



Test plan overview

A. Ballarino

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International Review of the Conceptual
Design of the Cold Powering System for
the HL-LHC Superconducting Magnets

Outline

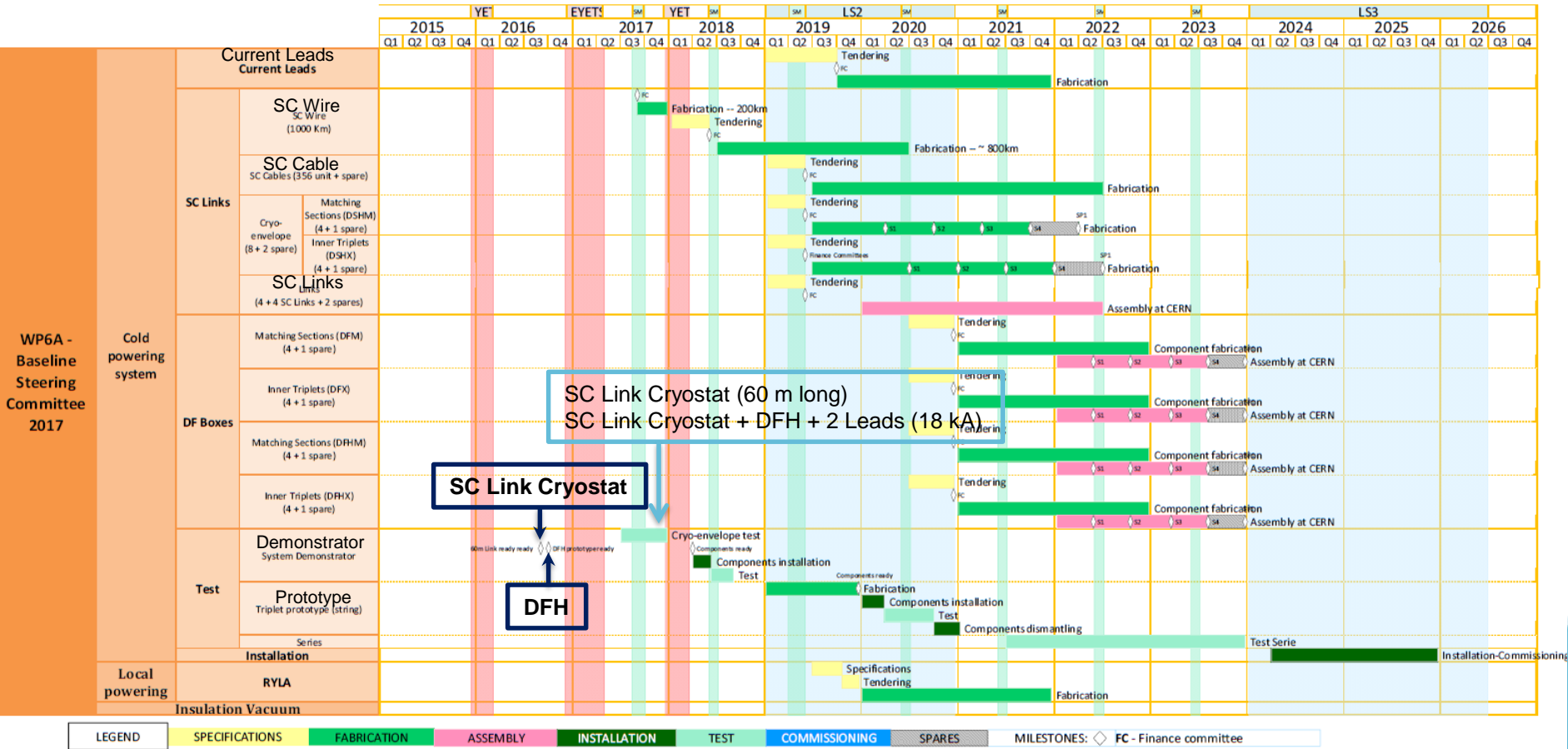
- Introduction
- Master plan of WP6a
- Key steps of validation
- Strategy for the test series production
- Conclusions

Introduction

- Significant amount of measurements for validation of MgB₂ wires, MgB₂ cables, splices in nominal operating conditions and in LHe have been performed in the past
- A dedicated test station has been designed and constructed for measurement of SC cabled and splices in nominal cryogenic conditions (operational from 2014 until 2016)



