

# LS2 status update

A. Tauro



ALICE

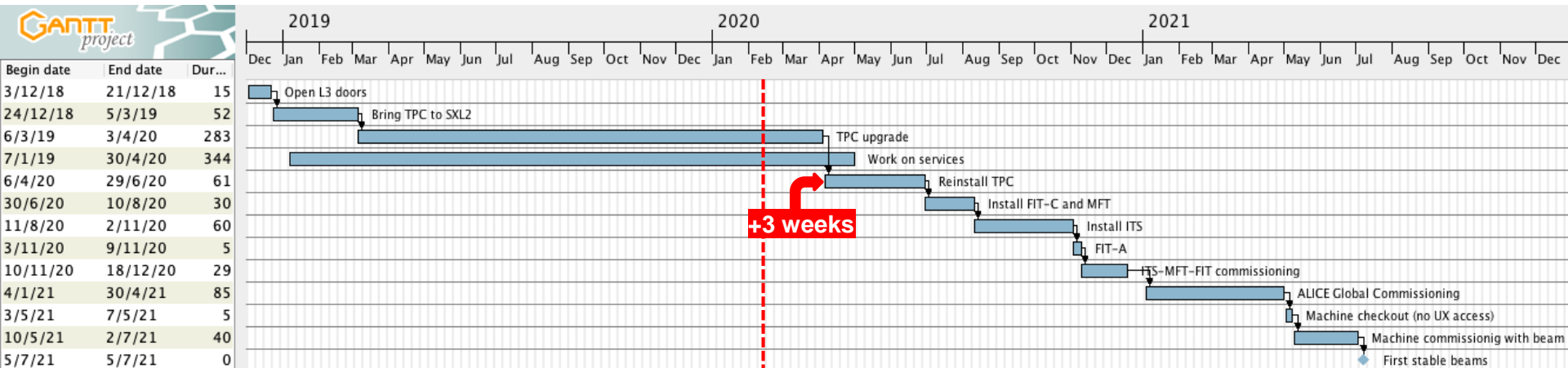
# ALICE LS2 schedule (v36)



Start of the detector installation sequence shifted by **3 weeks** with respect to Jan TB:

