

# Update on the re-start plan

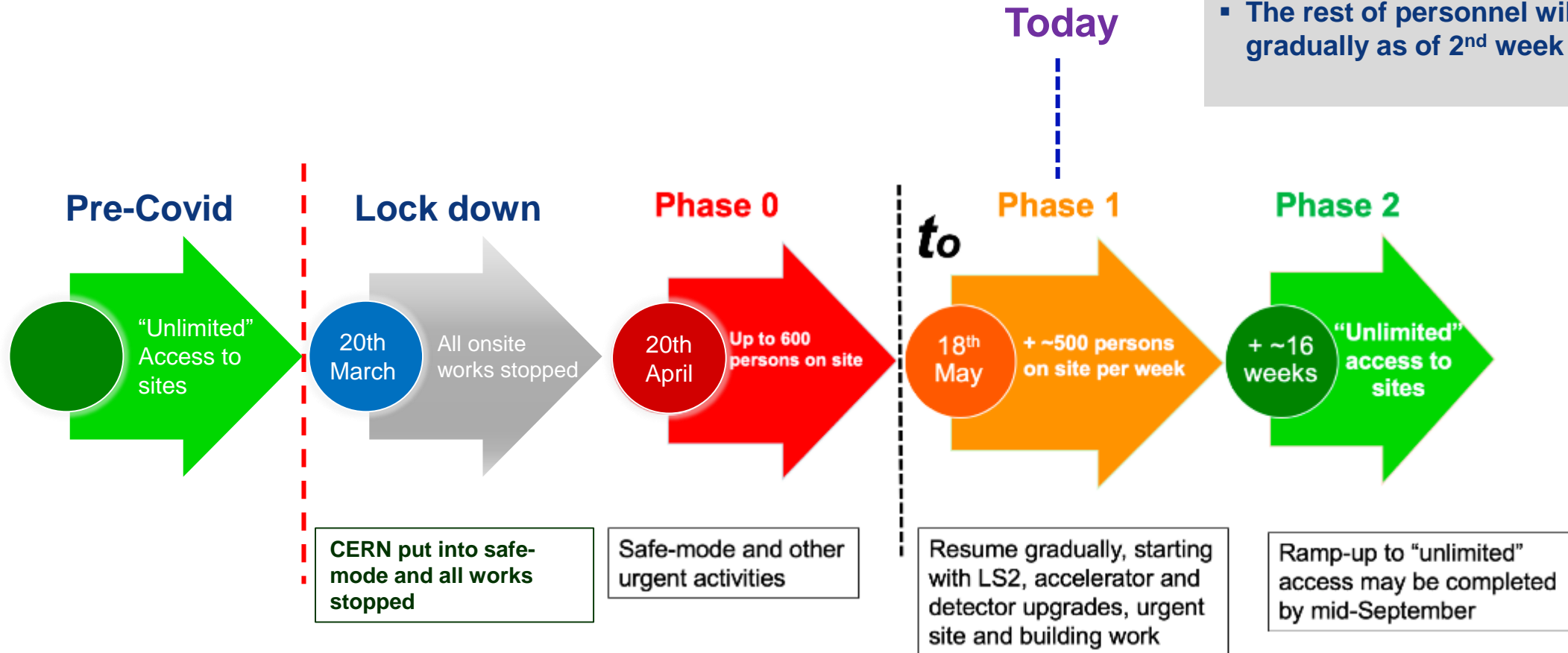
Frédéric Bordry

29<sup>th</sup> June 2020

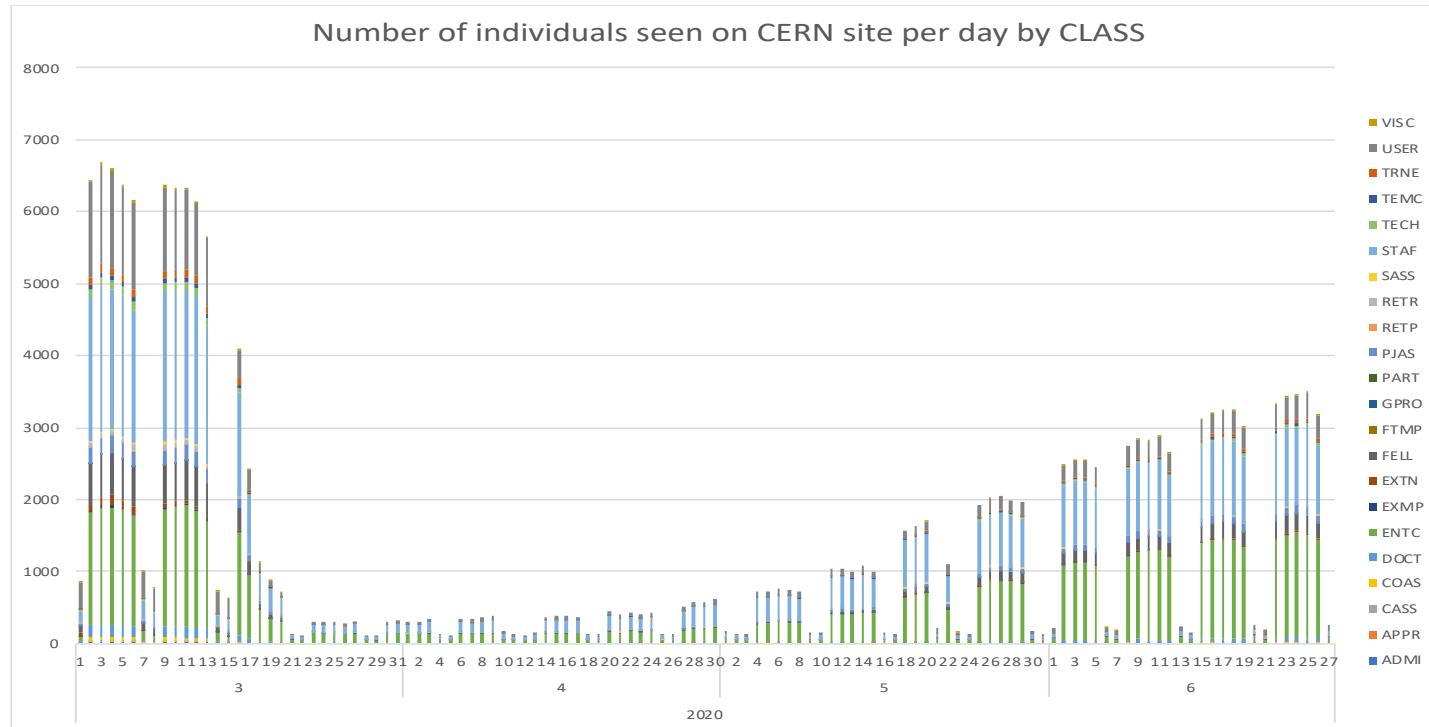


# Gradual and cautious re-start plan

- Number of people on sites includes CERN's personnel as well as contractors.
- Personnel involved in LS2, accelerator and detector upgrades, urgent site and building work will come back to site gradually as of 18 May.
- The rest of personnel will come back gradually as of 2<sup>nd</sup> week of June.



# Number of people on CERN sites



**Blue: staff**  
**Grey: users**  
**Green: contractors**

From the access control system,  
 number of people simultaneously on sites





# COVID-19-related health and safety measures for the period covering the restart of CERN's activities

v. 1 5 May 2020

EDMS: 2370903

DG/2020-103

5 May 2020

EDMS: 2370902

## MEMORANDUM

From: Fabiola Gianotti, Director-General, *Fabiola Gianotti*  
Doris Forkel-Wirth, Head of the HSE Unit *Doris Forkel-Wirth*

To: Extended Directorate,  
Technical Coordinators of the large LHC experiments,

Cc: SAPOCO Chair, President of SA, HSE-MB members, Chair of ACCU

Ref: COVID-19-related health and safety measures for the period covering the restart of CERN's activities

Date: 5<sup>th</sup> May 2020

**Individual responsibility**  
**Responsibilities in matters of work organisation**  
**Responsibilities for the hygiene of the premises**

## ANNEX 1 CERN instructions on COVID-19-related health and safety measures

These instructions complement the Memorandum by the Director-General and the Head of the HSE Unit, entitled "COVID -19-related health and safety measures", issued on 5<sup>th</sup> of May 2020.