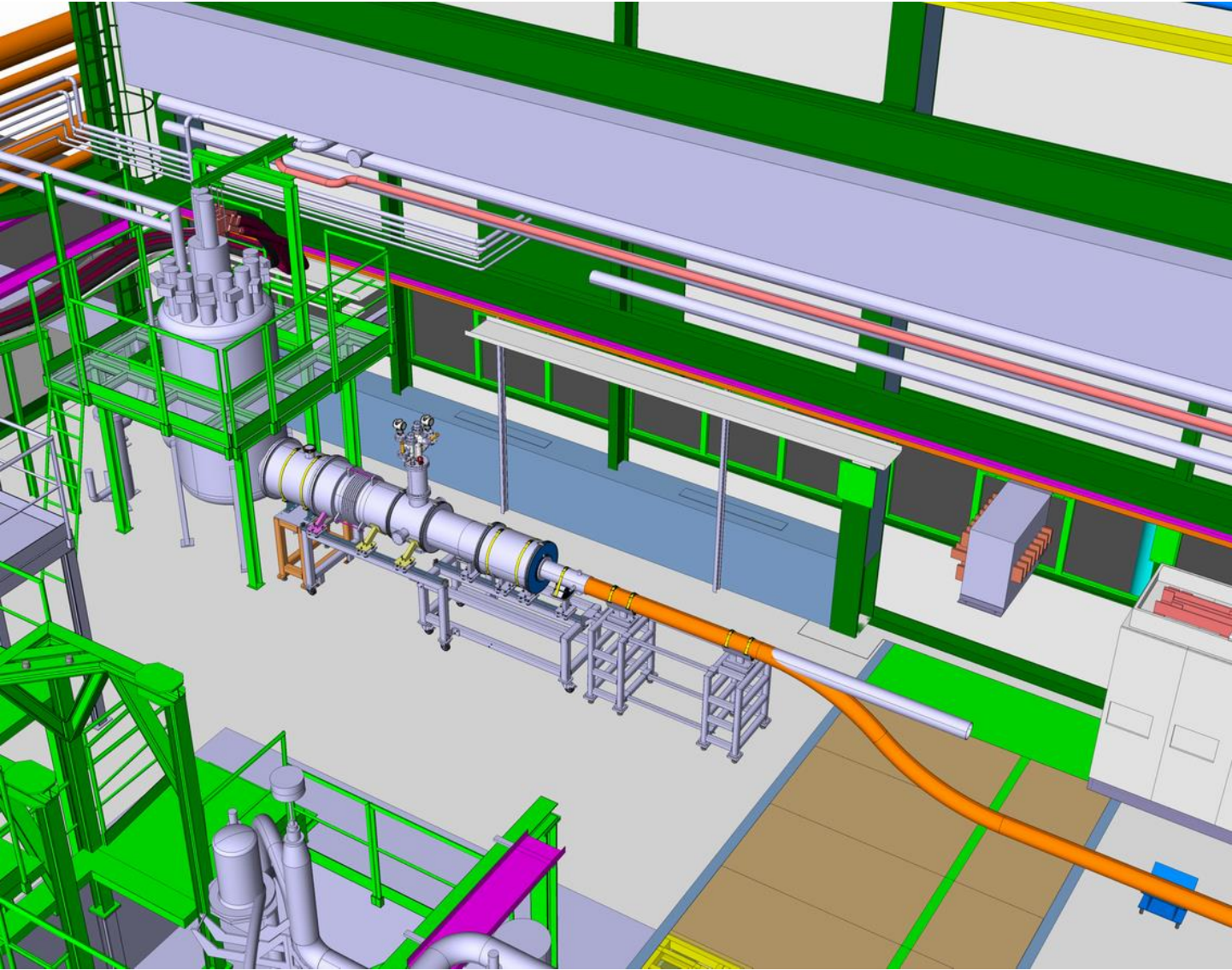
Test plan – 2017