**+1 week to replace IROC A17**

**+2 weeks to replace OROC A08 – this came up only yesterday afternoon**



**Installation of TPC:**

**Apr. 6<sup>th</sup> 2020**

**Installation of ITS:**

**Aug. 11<sup>th</sup> 2020**

**Start of global commissioning:**

**Jan. 4<sup>th</sup> 2021**

**End of access to the cavern:**

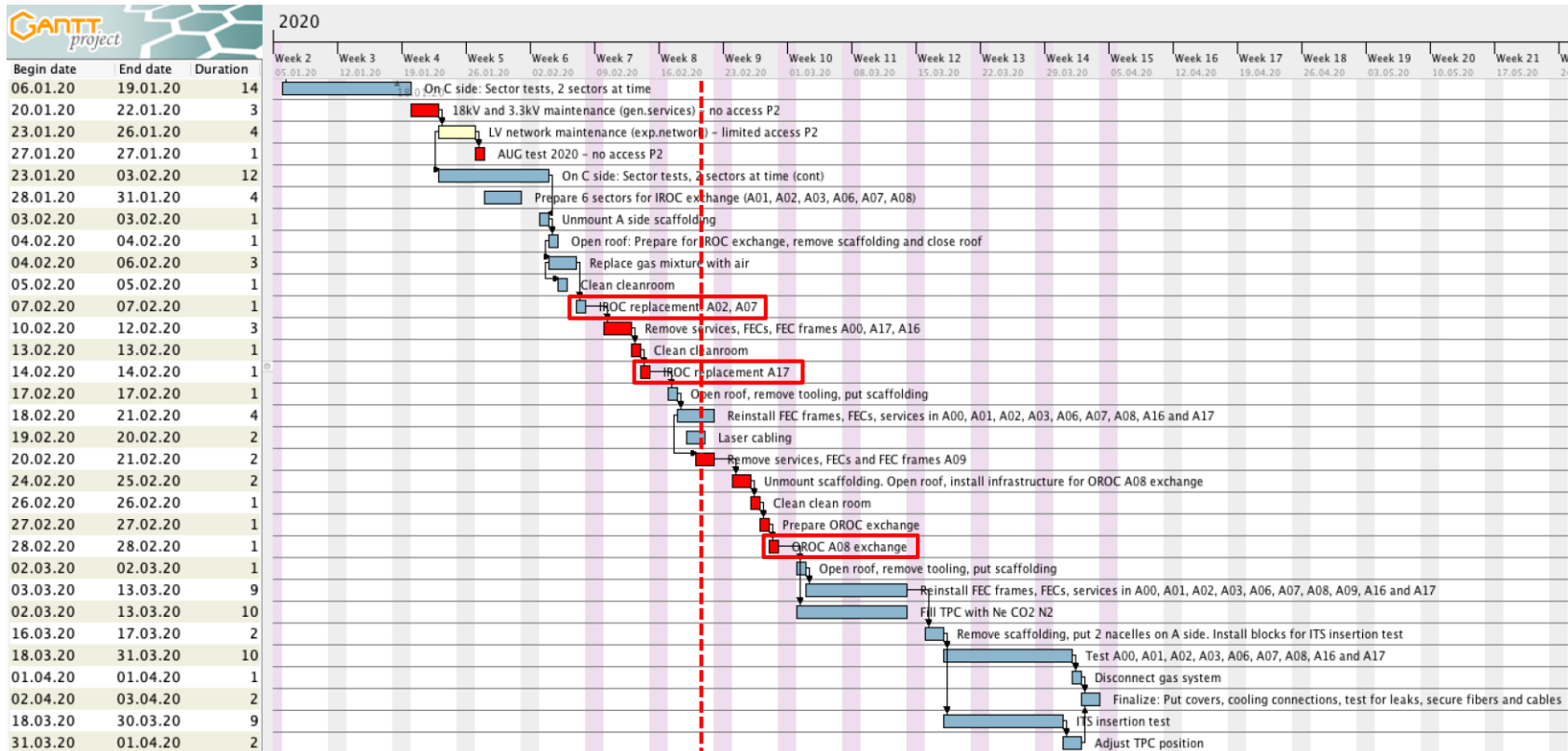
**May 1<sup>st</sup> 2021**

**→ 116 days of global commissioning = 17 weeks = 4 months**

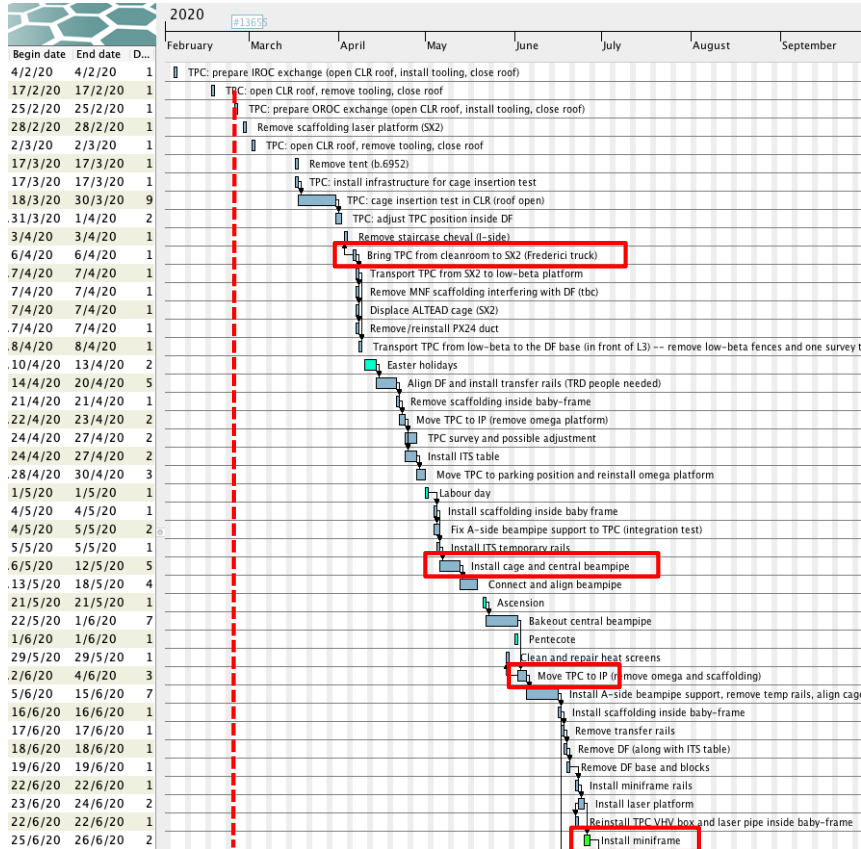


# TPC upgrade sequence

*TPC schedule v43*



# TPC & miniframe reinstallation sequence



Feb 4<sup>th</sup> – Apr 3<sup>rd</sup> - complete TPC, cage insertion test in SXL2 cleanroom, prepare for TPC transportation

Apr 6<sup>th</sup> - transportation TPC to SX2

Apr 7<sup>th</sup> - May 5<sup>th</sup> - reinstall TPC  
TPC moved to IP, adjusted and put back to parking position

May 6<sup>th</sup> - Jun 1<sup>st</sup> - install cage and central beampipe

Jun 2<sup>nd</sup> - 4<sup>th</sup> - move TPC to IP - start connection TPC to services