These instructions shall apply as of 5<sup>th</sup> of May 2020 and until they are revoked. They will be reviewed and updated as needed, to take account of the evolution of the pandemic and of scientific and regulatory developments related to COVID-19.

### 1. Individual responsibility

Each person present on the CERN site shall comply with the health and safety measures set out hereunder and any instruction given in relation to their implementation:

COVID-19  
PROTECT YOURSELF AND OTHERS

Keep your distance. 3m

Wear a mask.

STILL IMPORTANT:

Wash your hands thoroughly.

Avoid shaking hands.

Cough and sneeze into a tissue or the crook of your arm.

Stay at home if you experience symptoms.

Always call ahead before going to the doctor's or the emergency department.

<https://hse.cern>

Coronavirus information

A safe return to the CERN site

The main information you need and where to find out more

The COVID-19 crisis has led to a wealth of information available in different sources which are not always easy to find. Here's a quick-find guide to answer your questions.

If you are looking for...

Key information about contracts, telework, health and safety, travel and leave, infrastructure, and other topics

General questions & answers

HSE measures

HR measures

Services availability

Detailed information on CERN's current situation, health and safety measures, and response to COVID-19

Specific procedures on e.g. telework, absence management, substance management, Swiss and French cards, and other administrative concerns

Current status of services and infrastructure, and general questions

If your question is not answered through these channels, ask Quark the chatbot, or contact us at [HR.Covid19@cern.ch](mailto:HR.Covid19@cern.ch)

CERN

....and FAQ.

# Safety first



Safety First



Quality second



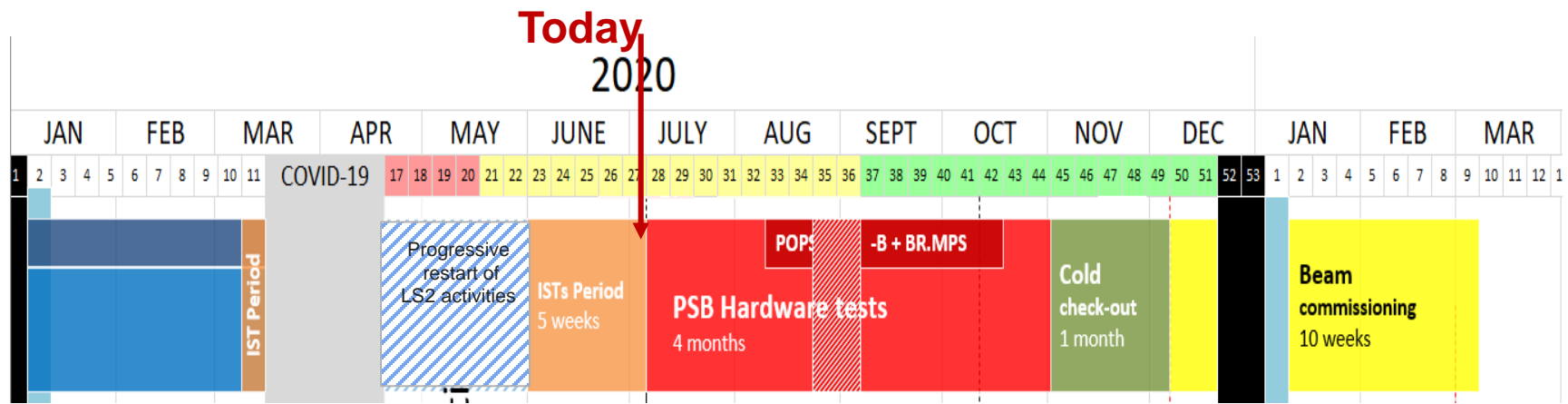
Schedule third

- To respond to **all safety hazards** and **maintain the highest standards** of safety as demonstrated since the start of the LS2.
- **COVID-19** is treated as **an additional hazard** with all necessary adjustments following the recommendations of HSE and host States.



PPE for work-related hazard and Covid-19

# Booster - PSB



## - Completion of LS2 activities

Cabling and electrical distribution ended as planned

All power converters installed

**Last beam line element (beam absorber block) installed**

All equipment under vacuum

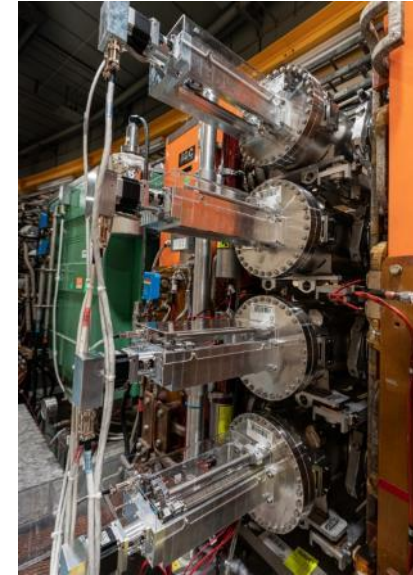
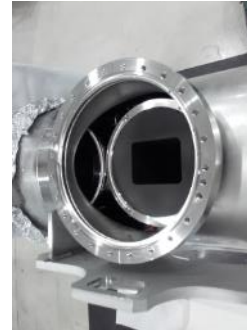
## - Ongoing

Individual test of each equipment being performed

## - Upcoming

4 months of hardware commissioning

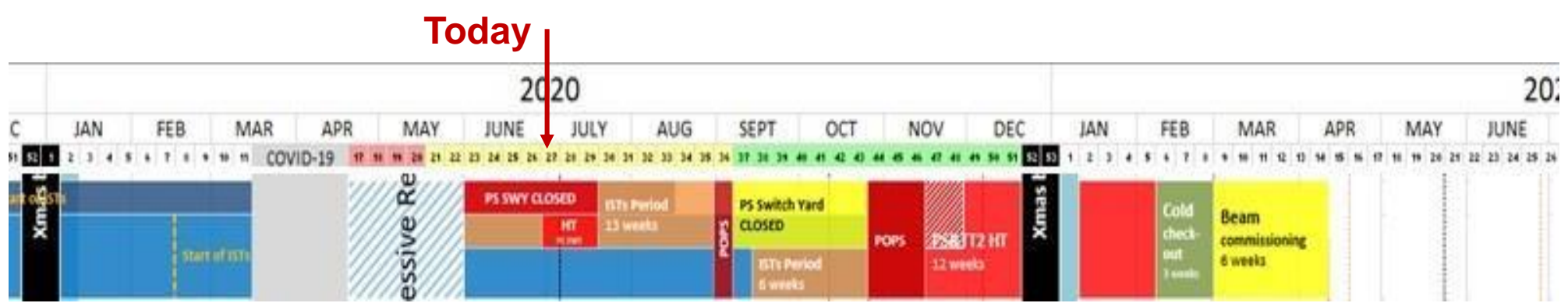
2.5 months of beam commissioning



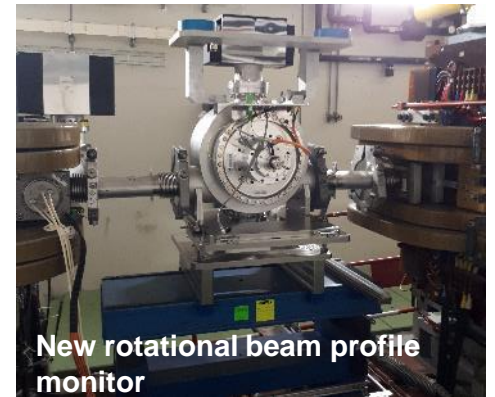
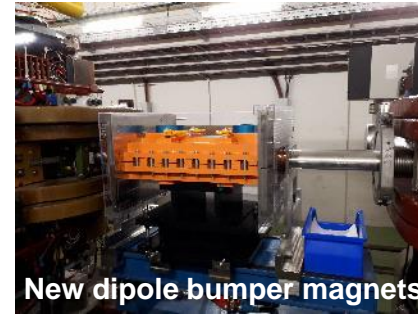
PSB beam absorber







