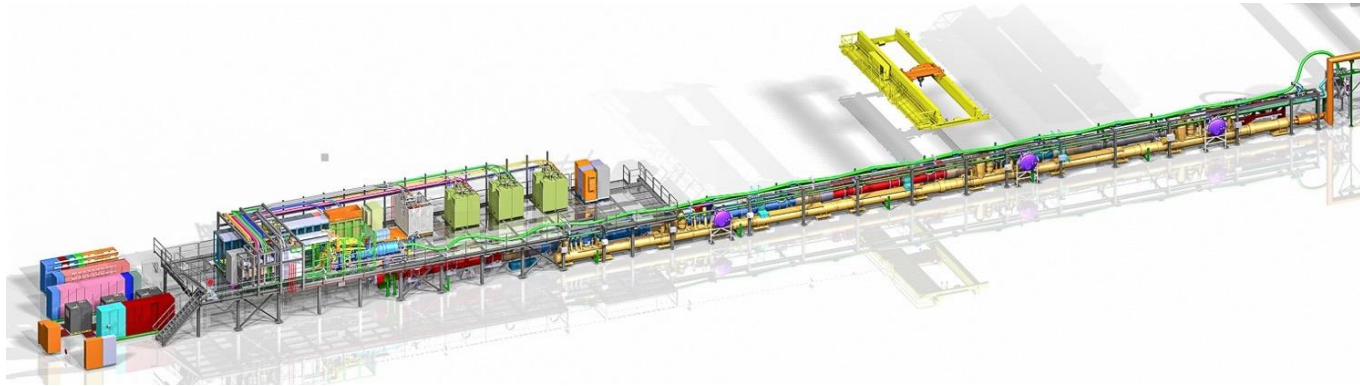




# HL-LHC IT String: From Design Concept to Construction Reality — Facing Challenges and Building on Opportunities

N. Heredia Garcia

On behalf of TE-MPE-SF (M. Bajko, S. Blanchard, D. Bozzini, L. Herrero and S. Yammine)

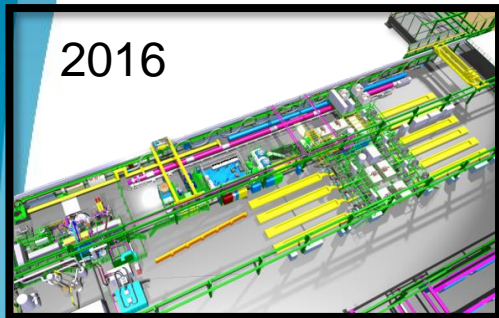


TE-MPE Annual Meeting – 21st of January 2025

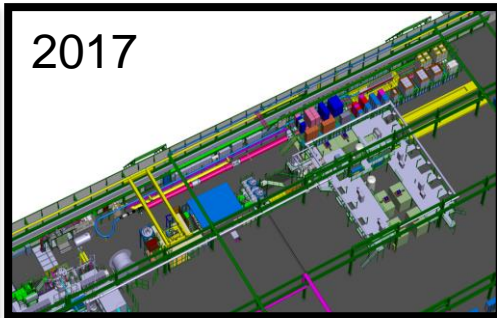
# HL-LHC IT String Integration

- Complex integration phase to accommodate the components to the allocated space in SM18.