Jun 5<sup>th</sup> - 24<sup>th</sup> - prepare miniframe installation

Jun 25<sup>th</sup> - 26<sup>th</sup> - reinstall miniframe

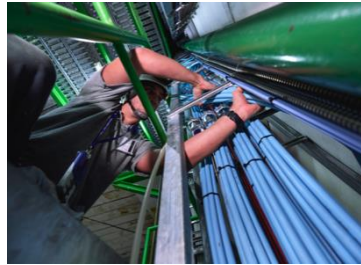


# Key dates

Activity	Date
Move TPC to SX2	6 Apr 2020
Install TPC (parking position)	7 – 30 Apr
Install cage and central beampipe	4 May – 1 Jun
Move TPC to IP	2 – 4 Jun
Install Miniframe	25 – 26 Jun
FIT-C & MFT installation and checks	30 Jun – 10 Aug
ITS installation and checks	11 Aug – 2 Nov
FDD-C installation	First half Aug*
FDD-A installation	1-10 Sep
FIT-A installation	3 – 9 Nov
ITS & MFT commissioning time	6w
ALICE global commissioning time	17w
<b>End of LS2 – stop UX25 access</b>	<b>1 May 2021</b>
Start commissioning with beam – ALICE in super-safe	10 May 2021

\* we need to redo tightness UX-RB26 before w35 (start cool down S23)

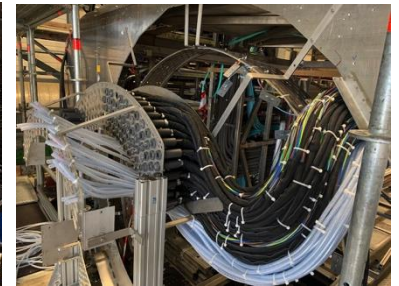
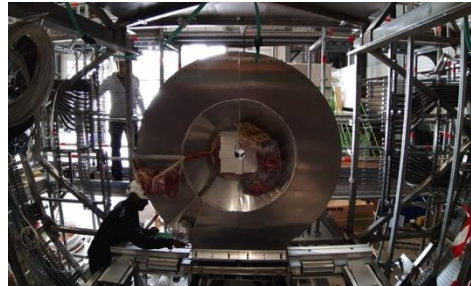
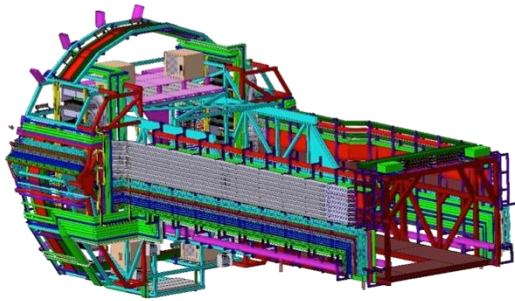
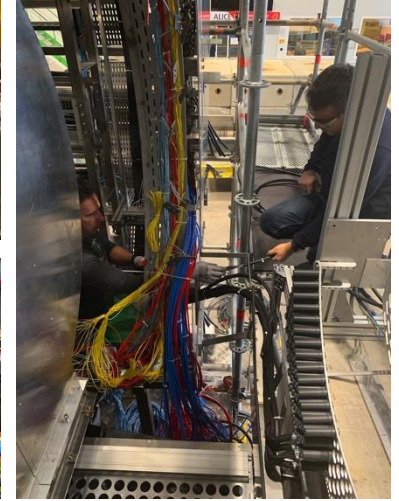
# Status of services installation