- New installed hardware, e.g. 2 GeV injection equipment and new instrumentation



- Manufacturing and testing of beam intercepting devices



Before COVID














## New beam dump system

- Completion of civil engineering activities at tunnel location hosting the new beam dump
- Ongoing reinstallation of beam line at the location of the old beam dump



## Upgrade of 200 MHz RF system

- | Amplifier #1  |                             | Amplifier #2  |                             |
|---|-----------------------------|---|-----------------------------|
|  | 1280 x 2 kW RF modules      |  | 1280 x 2 kW RF modules      |
|  | 16 Towers                   |  | 16 Towers                   |
|  | 300 m of 6-1/8 Lines        |  | 300 m of 6-1/8 Lines        |
|  | 15 Hybrid combiners & loads |  | 15 Hybrid combiners & loads |





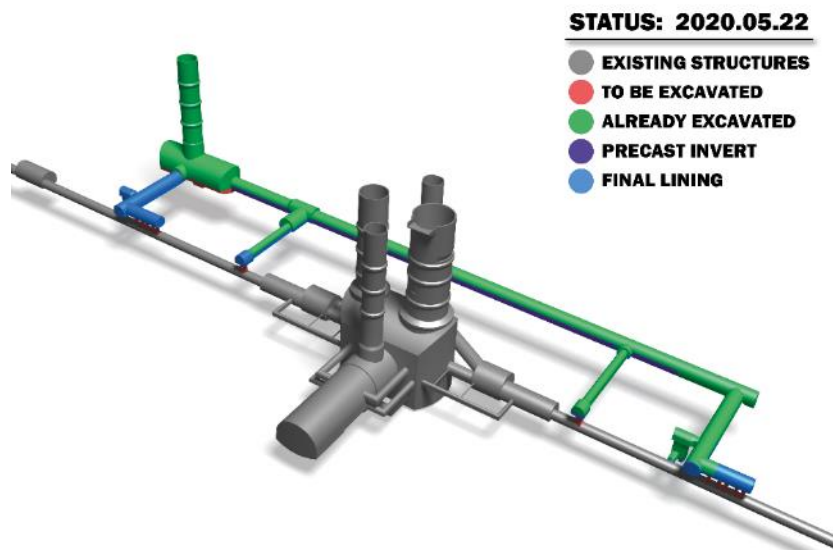
# New SPS beam dump assembly in TE-ABT clean room



**TIDVG5 being installed in the vacuum chamber  
(25/Jun/2020)**

# HL-LHC civil engineering status (underground)

## Progress at Point 1

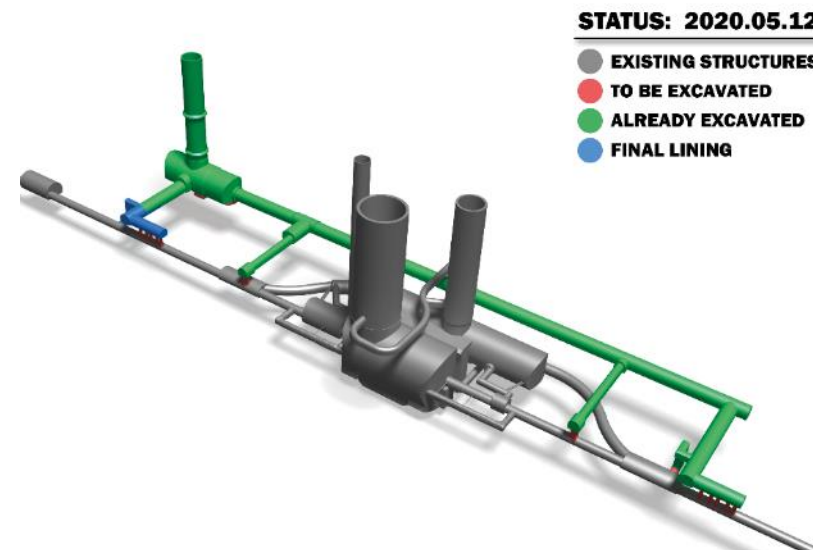


### Progress:

Excavation\*: 95%  
Precast invert: 67%  
Final lining: 20%

\*: US/UW lowest part is missing only

## Progress at Point 5



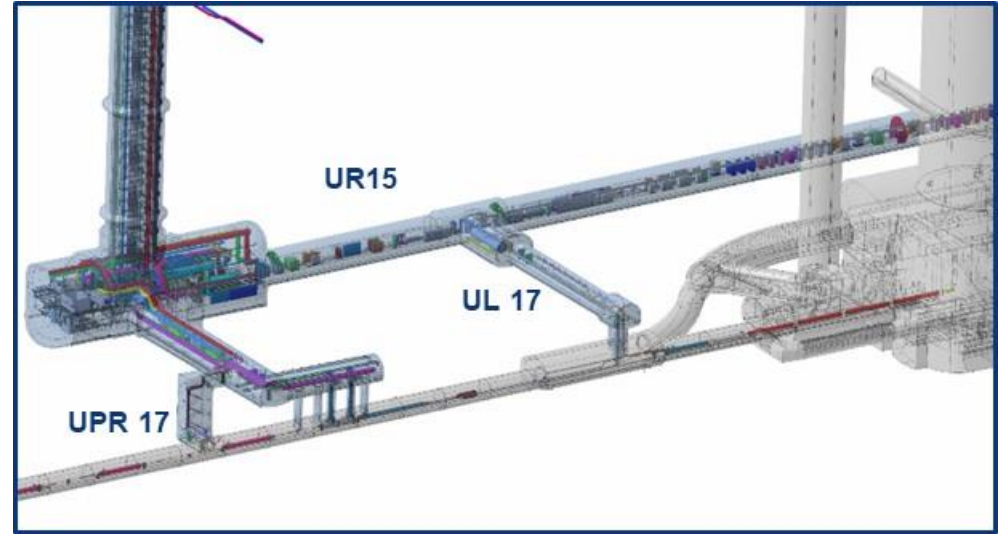
### Progress:

Excavation\*: 95%  
Final lining: 5%

\*: US/UW lowest part and ~3-m of UPR53 are missing only



# HL-LHC: Point 1 – Underground Works



**UL17 gallery**

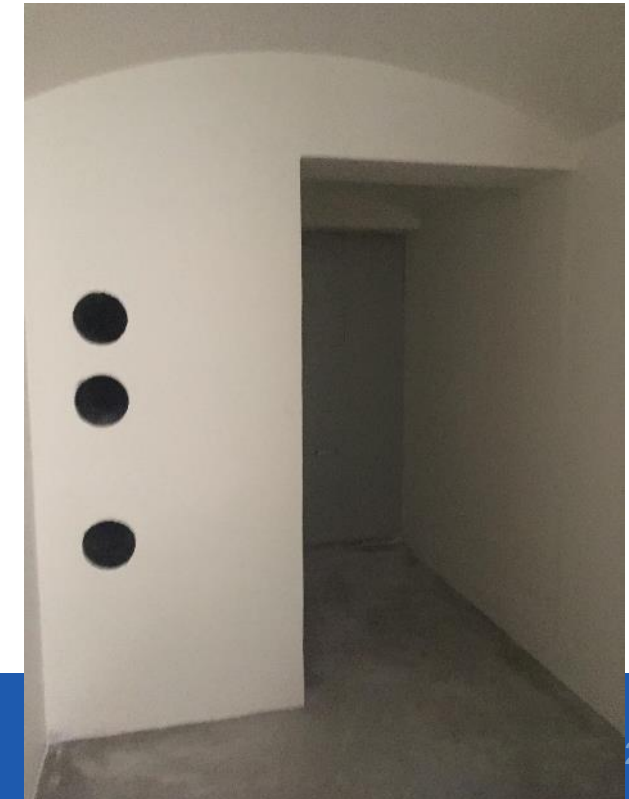


**UA/UPR17 gallery**

# HL-LHC: Point 1 – Underground Works

## UPR17:

- CE handover on 29<sup>th</sup> June
- Installation start form 1<sup>st</sup> July