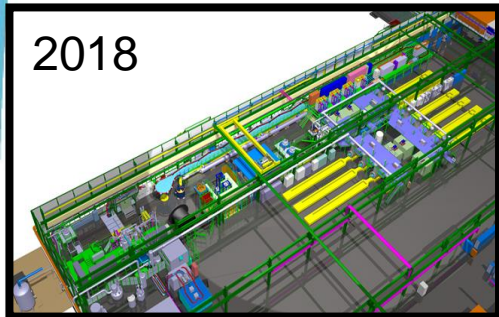
2016



2017



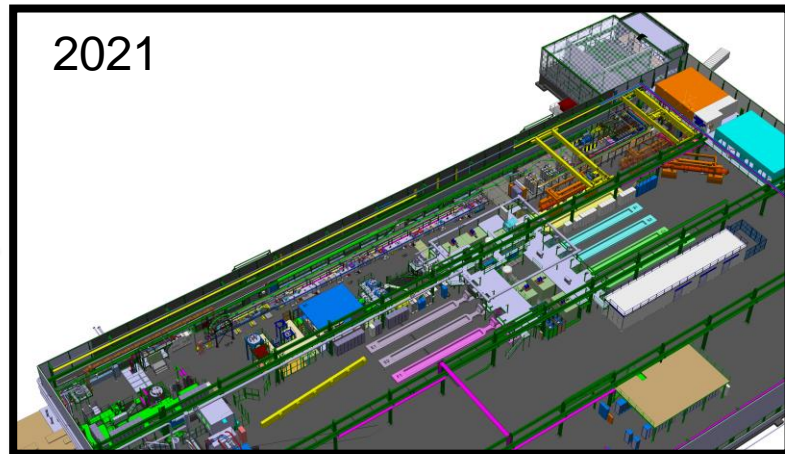
2018



2019



2021



# HL-LHC IT String Construction Site



December 2020

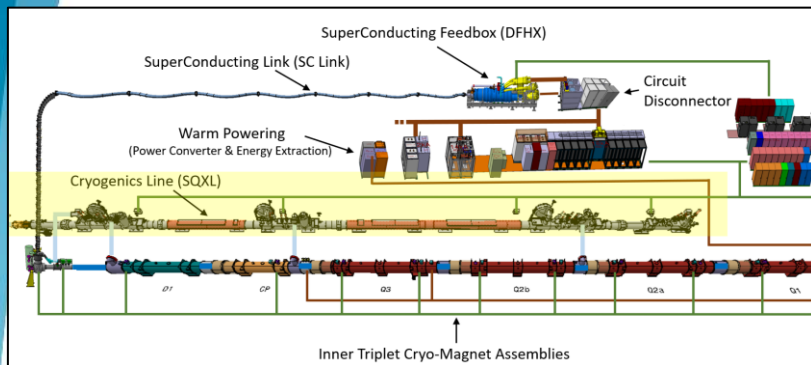


January 2025

- Many lessons learned from onsite coordination and unplanned situations.

