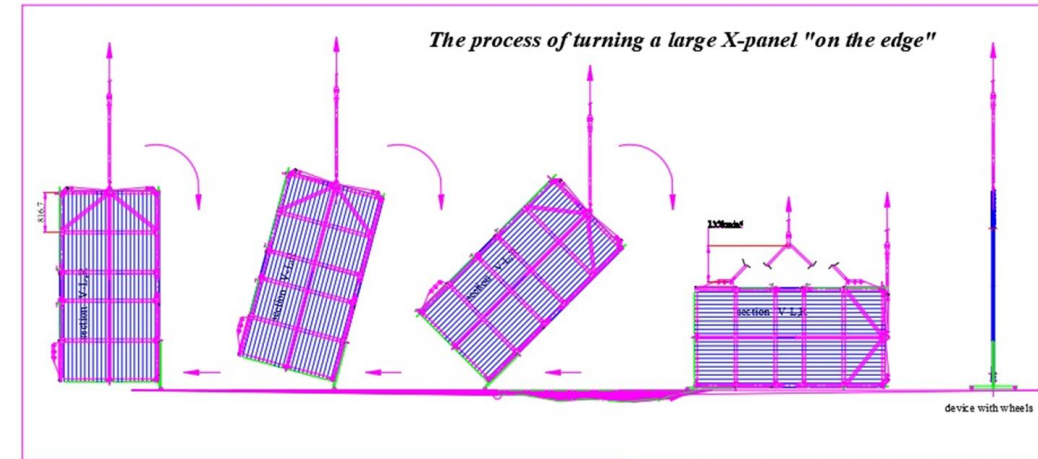


- ❑ We expect that the crane repairs in the COMPASS hall will finish as expected by the end of 09.2019
- ❑ The majority of tools needed for the dismantling was located but some are still to be produced during 09.2019

Richwall repair planning

The presently still rough planning of the whole operation that was agreed:

- ❑ By mid 09.2019 we need to define all the mechanical elements (suspensions, supports, tooling) to be acquired/prepared to start the operations
- ❑ Dismounting of the Richwall in single panels during the first 3 weeks of 10.2019
- ❑ Preparations of the repair environment until the end of 11.2019
- ❑ Installation of the acoustic wire tension test stand and software in 12.2019 – 01.2020
- ❑ Testing of all the 504 tubes until 06.2020
- ❑ Repair of the loose/broken wires and gas leaks and reassembly of the panels with the additional MDT supports by mid 07.2020
- ❑ Reassembly of the mechanical structure of the Richwall in the end of 07.2020



Richwall repair work load and sharing

The operations are subdivided in the following way (conservative version):

Dismounting and remounting of gas piping and HV:

Torino – 2 persons for 4 weeks

Dismounting and remounting (mechanics) of the Richwall:

Torino – 3 persons for 4 weeks

Dubna – 1 person for 4 weeks

CERN – 1 person for 4 weeks

Acoustic test stand installation and training:

Torino – 1 person for 1 week

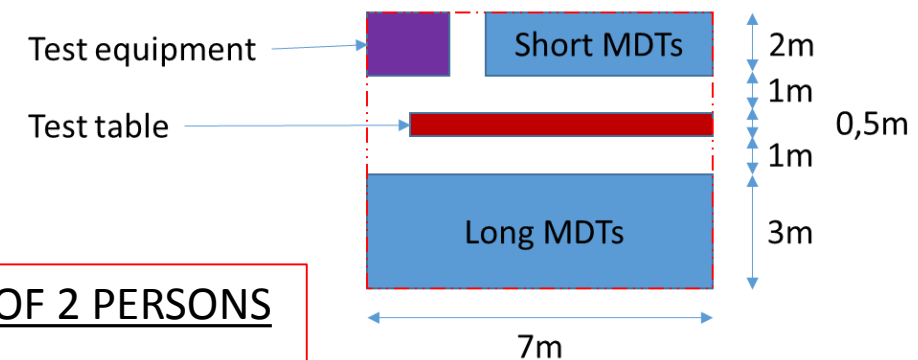
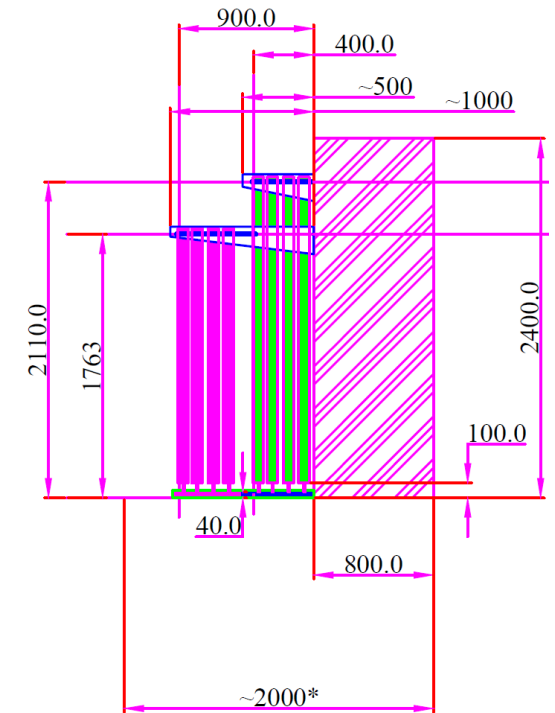
Dubna – 1 person for 1 week

MDT repair operations:

Torino – 1 person for 2-3 weeks

Dubna – 2 person for 2-3 weeks

➤ THE TESTING WILL REQUIRE AN ALMOST PERMANENT PRESENCE OF 2 PERSONS
The speed of the testing is not well defined...



Conclusions

- ❖ The Mylar operations are now in preparation, the total number of the chambers to be refurbished is not yet decided
- ❖ We would like to install a forced cooling to 3 – 4 of the chambers that have the worst natural air flow
- ❖ The iFTDC FE installation on one full chamber is to be evaluated and prepared
- ❖ The repairs of the old FEs is a must but may require some additional preparatory work
- ❖ The Richwall MDT repair preparation is proceeding with no evident problem yet