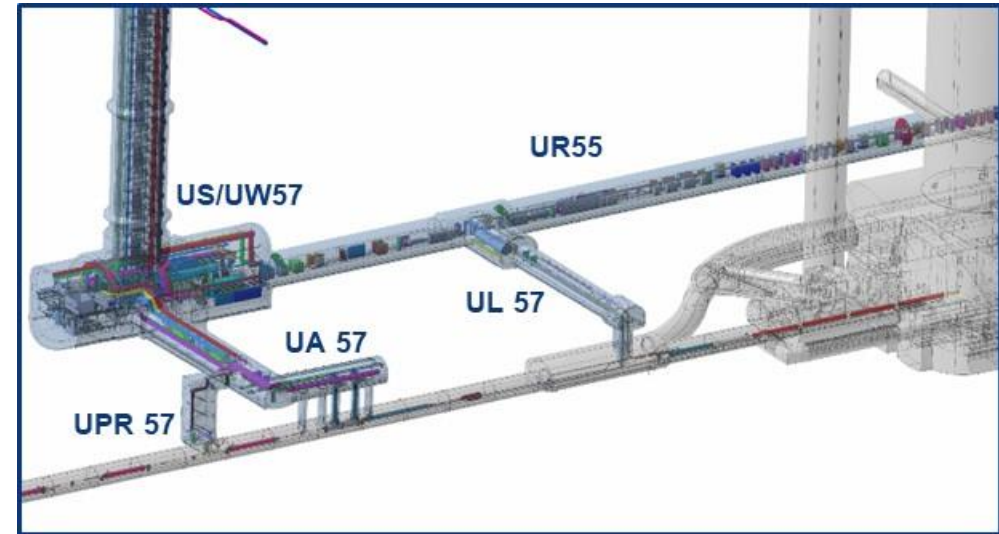
# HL-LHC: Point 5 – Underground Works



**UR55 gallery**



**UA57 gallery**



**Formwork in the connection UA57/UPR57**

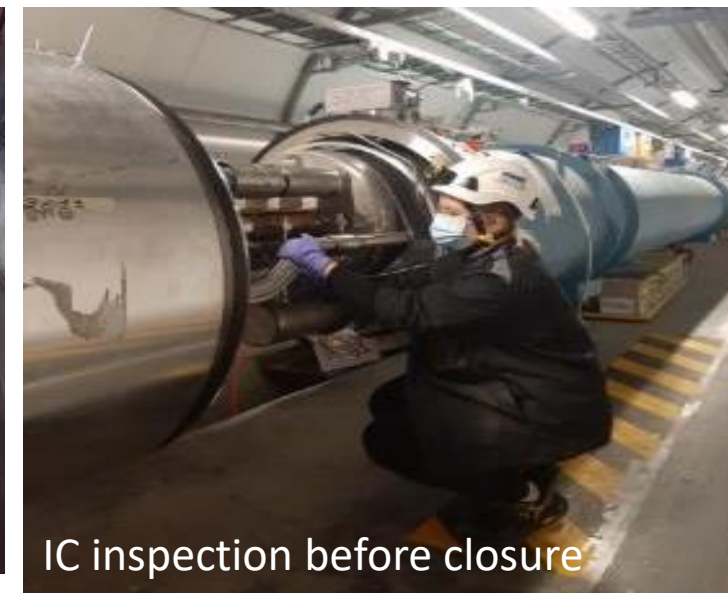
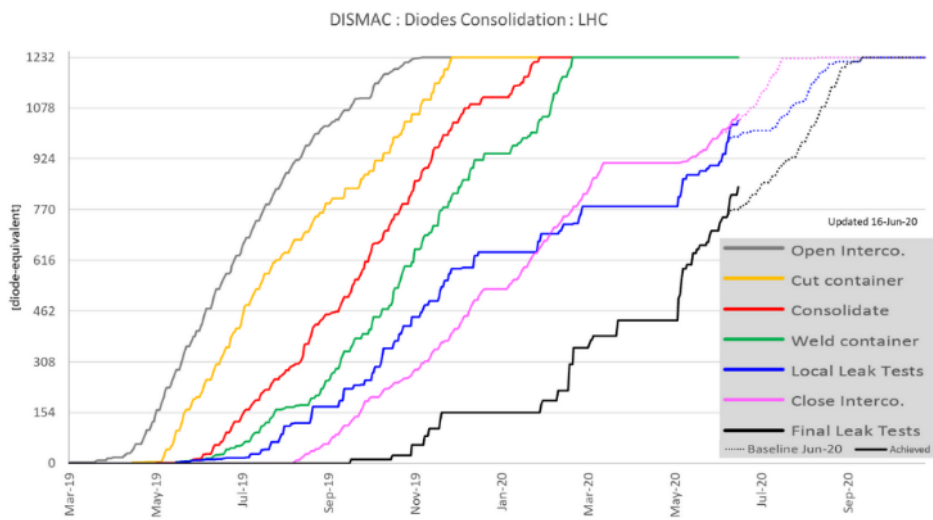
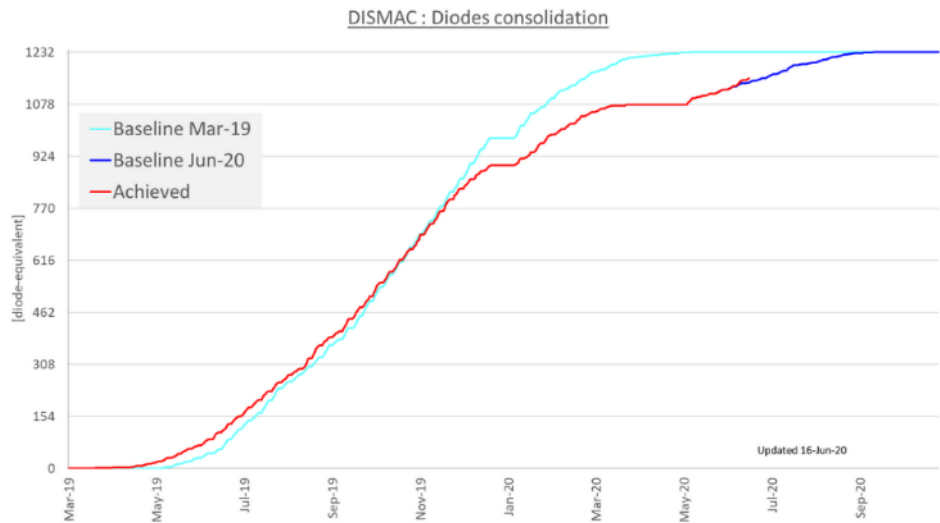
