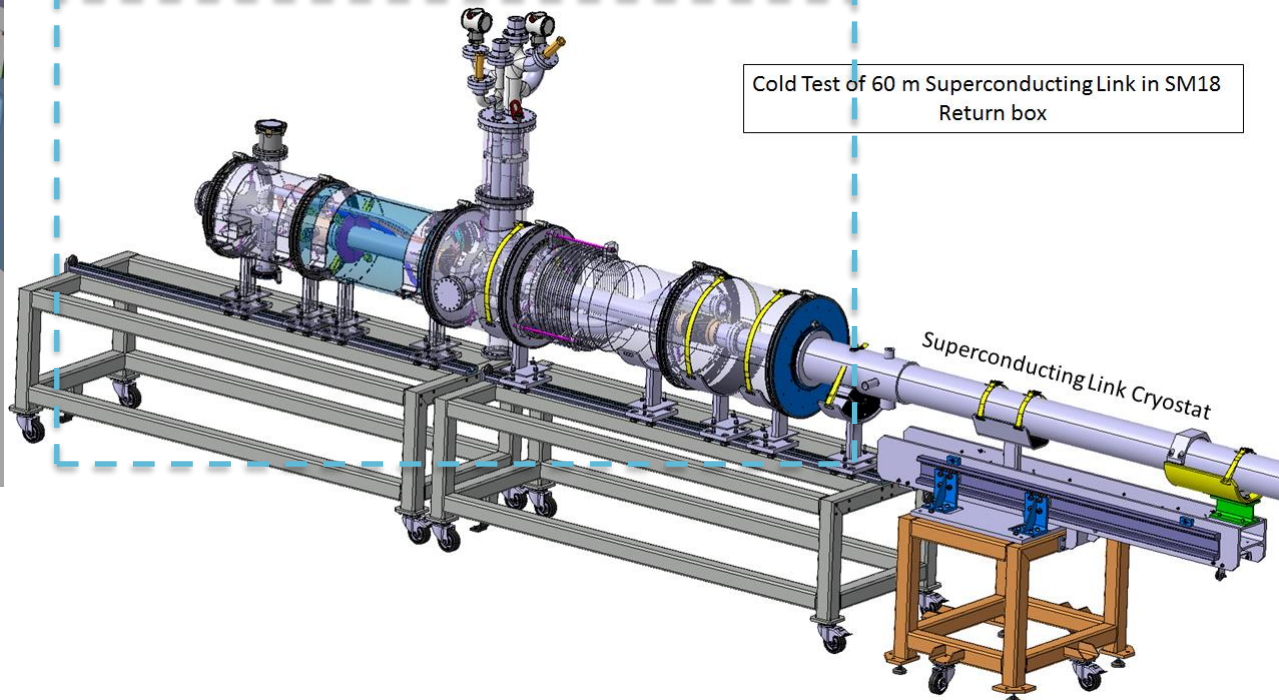
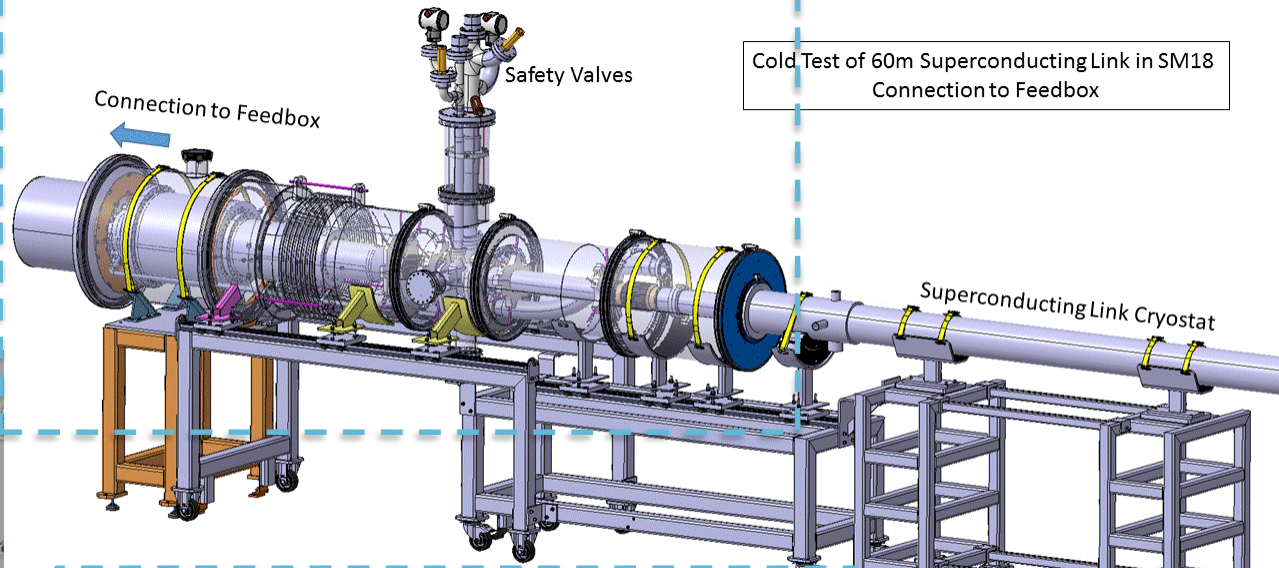
