



Super – FRS Test organization

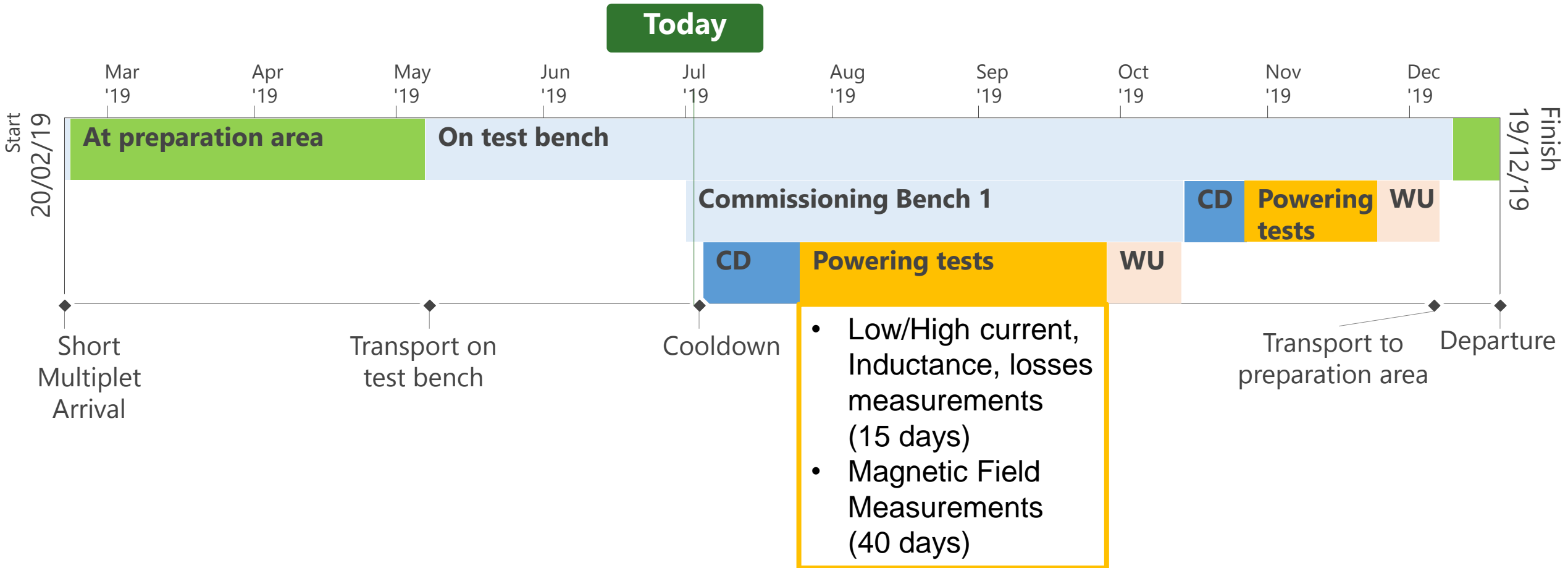
Antonella Chiuchiolo

on behalf of GSI-CERN collaboration on Super-FRS testing

*Collaboration kick-off meeting
CERN, Geneva 3th -4th July, 2019*

- First Short Multiplet test plan status
- Test organization
- FSU Resources
- What next?

Test plan status



Test plan status



- SuperFRS Carpenter <https://superfrs-carpenter.web.cern.ch/>

The screenshot displays the SuperFRS Carpenter web interface. The top navigation bar includes 'SuperFRS Carpenter', 'Playground', and 'Travel information'. The main header shows the test plan title 'Testplan for 00_FPF2YMQ12 (02-000226-05-3, TP_ID #121)' and the assigned station 'SuperFRS, Blue'. Below this, there are sections for 'People in charge' (listing Kei SUGITA, Antonella CHIUCHIOLO, and Florian GREINER) and 'General information' (including testplan comment and PDFs). A progress bar at the top of the main content area shows various stages: Welcome, On Lorry, Prep area, BC, At bench (highlighted in red), Pumping,Cooldown, Test w/o exc, Test w exc, Warmup, Warm, vacuum, Warm, atm, Removal prep, Transp prep, and Goodbye. The 'Cryomodule at test bench' section lists tasks with color-coded bars: Inst at bench, Vacuum conn, Cd Mass Survey, Cable conn, Sens verif (red), QPS verif, Ctrl sys (yellow), and App Pump. The 'Control system commissioning' section includes general and special instructions, a 'Submit new result' form with fields for user (achiuchi), date, and result comments, and buttons for 'Not OK', 'OK, repeat', and 'OK, finished!'. Below this, there is a section for 'Existing results' showing a table with columns for status (OK), user, date, and time, and a 'Delete!' button.

Sandbox
This is the main attraction of the Playground. All the test stations are listed below.