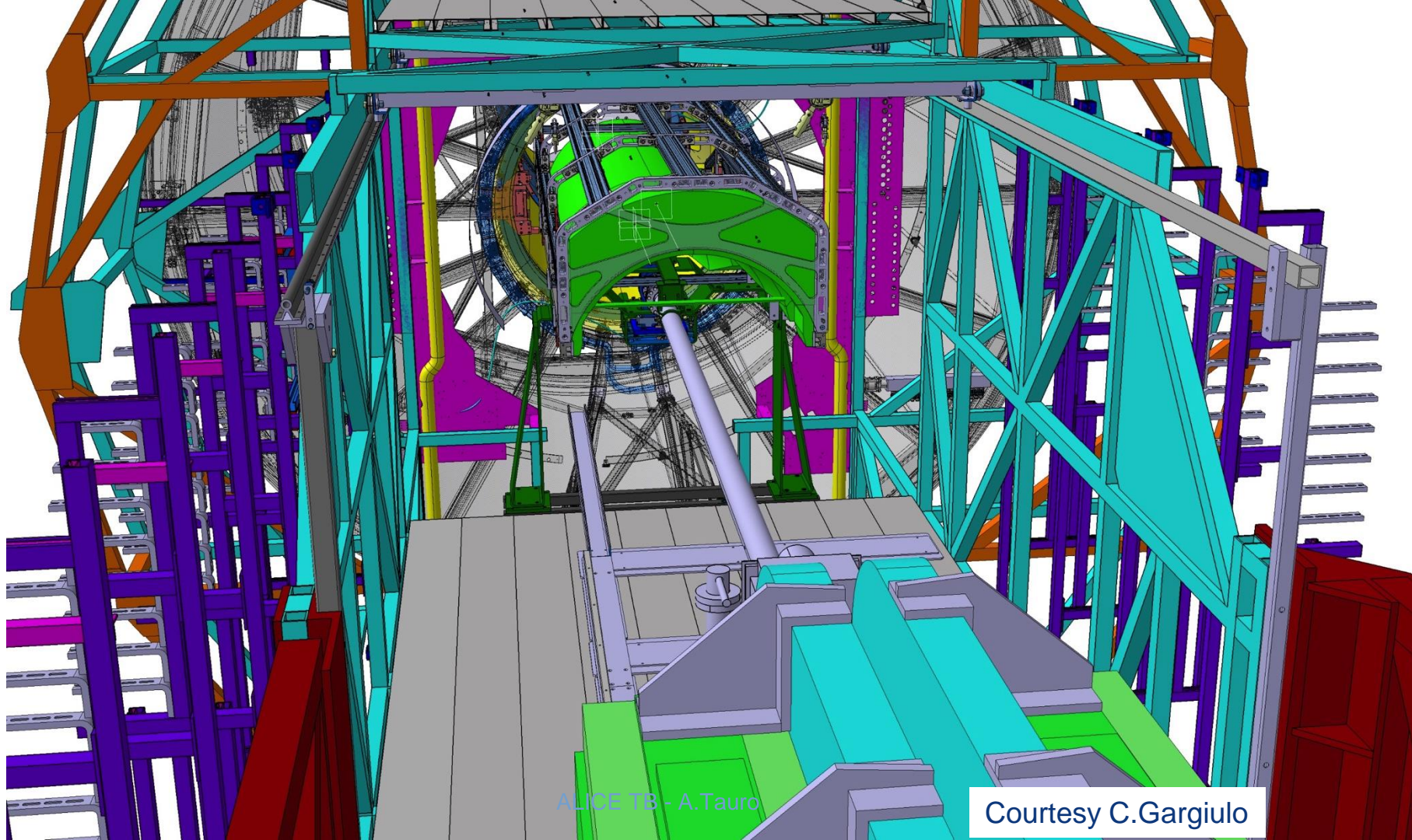


- **LV cables:**
  - **Rework in the backframe (EN-EA) done**
- **Cooling:**
  - **ITS and MFT inox pipes in UX almost completed. To be done:**
    1. connections to ITS and MFT cooling plants (last ~5m)
    2. connections Miniframe-PP0
  - **TRD return lines re-routed (remove siphons in lines)**
- **Optical fibers:**
  - **Progress: 75% installed and tested**
  - **A-side done (TPC, TOF and ITS)**
  - **MCH and MID done**
  - C-side ongoing, completion by March
- **Copper cables:**
  - **Progress: 96% pulling done**
  - First cabling campaign (2900 cables): all done except miniframe connectors (complete by March)