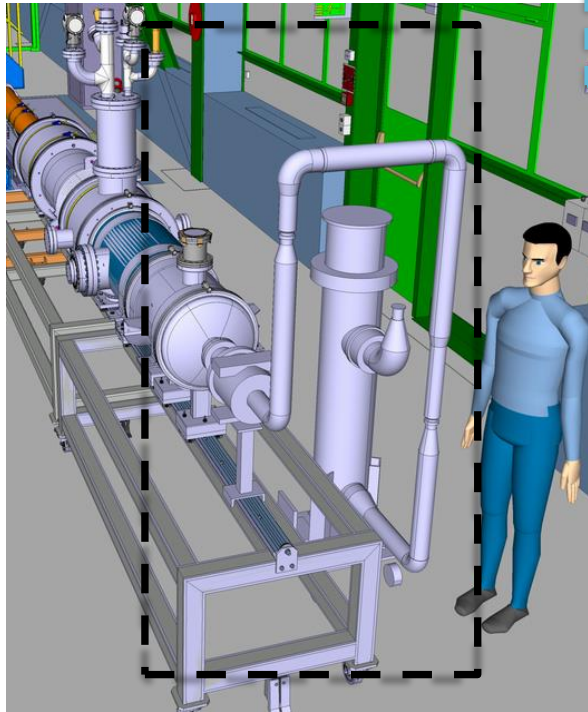
SC Link Cryostat