# Cryogenic system for the HL-LHC IT String

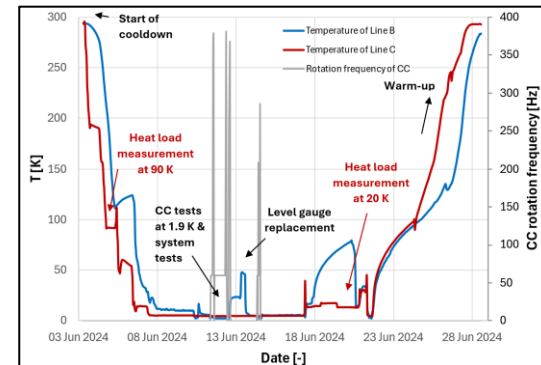
## Integration



## Installation



## Commissioning



## Challenges:

Responsibilities clarification

Non-conformities detected

Additional commissioning step

## Opportunities :

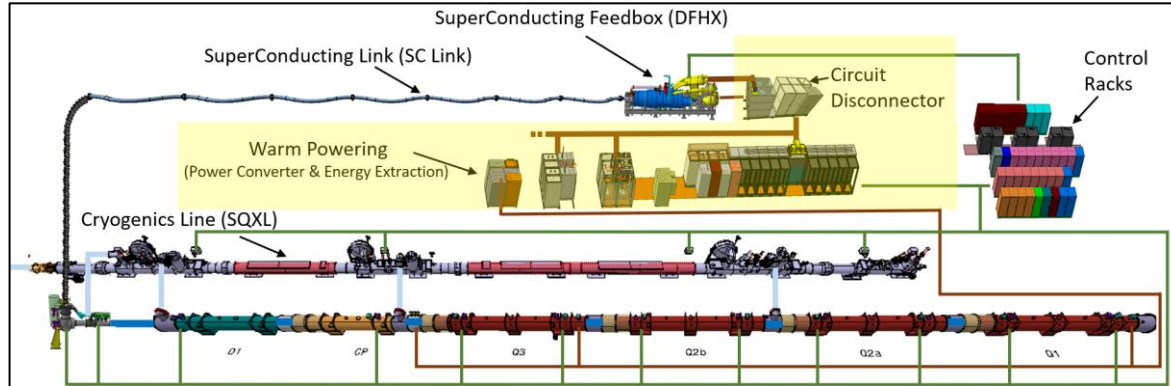
Define commis. procedure

Improve design of equipment

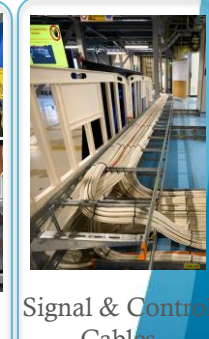
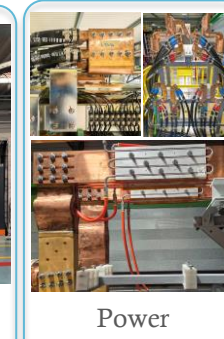
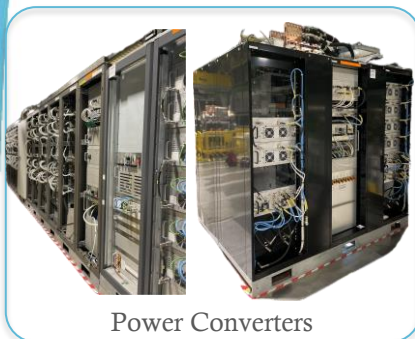
Define operational modes

# Circuits in the HL-LHC IT String

## Integration:



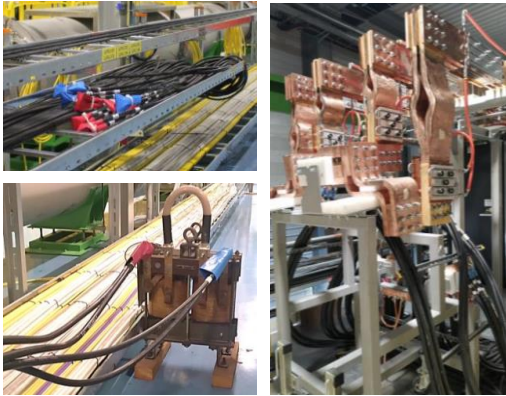
## Installation:



# Circuits in the HL-LHC IT String

- Commissioning: IST & SCT

- Challenges:



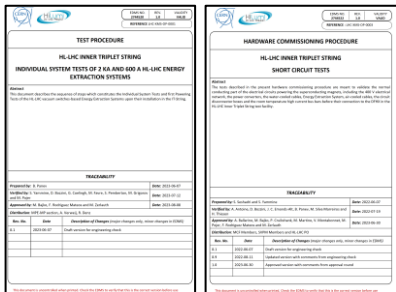
Debugging of low-tech equipment (water system, cabling...)

Configuration for executing short circuits

Strategy for electrical safety (work permit + access control)

- Opportunities:

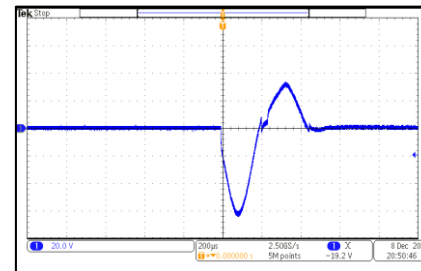
Apply procedures



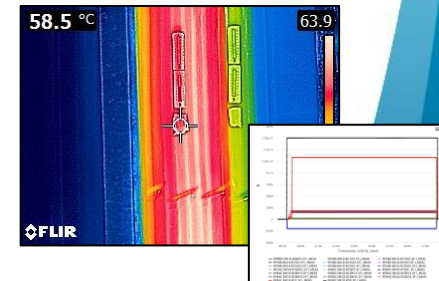
Test software



Execute EEs discharges

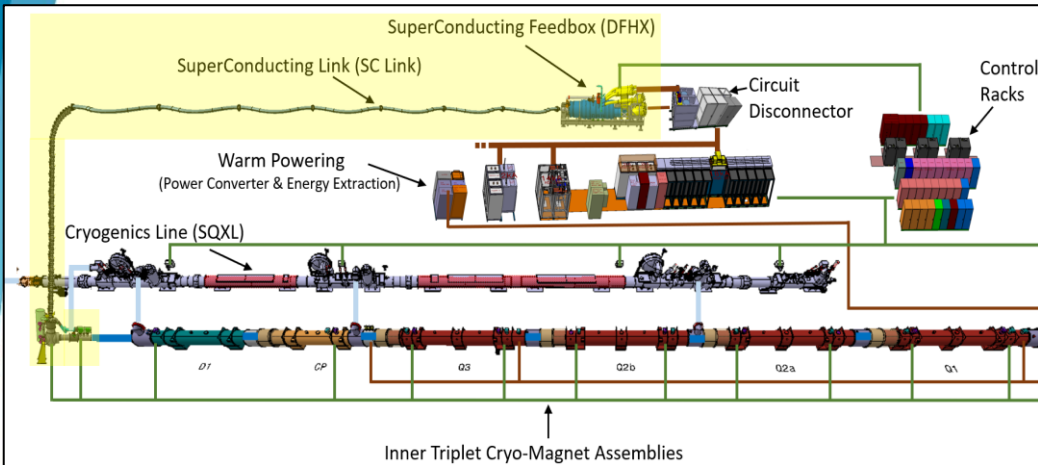


Monitor heat loads



# Cold powering system for the HL-LHC IT String

## Integration



## Installation



## Commissioning



## Challenges

Complex installation maneuvers

Personnel and surface underestimated

## Opportunities

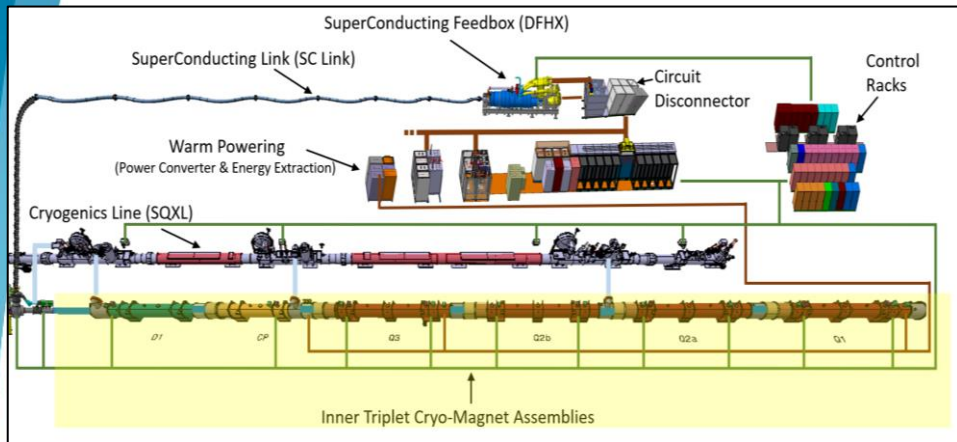
Definition of installation methodology

Collaboration between teams

Apply commissioning procedures (EIQA, vacuum)

# HL-LHC IT String Magnets

## Integration

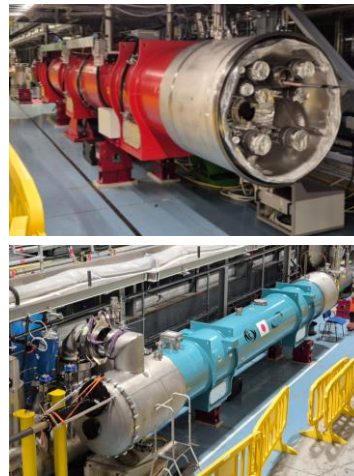


## Challenges :

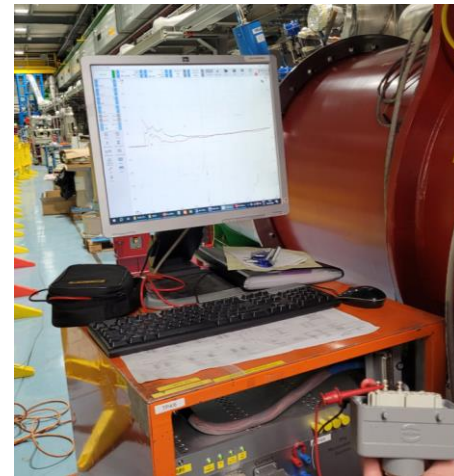
Last minute adaptations

Interfaces (cryogenic line, floor)

## Installation



## Commissioning



## Opportunities :

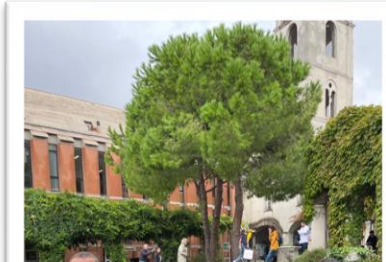
Apply HL-LHC installation sequence

Check commis. HL-LHC procedures (EIQA)

Communication ([videos](#) + [article](#))



# Closing remarks



- Motivated and reactive team
- Adaptability and creativity to solve unforeseen issues
- Committed stakeholders thanks to win-win situations



# Stay tuned to the IT String publications!



[Installation of the D1 magnet into the IT String at CERN](#)



[HL - LHC Project - YouTube](#)



[Home | High Luminosity LHC Project](#)



[Installation of the Cold Powering System into the HL-LHC IT String](#)



[First magnet installation \(Q2a\) into the IT String at CERN](#)



*Many thanks to TE-MPE colleagues for their  
collaboration on the HL-LHC IT String*