Green

White

Blue

00_FPF2YMQ12

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(TE-MS-C-TF)

Test organization summary

- Activities on the preparation area (arrival/departure)
- Activities on the test bench at warm
 - First of Series (FoS) related activities and non conformities
 - Test Facility commissioning related activities
- Activities on the test bench at cold

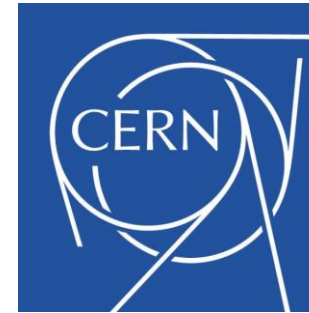


Test organization summary

- Activities on the preparation area (arrival/departure)
- Activities on the test bench at warm
 - First of Series (FoS) related activities and non conformities
 - Test Facility commissioning related activities
- Activities on the test bench at cold

New facility, new magnets, new instrumentation, new team.

- Resources



- 1.4 FTE
- FSU on call TE-MS-C-MM



- GSI team @ CERN



- Teams for remote/on spot support

Test organization – @ Preparation Area



FoS Activities

- 1) Arrival
- 2) Handling
- 3) Unpacking
- 4) Commissioning racks and electrical tests
- 5) Temporary support
- 6) Feet mounting and alignment

CERN resources

- 2) EN-HE-HH
- 3) FSU
- 4) TE-MS-C-TF
- 5) EN-HE-HH
- 6) EN-HE-HH + FSU

GSI resources

- 1) GSI team
- 2) GSI team
- 3) GSI team
- 4) GSI team
- 6) GSI team

Issues

- Deployment GSI team
- Debugging system/Cherry picker/Non conformity
- Non conformity

Test organization – @ Preparation Area



FoS Activities

CERN resources

GSI resources

Issues

1) Arrival		1) GSI team	■ Deployment GSI team *
2) Handling	2) EN-HE-HH	2) GSI team	
3) Unpacking	3) FSU	3) GSI team	
4) Commissioning racks and electrical tests	4) TE-MS-C-TF	4) GSI team	■ Debugging system/Cherry picker/ Non conformity
5) Temporary support	5) EN-HE-HH		
6) Feet mounting and alignment	6) EN-HE-HH + FSU	6) GSI team	■ Non conformity

- Deployment of the GSI personnel (4 FTEs) was completed by beginning of February 2019. First Short multiplet arrived in February 2019 =>
 - Training of the personnel in SM18 not possible
 - Safety trainings arrangement (up to 85 h in classroom within beginning of April)

Test organization – @ Preparation Area



FoS Activities

- 1) Arrival
- 2) Handling
- 3) Unpacking
- 4) Commissioning racks and electrical tests
- 5) Temporary support
- 6) Feet mounting and alignment

CERN resources

- 2) EN-HE-HH
- 3) FSU
- 4) TE-MS-C-TF
- 5) EN-HE-HH
- 6) EN-HE-HH + FSU

GSI resources

- 1) GSI team
- 2) GSI team
- 3) GSI team
- 4) **GSI team**
- 6) GSI team

Issues

- Deployment GSI team
- Debugging system/Cherry picker/ Non conformity *
- Non conformity

- Temperature sensors PT1000 on the current leads broken required the intervention of ASG (mid April)
- Voltage taps at the current leads swapped



Test organization – Test bench/ Warm (1/2)



FoS related activities

- 1) Transport
- 2) Installation safety valve
- 3) Jumper operation
- 4) Welding jumper
- 5) Insulation vacuum pumping

CERN resources

- 1) EN-HE-HH
- 2) TE-CRG-ME + FSU
- 3) EN-MME-FW
- 4) EN-MME-FW
- 5) Contractor TE VSC

GSI resources

- 1) GSI team
- 3) GSI Cryo
- 5) GSI team

Issues

- Non conformity
- From remote
- Non conformity

Test organization – Test bench/ Warm (1/2)



FoS related activities

- 1) Transport
- 2) Installation safety valve
- 3) Jumper operation
- 4) Welding jumper
- 5) Insulation vacuum pumping

CERN resources

- 1) EN-HE-HH
- 2) TE-CRG-ME + FSU
- 3) EN-MME-FW
- 4) EN-MME-FW
- 5) Contractor TE VSC

GSI resources

- 1) GSI team
- 3) GSI Cryo
- 5) GSI team

Issues

- Non conformity
- From remote *
- Non conformity

- The non conformity of the multiplet cryo lines has required the adaptation of the jumper to the multiplet. The alignment, the connection, the closure and the leak test has been followed by remote support



Test organization – Test bench/ Warm (2/2)



FoS related activities

CERN resources

GSI resources

Issues

6) Cold mass survey

7) Removal transport rods

8) Leak test (Jumper, IV, LHe vessel + IP)

9) Purging

10) Electrical tests

7) FSU

8) Contractor TE-VSC

9) TE-CRG-ML

10) TE-MS-C-TF

6) GSI survey

7) GSI team

8) GSI team

9) GSI team + GSI control

10) GSI team

- Not adequate tools available
- Not optimized
- GSI control software debugging

Test organization – Test bench/ Warm (2/2)



FoS related activities

CERN resources

GSI resources

Issues

6) Cold mass survey

7) Removal transport rods

8) Leak test (Jumper, IV, LHe vessel + IP)

9) Purging

10) Electrical tests

7) FSU

8) Contractor TE-VSC

9) TE-CRG-ML

10) TE-MS-C-TF

6) GSI survey

7) GSI team

8) GSI team

9) GSI team + GSI control

10) GSI team

- Not adequate tools available *

- The pneumatic wrench to apply up to 4600 Nm torque for removing 10 transport rods is not available in the FAIR test facility. The procedure was not clearly defined.