- Length of cryostat = 60 m
- Cryostat with **dummy copper cable inside**, 60 m long, integrated inside. No electrical tests
- **Learning:** integration of cable in cryostat (building 927), transport and installation of cryostat (from building 927 to SM-18)
- **Using existing feedbox in SM-18** for supply of GHe
- **Constructing a new test station** equipped for:
 - Measurement of static load of cryostat
 - Measurement of pressure drop

SC Link Cryostat



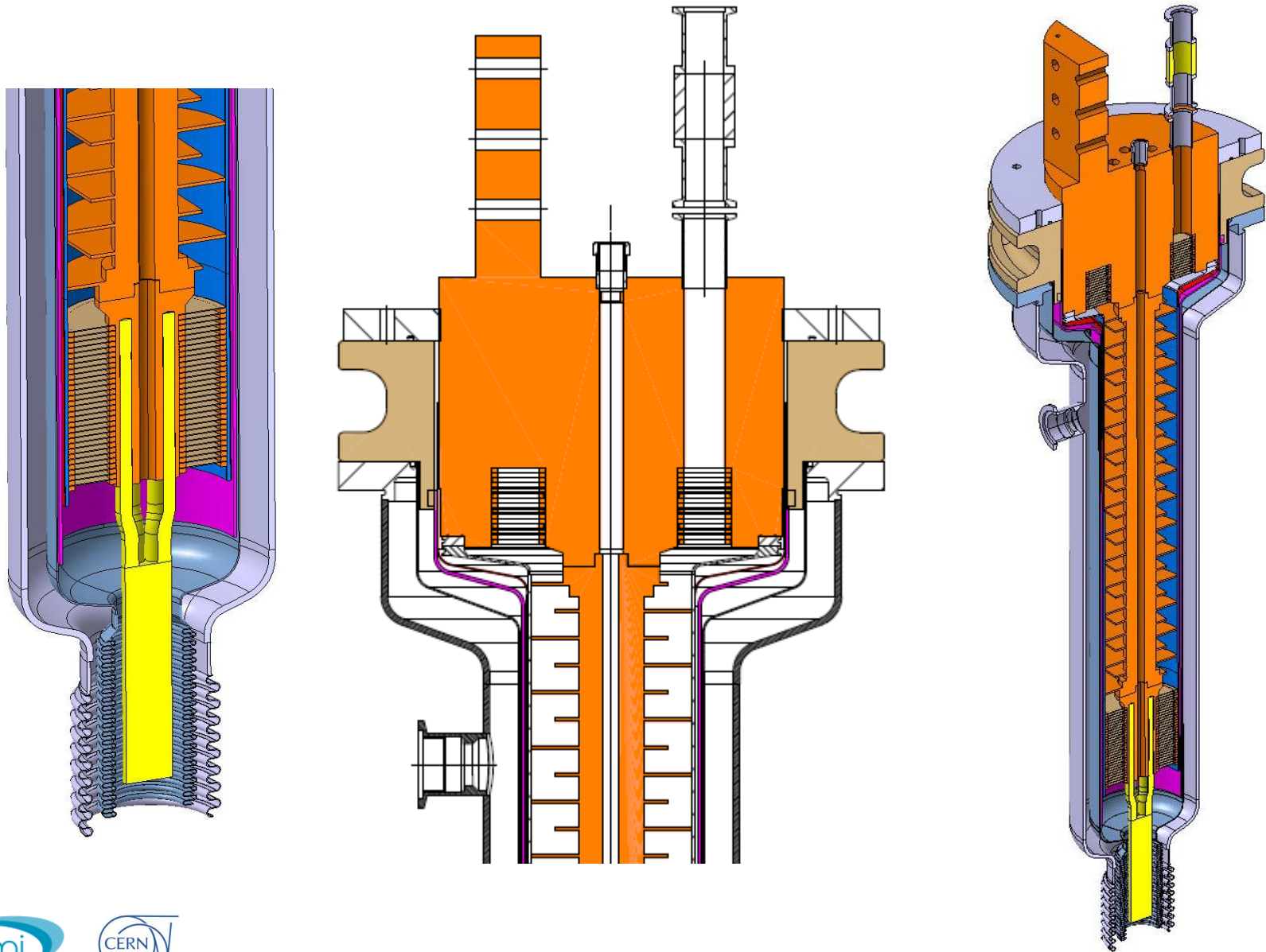
SC Link Cryostat



SC Link Cryostat with two 18 kA leads

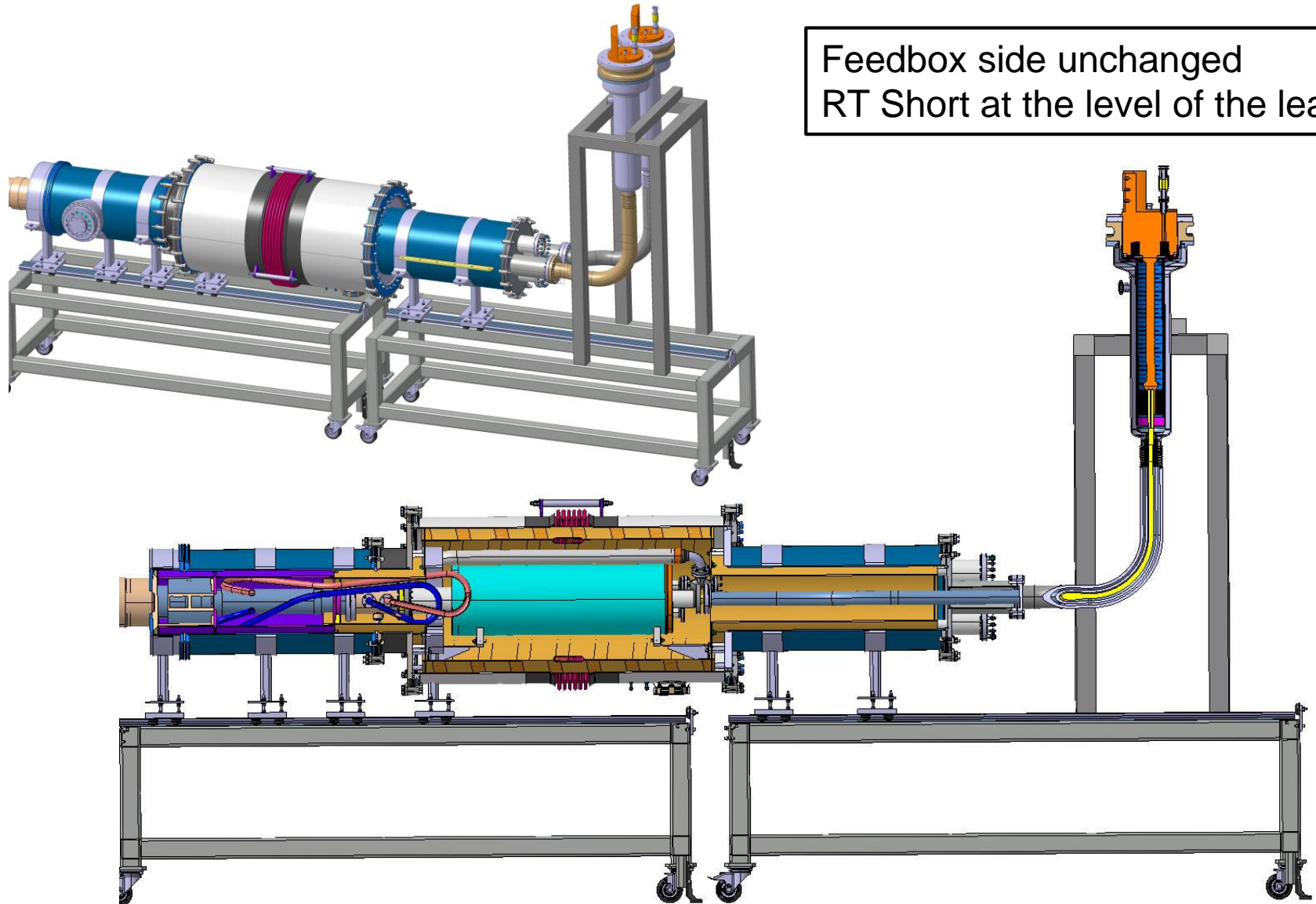
- Use installation for testing the 60 m long cryostat with a pair of 18 kA leads
- Reduced size DFH constructed
- Contract for cabling MgB_2 running at Tratos
- Leads designed. To be assembled together with the Main Workshop. Critical raw material procured. Contract for manufacturing of components placed with external company (CECOM)