  - **Second cabling campaign (300 cables) in Mar-Apr 2020: FDD, BCM, ITS-DSS, ITS&MFT PT, ZEM, TPC**

# Miniframe status

- Re-routing TPC cooling pipes → done
- Installation ITS and MFT cooling pipes → done
- Installation new TPC LV cables → done
- FIT mechanics → done
- Optical fibers installation → done
- Copper cables installation → all cables installed, connectors and test ongoing, completion by April
- ITS cables mock-up PP1-PP2 → ongoing
- ITS & MFT barrels handling test → ongoing
- **Miniframe reinstatement June 25<sup>th</sup> – 26<sup>th</sup> 2020**





ALICE TB - A.Tauro

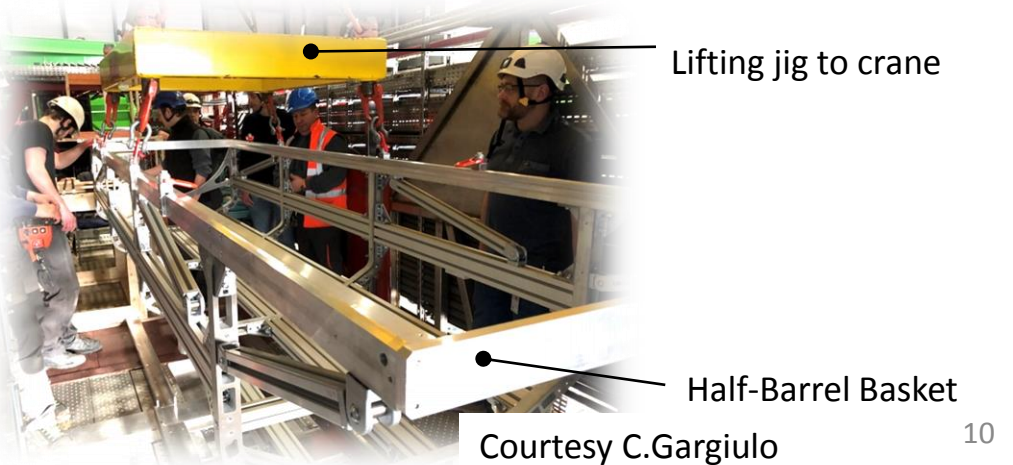
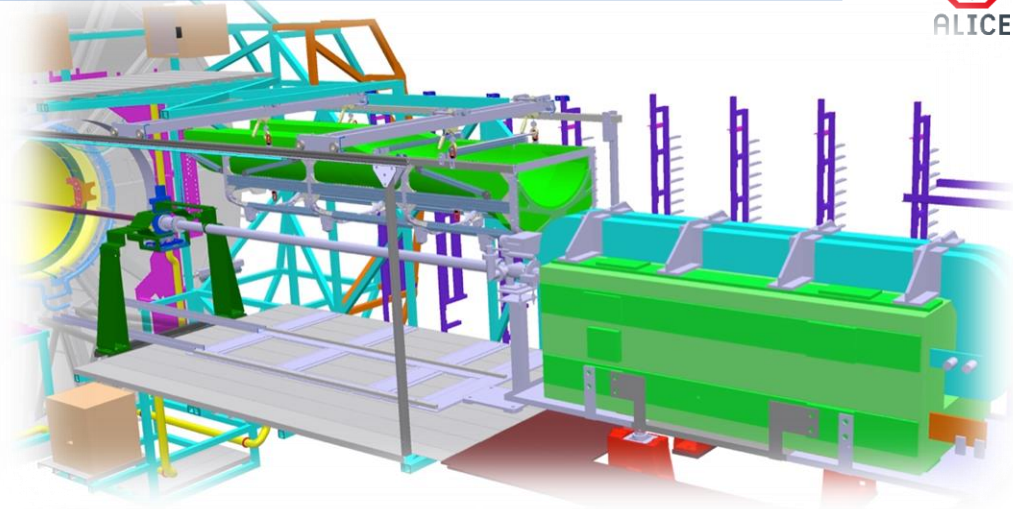
Courtesy C.Gargiulo