Test organization – on Test bench/ Warm



Bench activities

CERN resources

GSI resources

Issues

1) Removal platforms

1) EN-HE-HH + FSU

2) Spacers/marks
position

2) EN-SMM-ASG

3) Install brackets

3) EN-ACE-COS

4) Piping for current leads

4) External Contractor

4) GSI team

5) Cabling IP and EC

5) GSI team

6) HSE inspection

6) HSE-OHS-IB
TE-MS-C-MM

7) QDS cables integrity

7) TE-MPE-EP

8) Commissioning
interlock loop

8) TE-MPE-MS/MS-C-
TF/EPC-MPC

9) Commissioning EC
and IP

9) GSI team + GSI
control

- Brackets to be improved
- EC non conformities to be solved within 1 year
- GSI control software/Hardw are debugging

Test organization – on Test bench/ Warm

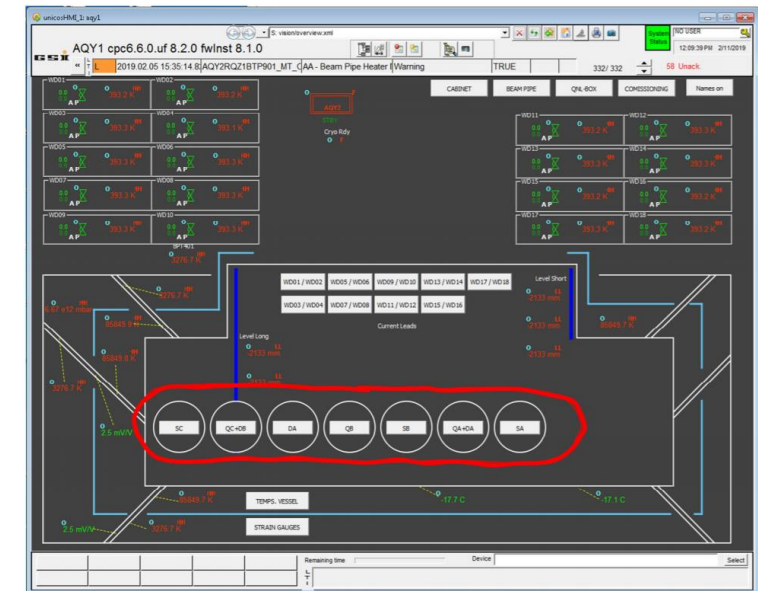
Bench activities

CERN resources

GSI resources

Issues

- An intensive improvement work has been required on the software to operate correctly the valves regulating the gas flow of the current leads. Hardware adjustments on going



- 9) Commissioning EC and IP

- 9) GSI team + GSI control

- GSI control software hardware debugging *

Test organization – on Test bench/ Cold



Activities

CERN resources

GSI resources

Issues

1) Cooldown	1) TE-CRG-ME/ML/CE	1) GSI control+ GSI team	■ Resources availability
2) Commissioning at cold	2) TE-MS-C-TF/MPE-MS/EPC-MPC	2) GSI team	■ “”
3) Electrical tests	3) TE-MS-C-TF	3) GSI team	■ “”
4) Installation Magnetic Meas. devices	4) TE-MS-C-MM+FSU	4) GSI team	■ “”
5) Magnetic Measurements	5) TE-MS-C-MM	5) GSI team	■ “”

- **So far** (Feb - June 2019)
 - 100 FSU working hours for reception and preparation for installation
 - Mechanical and electromechanical profiles
- **Next** (July - Dec 2019)
 - 1 FSU at 50% of the time for installation of MM devices (August - Nov)
 - 100 FSU working hours for departure (Nov - Dec)

Total FSU intervention equivalent to 0.3 FTE for the **First Short Multiplet**

- Commissioning next 2 benches (cryogenic, power converters, energy extraction, interlock, QDS units)
 - Scheduling and resources to be discussed
 - Can we use the Short Multiplet to commission the other benches from Jan 2020?
- Arrival and commissioning of the next 2 Electrical Cabinet and 2 Instrumentation Panel from GSI
 - To be discussed during the GSI closed session
- Leak tests of welding, Insulation vacuum, current leads piping, LHe vessel
 - To be assigned for the series tests
- Contractor work permission at CERN
 - Under investigation for ASG
- ASG' s contractor permission to work at CERN for packing the multiplet
 - To be discussed at CERN

Thank you for your attention

- Backup slides

- Wiki page of non conformities

https://wiki.gsi.de/foswiki/bin/view/SCM/B180Finding?validation_key=%3fd8738549cdb65905b23355cb9a40fde