SC Link Cryostat with two 18 kA HTS leads

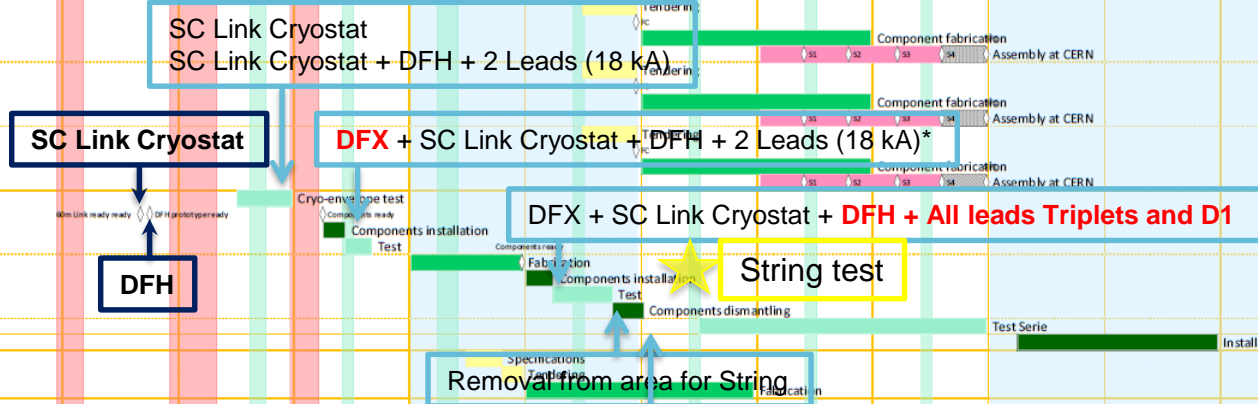
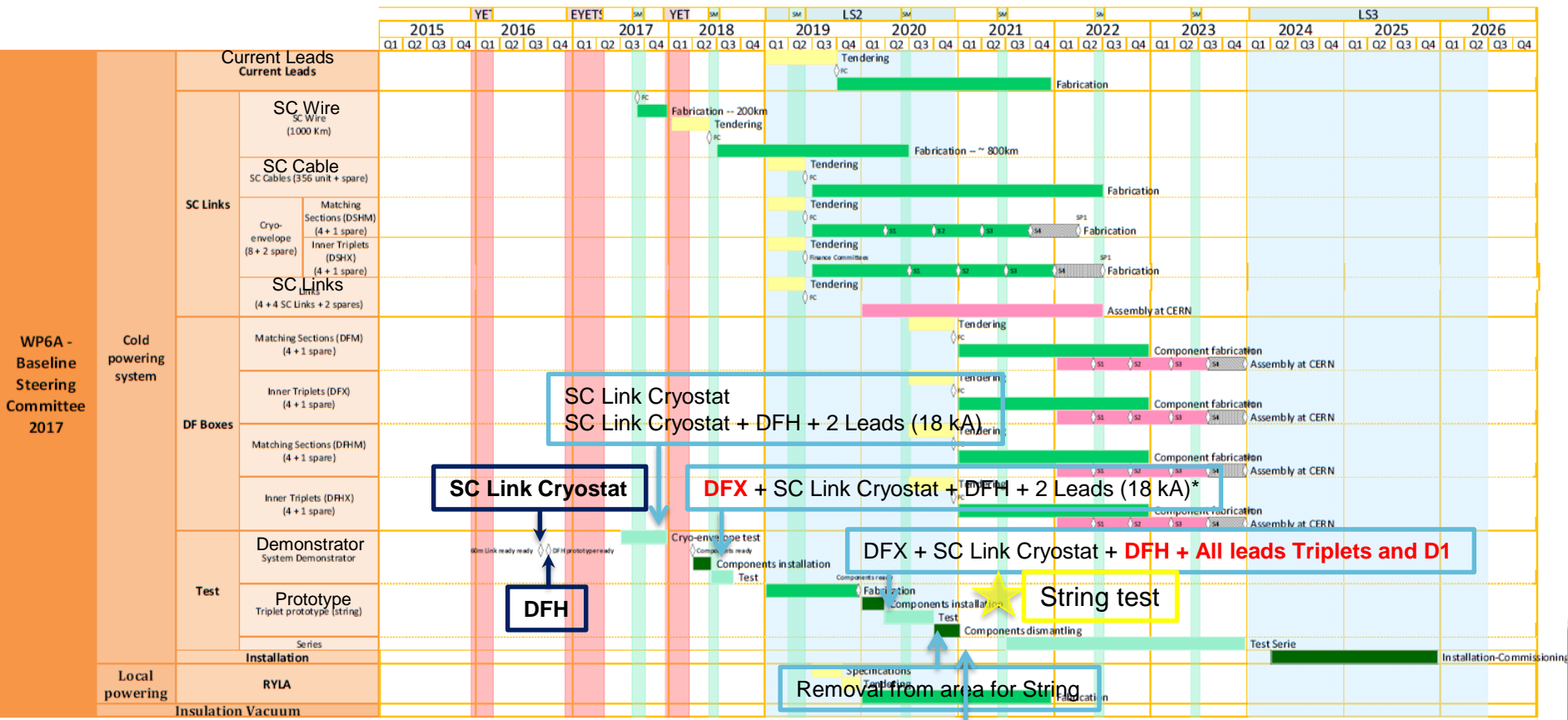