# ITS & MFT barrels handling tests in the miniframe - ongoing

**Scope:** validate half barrels handling procedure and tools  
**Procedure:** lower detector basket in MNF by crane, transfer basket to MNF chariot, displace H-Barrel and align with cage rails

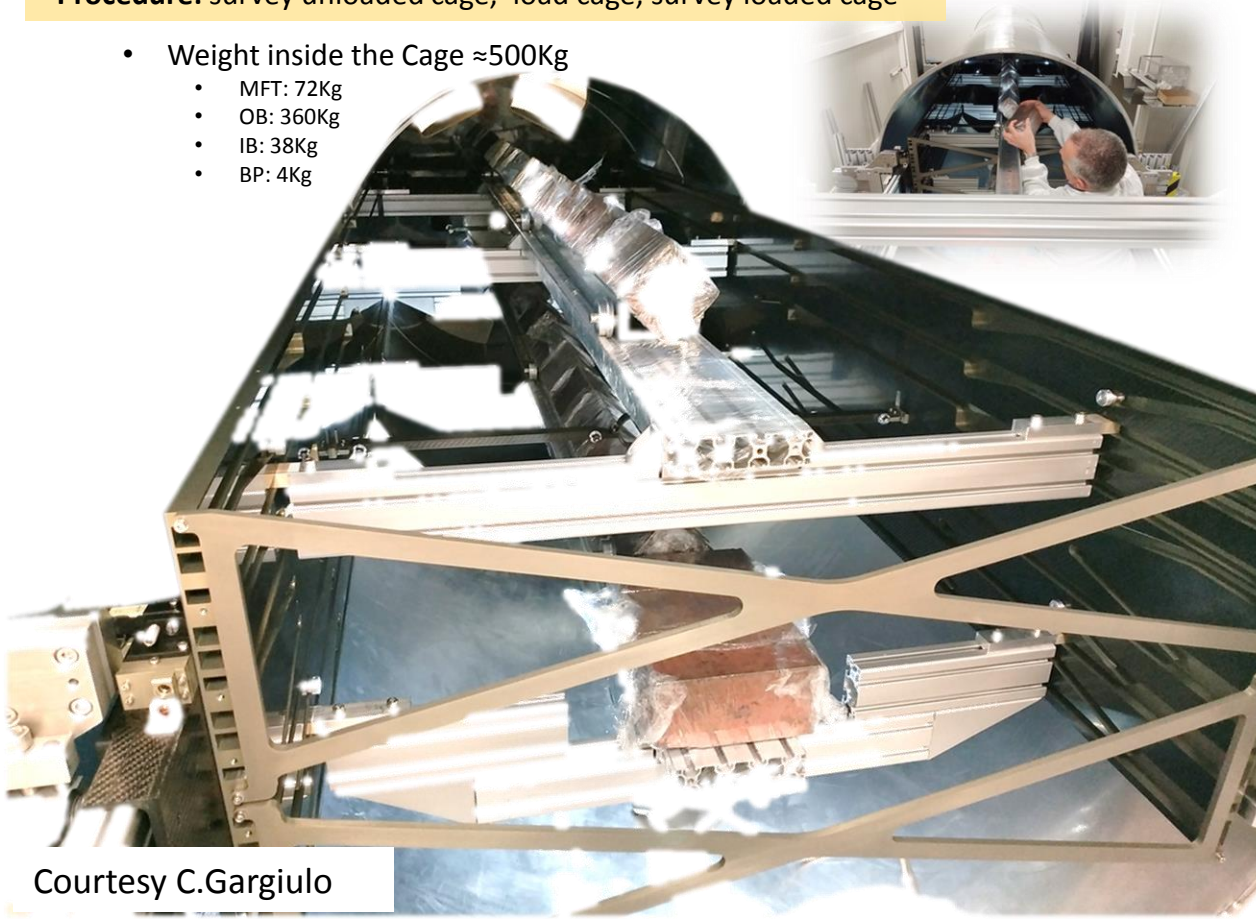


# Cage load test – DONE

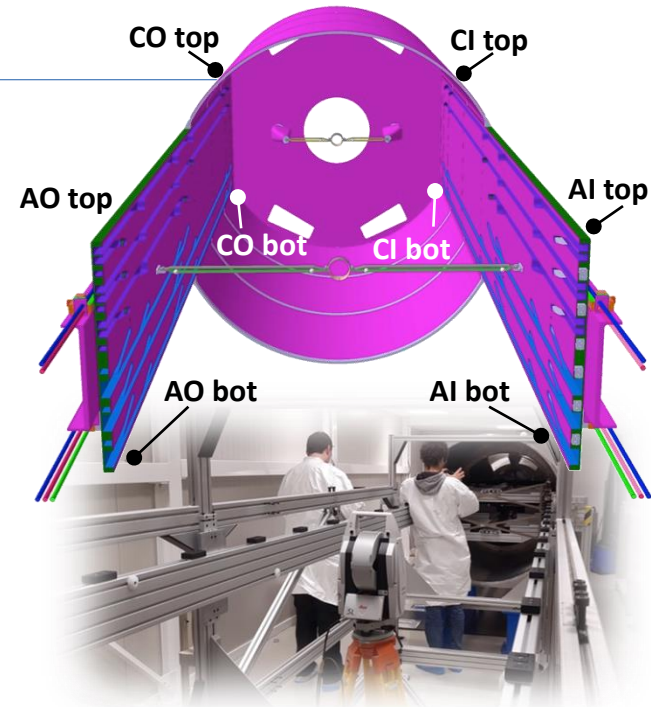
**Scope:** verify cage deformation under full load ( $\approx 500$  kg)

**Procedure:** survey unloaded cage, load cage, survey loaded cage

- Weight inside the Cage  $\approx 500$ Kg
  - MFT: 72Kg
  - OB: 360Kg
  - IB: 38Kg
  - BP: 4Kg



Courtesy C.Gargiulo



Survey targets	Z displ (mm)
AI_BOTTOM	-0.45
AI_TOP	-0.50
AO_BOTTOM	-0.56
AO_TOP	-0.60
CI_BOTTOM	-0.01
CI_TOP	0.04
CO_BOTTOM	-
CO_TOP	-0.12

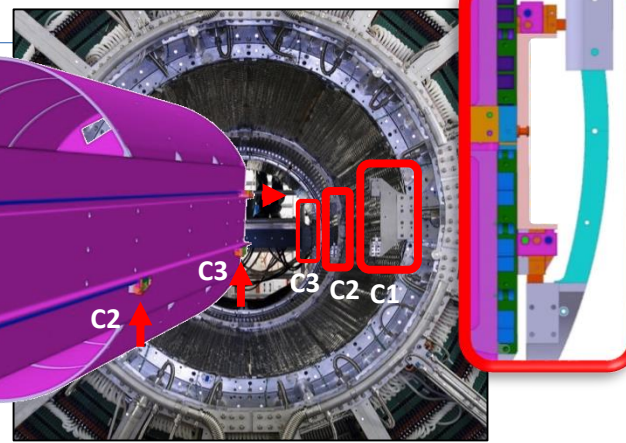
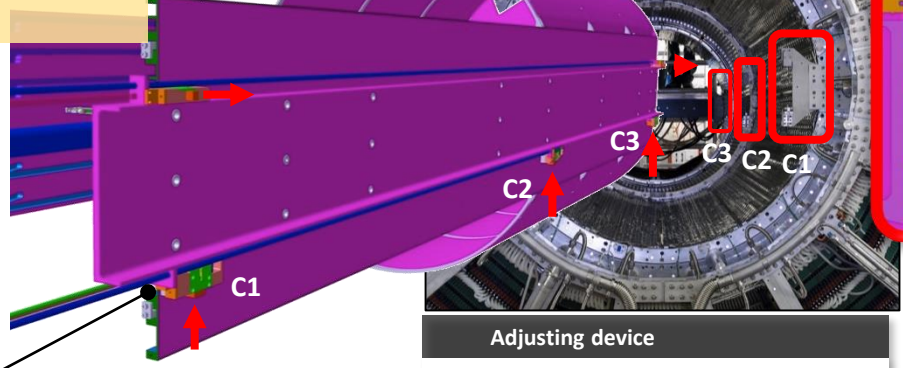
# Cage remote position adjusting – DONE