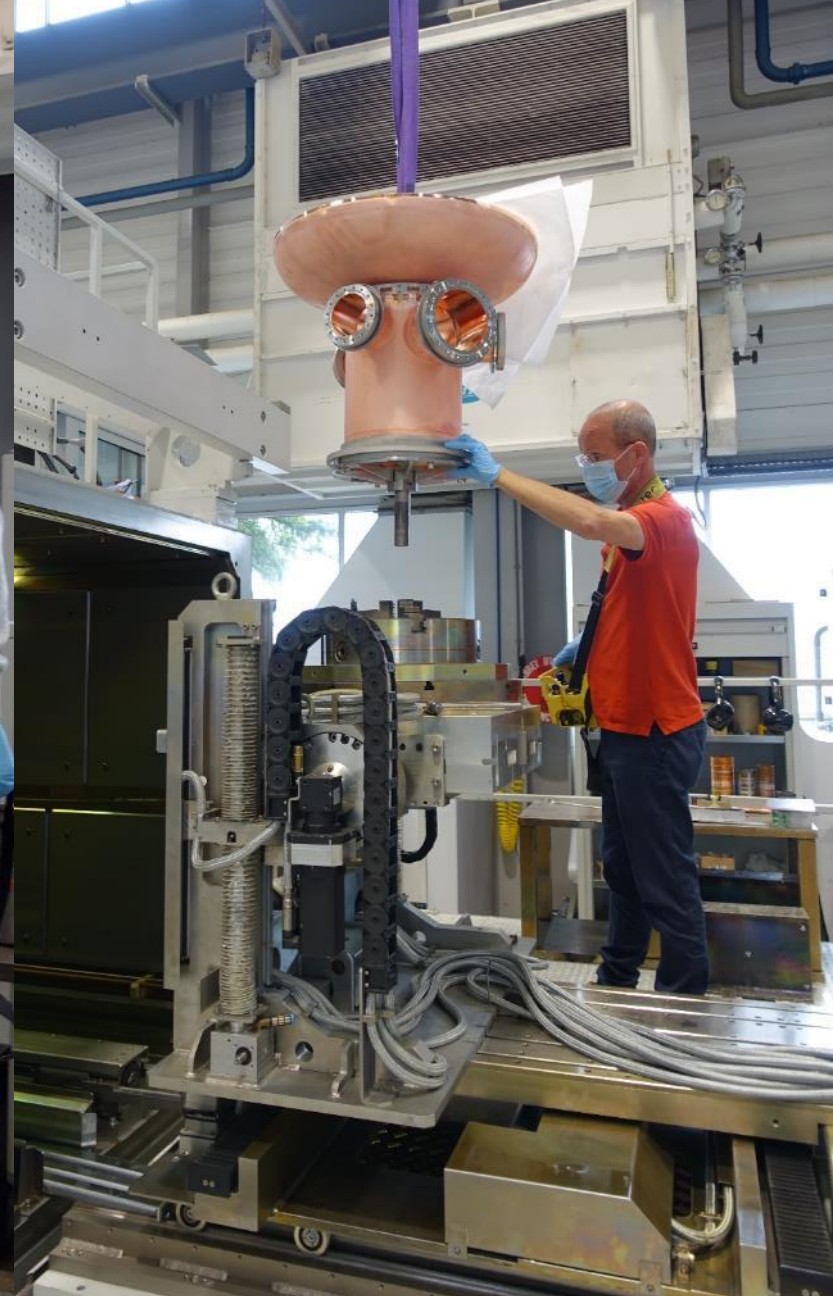
*Last intermediate leak test*



# LHC dump modification







400MHz spare cavity welding



# HL-LHC: some highlights...



Inner triplet prototype MXQFB (coil length: 7.2 m)  
ready to be tested in SM18



First RFD Crab cavity prototype (built at CERN)  
Ready to be tested and then completed with the  
helium vessel to be sent to UK (Daresbury) for  
completion with cryomodules. It will be the first RFD  
dipole completed and to be tested in SPS in 2022

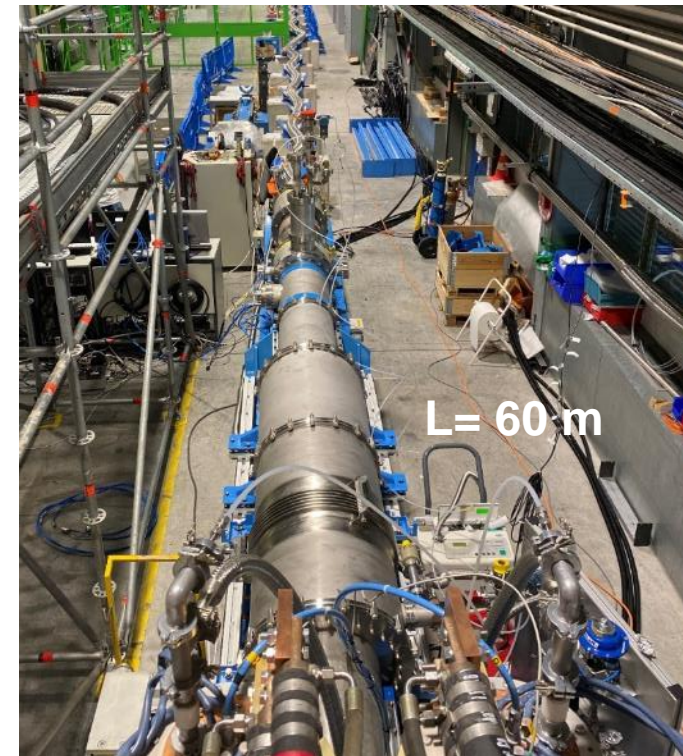
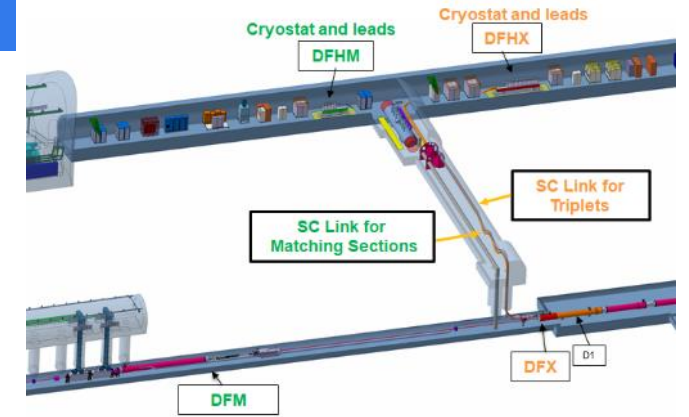
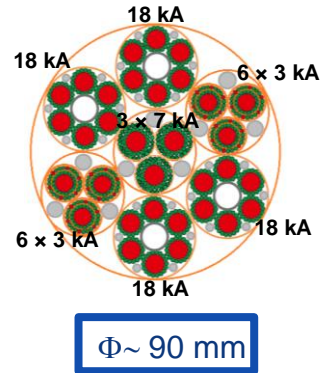


# HL-LHC: Power Transmission Line for HL-LHC Triplets

**MgB<sub>2</sub> cable:**

**$\Phi \sim 90$  mm**

**$|I_{tot}| > 100$  kA @ 25 K**

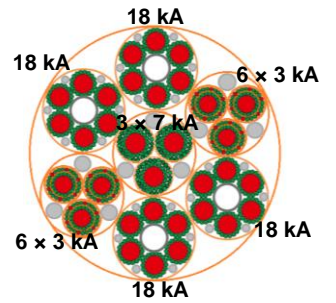


System demonstrator in SM 18



# HL-LHC: Power Transmission Line for HL-LHC Triplets

System demonstrator in SM 18, succesful test on June 10<sup>th</sup> 2020.  
MQXF (+18 kA, - 18 kA) and the Trim (+7 kA, - 7 kA) circuits