SC Link Cryostat with two 18 kA HTS leads

Feedbox side unchanged
RT Short at the level of the leads

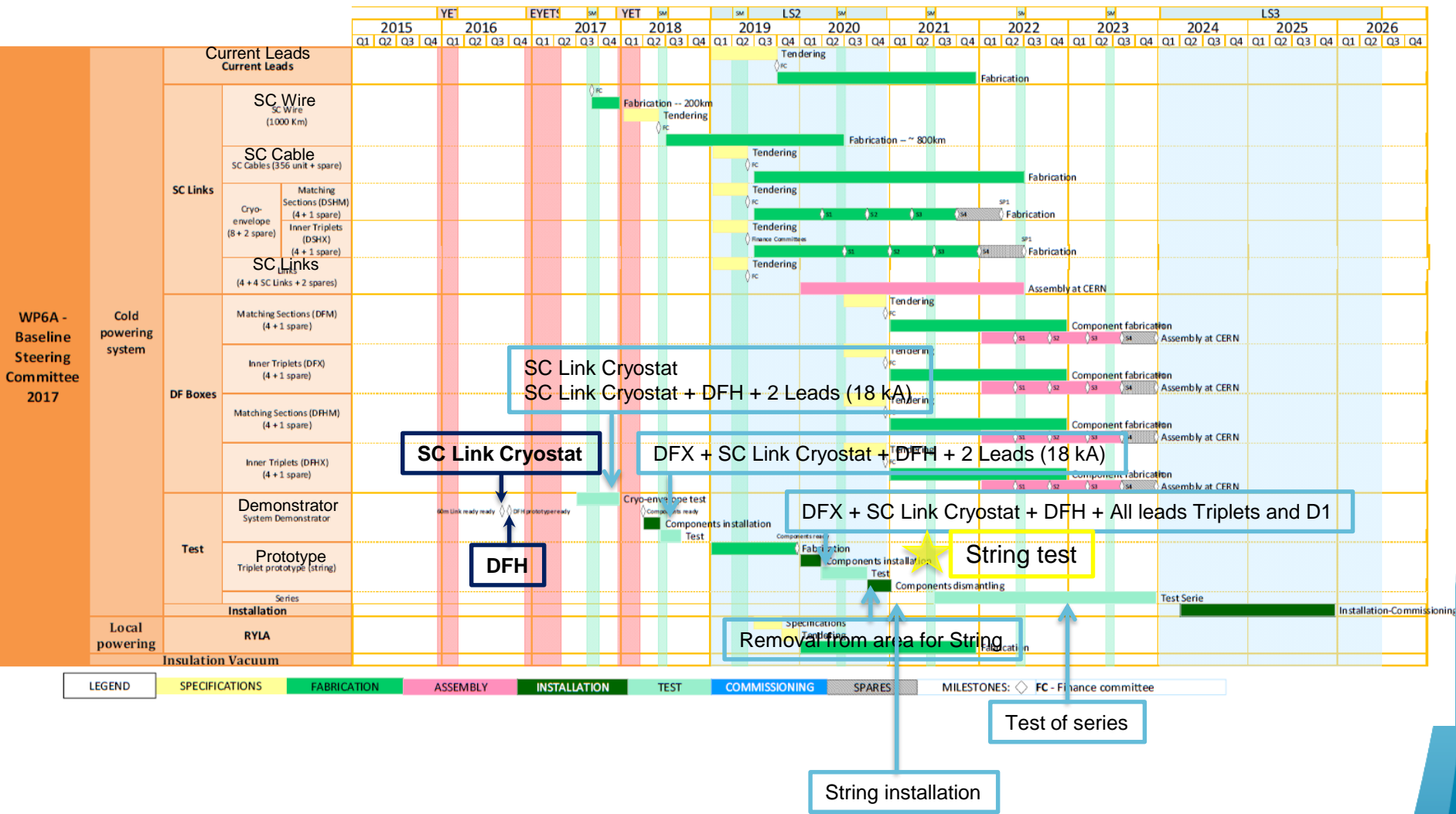


Test plan



*One full size final cable assembly made in industry available

Test plan



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Test plan

- Test of series:
 - Measurement of all current leads (as for LHC)
 - Measurement of all Superconducting Links
- Required a dedicated test station in the SM-18, where leads and link will be connected for being tested in nominal operating conditions and at maximum current (see presentation of M. Bajko)

Conclusions

- Significant test activity has been performed
- A plan/strategy for the future test programme has been established. It consists of intermediate steps for enabling validation of demonstrators, prototypes, sub-components, QPS and cryogenic control
- A complete prototype system (DFX, DFH, Current Leads) will be used for the powering of the String. This prototype system will be fully tested before integration – and operation- in the String

Thanks for your attention !