**Scope:** verify lifting/lowering of the cage fully loaded ( $\approx 500$  kg)

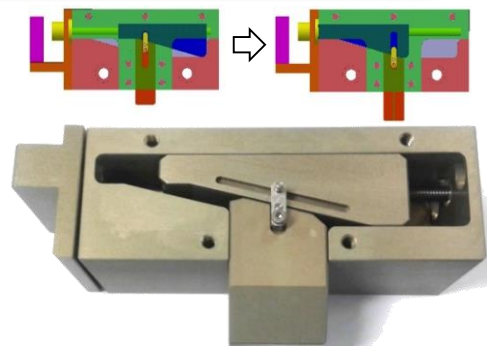
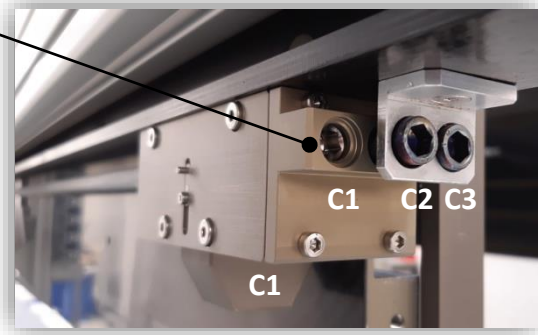
**Procedure:** load the cage, lift/lower the cage while recording displacement and applied torque



Courtesy C.Gargiulo



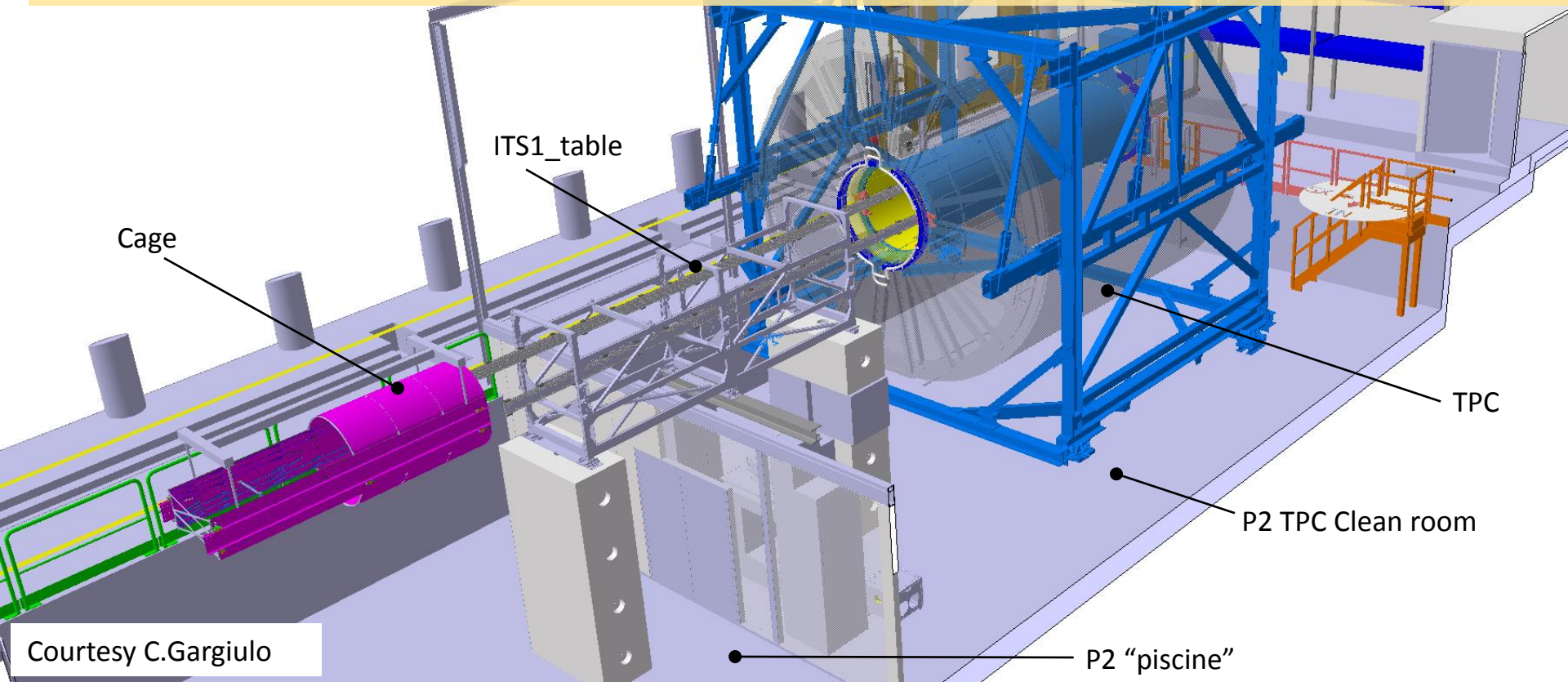
Adjusting device	
Registered Torque average	0.7 Nm
Registered Torque Max	1.54 Nm
Standard Torque M5	6 Nm
Per screw turn	0.2mm
Total adjusting capability	+/- 4mm