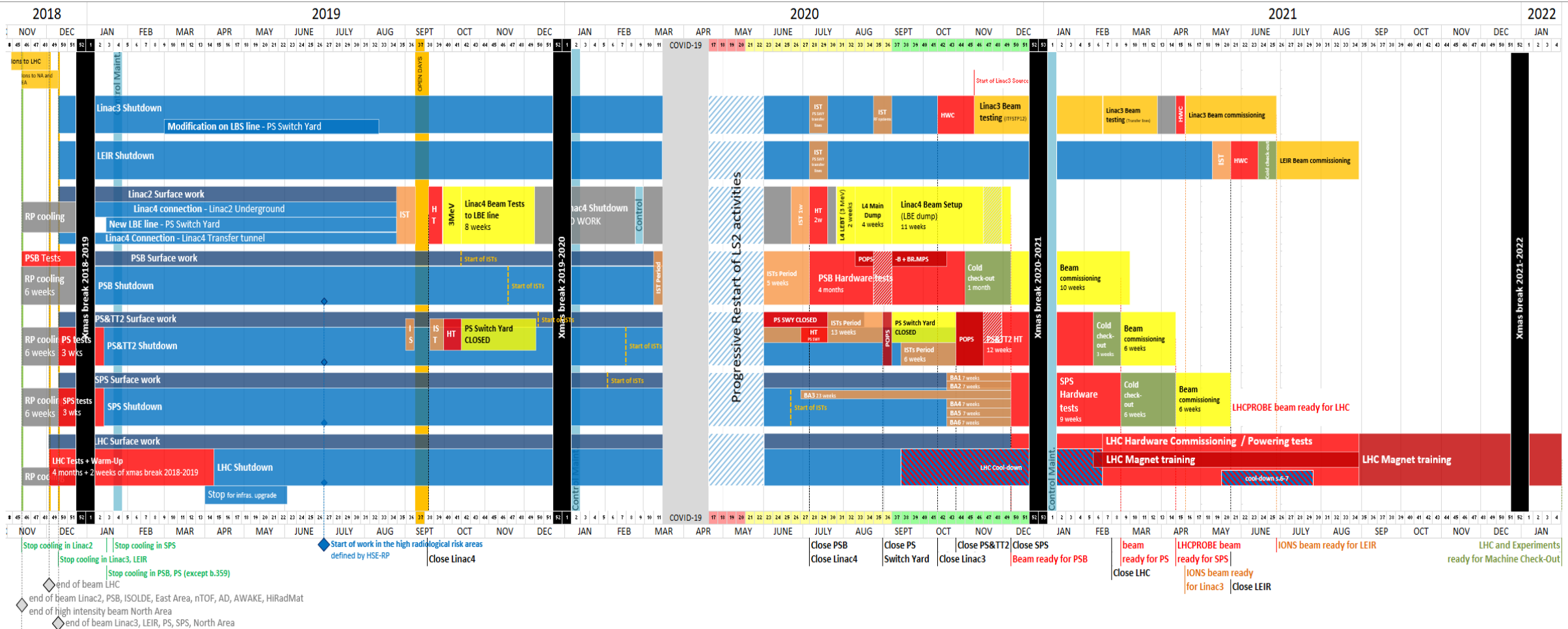


$\Phi \sim 90 \text{ mm}$





# LS2 Master Schedule v2.7 approved on 12<sup>th</sup> June 2020



ACC-PM-MS-0002 v.2.7

EDMS: 1687788



Update on the re-start plan  
Frédéric Bordry  
29<sup>th</sup> June 2020

# Injector Accelerator Schedule 2021

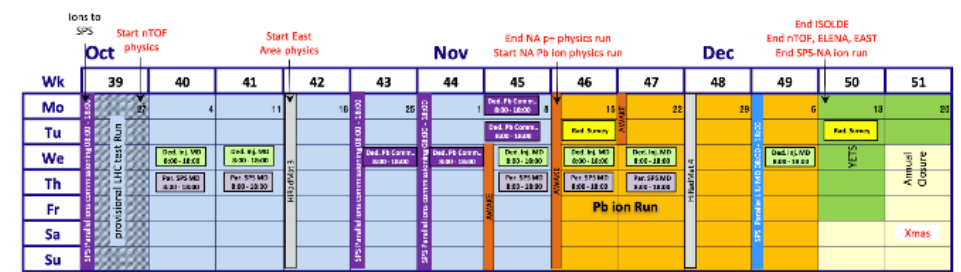
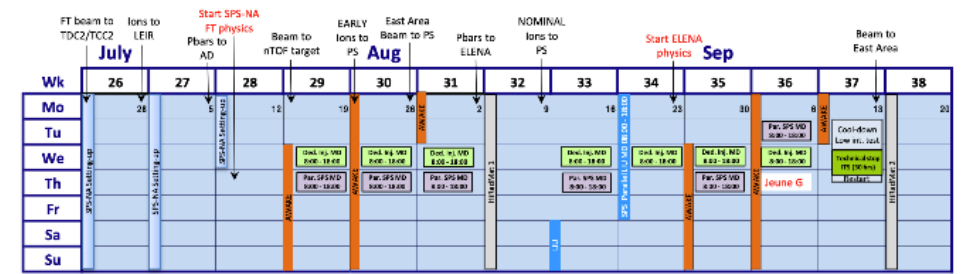
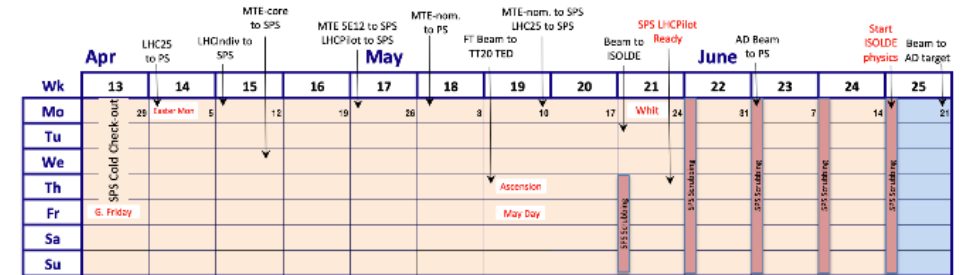
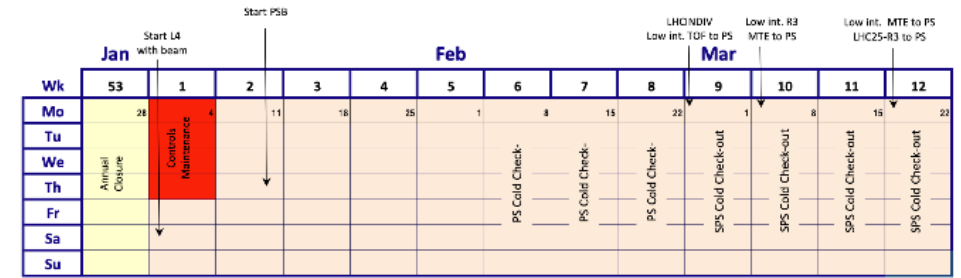
## 1<sup>st</sup> Draft

- Based on LS2 master schedule version 2.7
- Presently a Pb ion run of 4 weeks for the SPS North Area is assumed, pending confirmation by SPSC in October
  - No ions required for LHC
- Start date of YETS 2021-2022 may need to be revisited in view of an early start in 2022 for LHC

Experimental facility	Start Physics	End Physics	Duration [days]*
ISOLDE	21.06.2021	13.12.2021	175
SPS North Area p <sup>+</sup>	12.07.2021	15.11.2021	125
ELENA	23.08.2021	13.12.2021	125
nTOF	27.09.2021	13.12.2021	91
PS East Area	18.10.2021	13.12.2021	56
SPS North area Pb ions	15.11.2021	13.12.2021	28
AWAKE	-	-	35
HiRadMat	-	-	28

Subject to changes !!!

**02.12.2020: Approval of 2021 Schedule at Research Board**



Injector Complex MD Block  
 Injector chain Technical Stop  
 HiRadMat Run  
 AWAKE Run (pending SPSC beamtime appr.)  
 Special interventions/stops  
 CERN Official Holidays





# LHC experiments LS2 priority: Completion of Phase I (and Preparation of Phase II) Upgrades

- All experiments suffer delays due to the COVID-19 CERN shutdown, and the COVID-19 mitigation regulations implemented since the re-start
- Detector activities involves work in institutes in other countries, many of which are still significantly affected by COVID-19
  - Many labs and universities are still closed
  - Travel to CERN by experts often not allowed
- COVID-19 restrictions can lead to significant delays to work compared to pre-COVID schedule
- Due to the nature of this situation there remain large uncertainties on how this effects the schedules for the experiments LS2 work



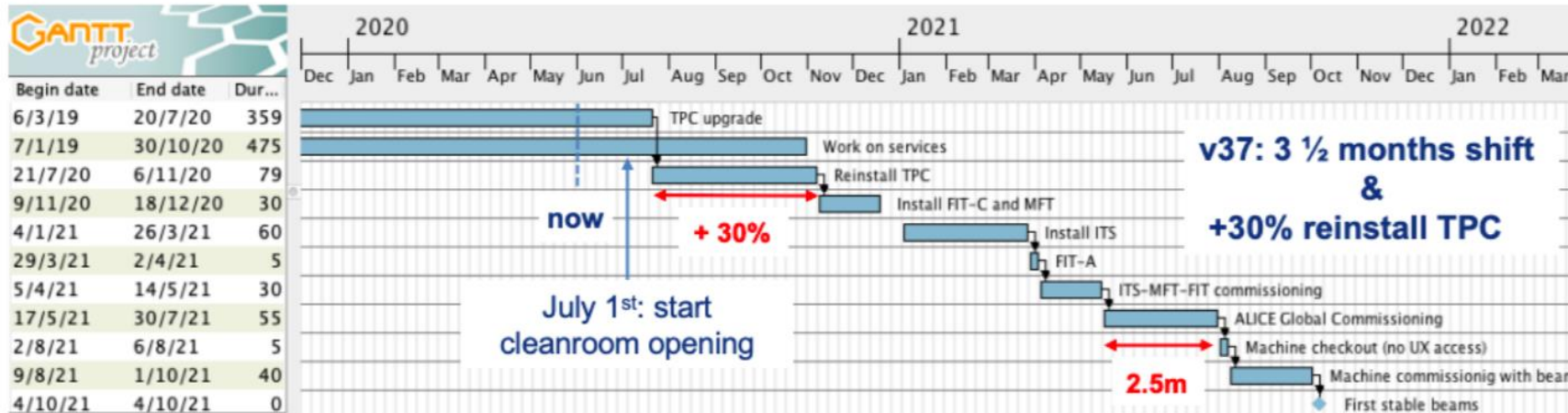
# Preparing for Run 3 – Restarting Activities at ALICE

A Large Ion Collider Experiment



## New LS2 Plan

- Restart the detector installation sequence on July 1<sup>st</sup> ⇒ i.e. **+3 and ½ months**
  - 30% additional time to reinstall the TPC** ⇒ i.e. **+1 month**
- Total delay of 4.5 months**
- Assumption that from November on we can move according to the original schedule
  - Start of global commissioning shifts from 4<sup>th</sup> Jan 2021 ⇒ 17<sup>th</sup> May 2021
  - Global commissioning: 17<sup>th</sup> May to 3<sup>rd</sup> Sep 2021 (16 weeks)
  - Part (1.5 month) of the global commissioning (readout and O2) may be done in parallel with LHC commissioning
- ⇒ earliest closure of ALICE cavern: **1<sup>st</sup> August 2021**





# Preparing for Run 3 – Restarting Activities at ATLAS

Cabling in LAr Phase-I Upgrade rack



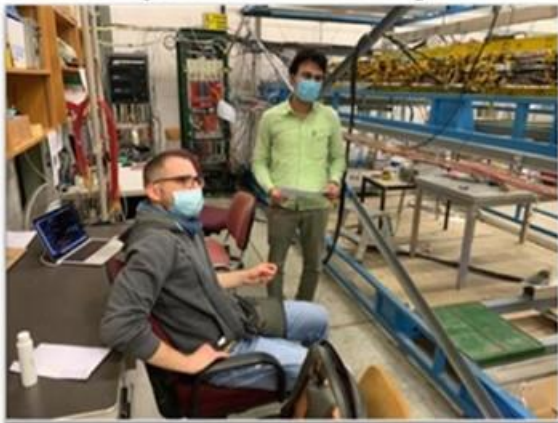
Cabling for new RPC gas racks



## ATLAS NSW assembly



Cosmic ray stand for MicroMegas



Testing the Front End Electronics of sTGCs



### June 2020

- ▶ electronics integration on detectors, for both Micromegas (MM) and sTGC
- ▶ chamber reception tests incl. @ GIF++
- ▶ Resume sTGC wedge assembly

### July 2020

- ▶ restart MM wedge assembly and ramp up over the summer to pre-COVID levels (~150 people @ CERN)
- ▶ Plan to be back to full speed in September

# Preparing for Run 3: Restarting Commissioning Activities at CMS

## Detector commissioning gradually restarting

Reducing the shift length to mitigate the difficult working conditions, such as wearing a mask

CMS Control Room compliant with COVID-19 rules and constraints. Furthermore minimizing the possible number of people present in the Control Room at all times

**Plan to steadily increase the commissioning activities**

Planning towards a with first cosmic data taking with all CMS detectors sometime during summer

Not possible anymore....



Pictures from last cosmic run in January

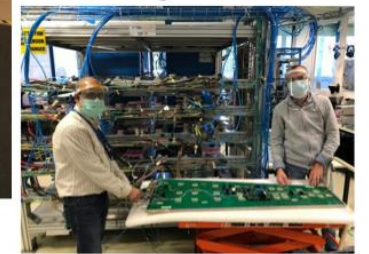
→ all not conforming to physical distancing



PPE distribution station@P5



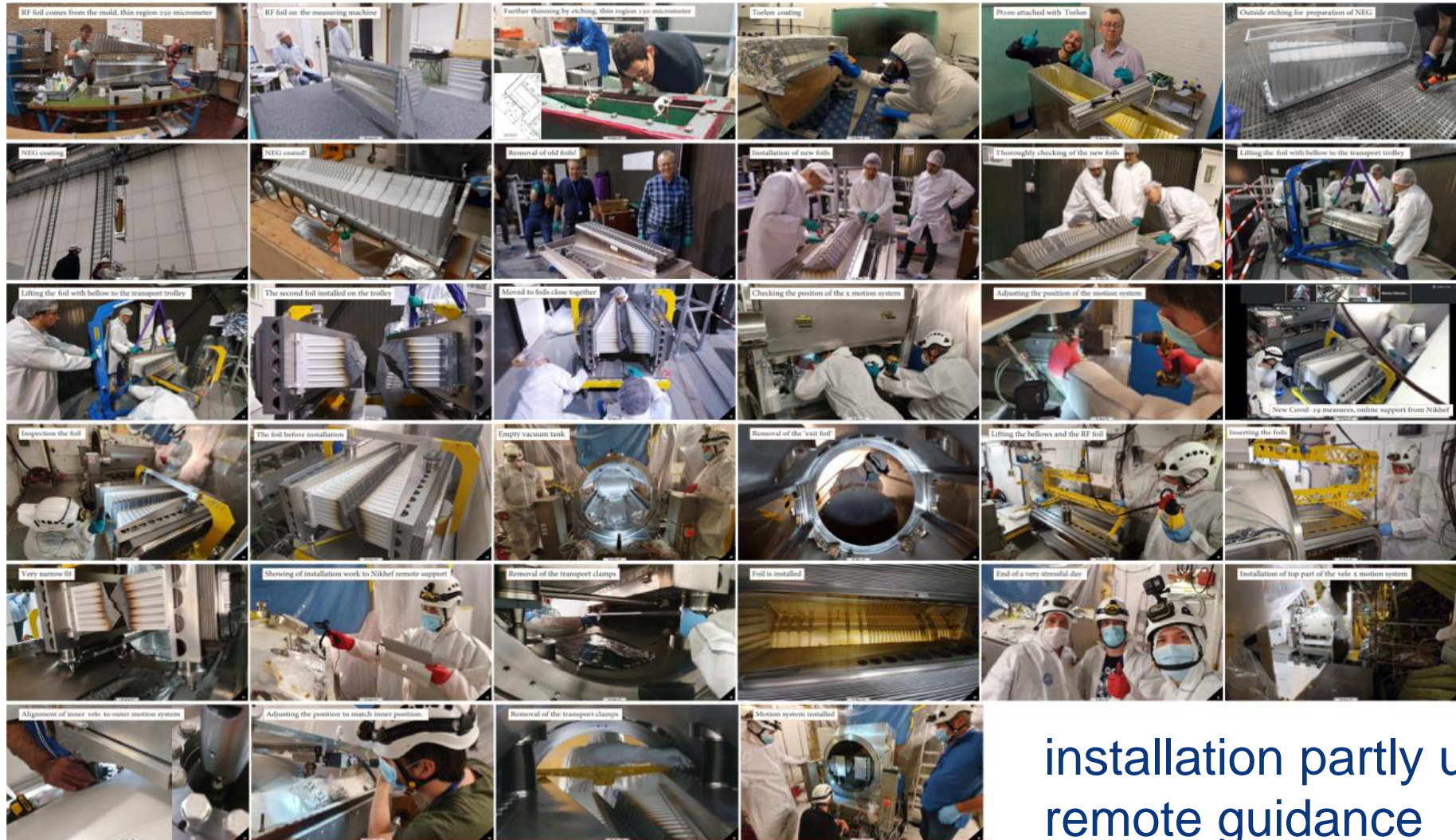
...working with PPE...