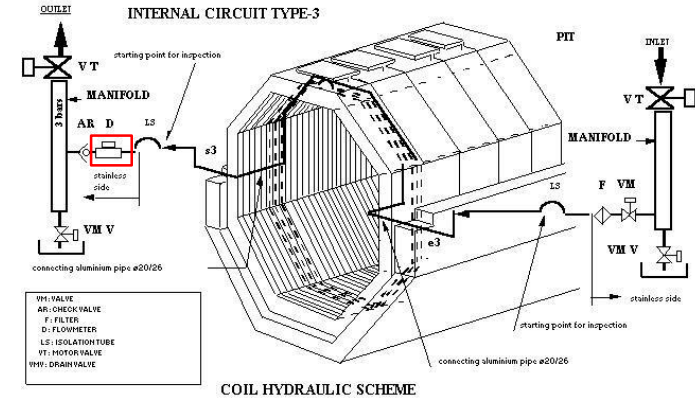
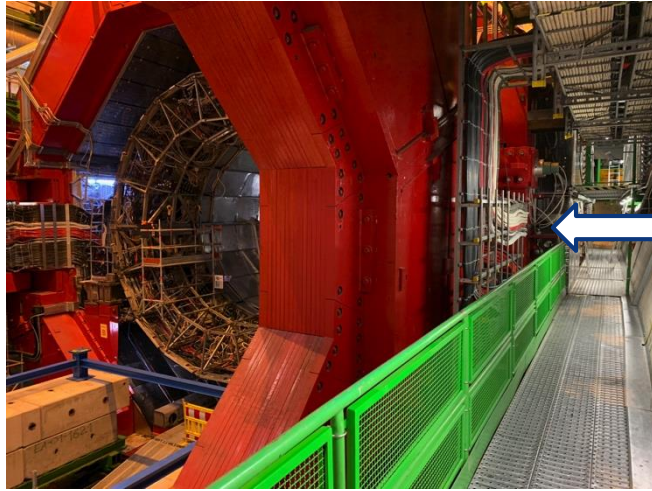
# Cage insertion test in the TPC – 18 to 30 March

**Scope:** validation of 1.cage insertion in the TPC, 2. loading with detectors dummy mass (400 kg), 3.adjust cage position from remote adjusting devices

**Procedure:** Insert cage, survey, load cage, survey, adjust cage position, remove dummy load, remove cage



# L3 cooling leak



Leak occurred two weeks ago when restarting cooling → faulty gaskets  
All 320 gaskets already replaced (160 flowmeters)

Calibration of flowmeters and replacement of filters are part of the yearly maintenance of the magnet

# Wiener water cooled Power Supplies

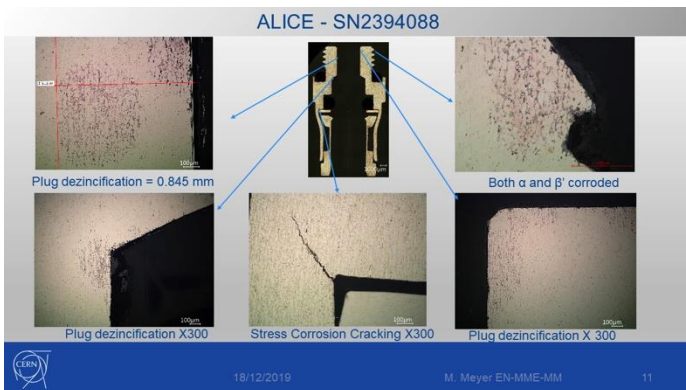
- A sample of straight fittings from 4 Experiments were analysed recently (EN-MME) → **high corrosion and cracks are observed in brass straight fittings** (ALICE sample as well as other Experiments)
- Fittings become brittle → risk of rupture leading to water leak in PS
- Risk of spilling water on PS below:
  - Potential major damage (we have racks with 10 PS stacked)
- **EP-ESE and EN-MME recommend to change them with stainless steel ones**
- Currently with EP-ESE and Wiener working out the details of a possible exchange campaign in Spring 2020



Water cooled PS in operation

Brass straight fitting  
(up to 12pcs/PS)

Alice	221	>20 types
CMS	154	2 types
LHCb	99	8 types
ATLAS	73	6 types



## Reminder:

- 2 major water leaks in CMS
- Analysis revealed issues on some internal brass fittings in 2014
- All elbow fittings replaced in LS1 → All ~220 units were processed in the first 6 weeks of 2016

# Conclusions

- **LS2 schedule progress:**
  - Start of the detector installation sequence delayed by **3 weeks** with respect to Jan TB to replace 2 TPC GEM chambers → 7 weeks with respect to original schedule. With this plan we have 4 months of global commissioning, starting on Jan 4<sup>th</sup> 2021
- **TPC transportation dates: 6 April (SX2), 7 April (low-beta) and 8 April (in front of L3)**
- **Miniframe: reinstallation June 25-26. Installation ITS power cables before bringing the miniframe to the pit**
- **Services: copper cables will be completed by April; optical fibers completion by March and cooling available in time for ITS and MFT commissioning**
- **Issue: corrosion in some brass fittings in the water cooled Wiener Power Supplies → decided to exchange these fittings in Spring**



THANK YOU!