...keeping distance...

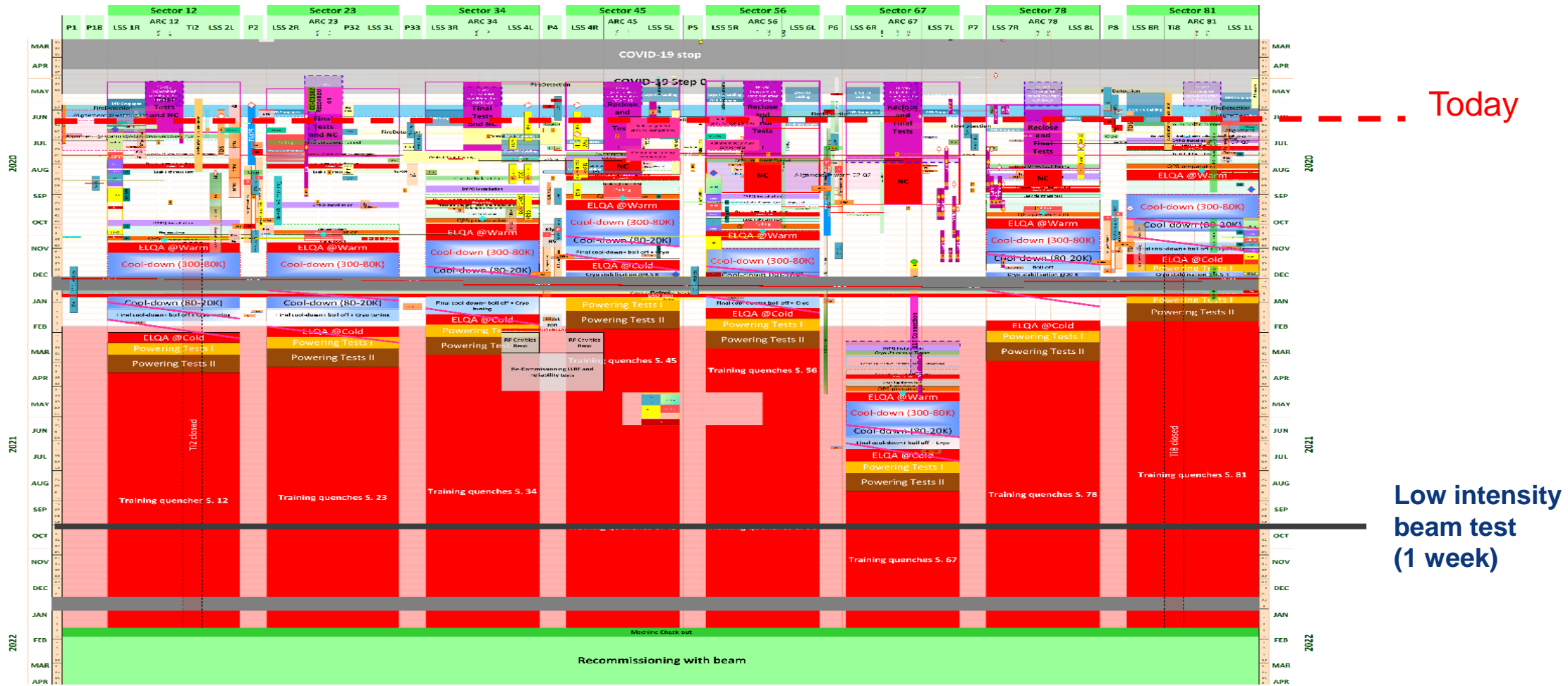


# Preparing for Run 3: LHCb - VELO RF Foil installation



installation partly under  
remote guidance

# LHC LS2 Master Schedule v3.0



LHC accelerator and experiments meeting (8<sup>th</sup> June) : L2 status and Run 3

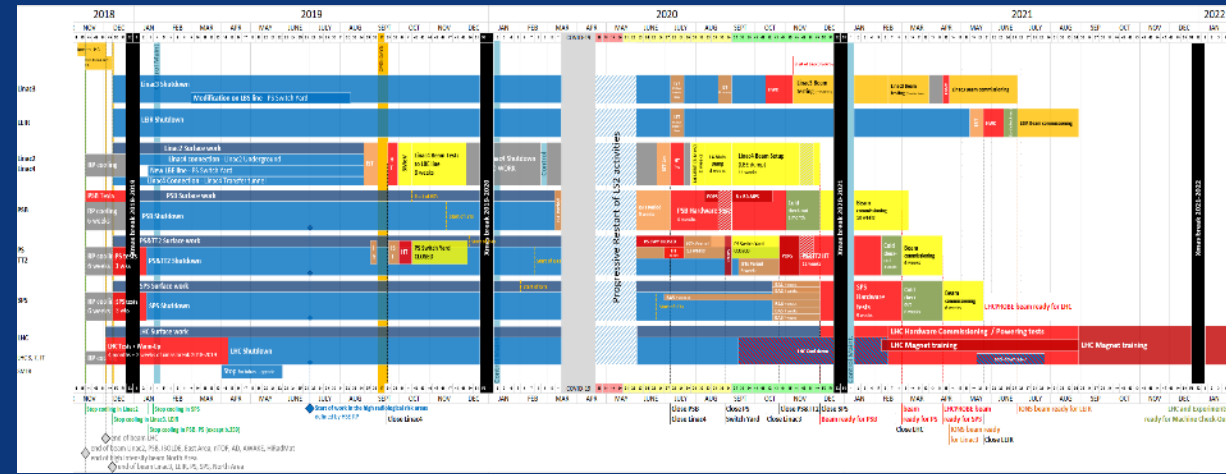
LS2 Day (12<sup>th</sup> June): Consolidate the LHC Experiments timeline and LS2 Master schedules.

LHC Performance workshop (“Chamonix”, 2<sup>nd</sup> to 5<sup>th</sup> of November 2020) to review and optimize the LS2 schedule and the Run 3





- The LS2 and projects were on schedule up to mid-March 2020.
- All activities on sites shut down due to the COVID pandemic. But intense and careful preparation for a gradual and cautious re-start (To : 18<sup>th</sup> May)
- We now have an ambitious but realistic schedule coordinated with the fixed targets and LHC experiments.



Many thanks to the coordination of LS2, the project and experiment managements and all the teams for the massive preparation, their compliance with the COVID-19 safety rules and their commitment which made the safe re-start possible and successful.

**KEEP CALM  
KEEP SAFE  
AND  
KEEP GOING**