A Large Ion Collider Experiment

Report from RC

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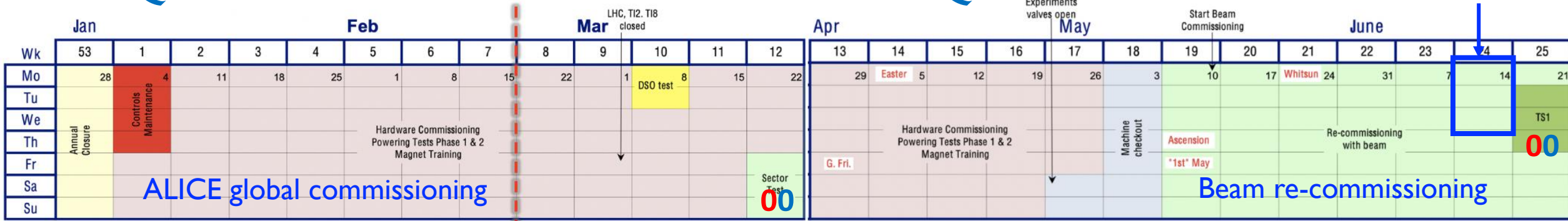Federico Ronchetti (INFN-LNF, CERN)

Run Coordination

Global commissioning 2021

A Large Ion Collider Experiment

2021-Q1

2021-Q2

First SB at 900 GeV?
B=0 for alignment?

ALICE global commissioning

Beam re-commissioning

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Individual system validation
Technical runs and cosmic
runs for full system
integration/validation

Cosmic data taking for pre-alignment studies and physics.
Special Kr runs for TPC and TRD (a few days)

ALICE will be in SS.

pp and HI running 2021

2021-Q3

2021-Q4

Intensity ramp-up

pp physics

HI physics

Start with ++ (Xing=+200-70)
20 kHz for 2 weeks (00, ++, --)
→ alignment studies and reference map
200 kHz for 2 weeks

Standard high intensity pp physics at 1 MHz
5 MHz for 2 weeks for 50 kHz Pb-Pb tests
Change the polarities halfway through

Pb-Pb physics
Change the polarities halfway through

4-5 days of pp_ref?

Some dates 2020 for commissioning

System	Activities	Date
DCS	Arrival of new servers Installation of the servers and network infrastructure Migration from old to new servers	End of March April May-June-July
CTP	Production of 24 boards Testing of 24 boards Delivery to subsystems and CTP commissioning	End of March April May
O2	IB network (FLP part) Installation of (some fraction of) EPN in CR0	May Summer
Subsystems (Cosmics)	TOF Cosmic trigger commissioning Cosmic data taking with TOF trigger (TPC, TRD, CPV)	July-August August-September

Plans for February and March 2020

- **Vertical Slice**
  - Commission and Testing of software components (global ECS, controls, CCDB, etc)
  - Tests with dummy data (StfBuilder/StfSender/TfBuilder, data writing to EoS)
  - Tests with TOF, MCH, and HMPID
- **TPC, ITS, MFT**
  - Continue pre-commissioning on surface
  - TPC & ITS: Full readout tests (CRU→FLP→EPN with StfB/TfB/DPL chains → EOS)
- **TOF, TRD, MCH, MID, HMPID, EMC, CPV, PHOS**
  - Commissioning in cavern
  - Readout tests up to FLP
- **EMC, PHOS, ZDC**
  - Readout firmware development in lab.

Re-commissioning status

- [Link](#) : Various activities are on-going (DCS, readout, QC)

Re-commissioning status sheet

	DC		Integration into global DCS	data streaming to O2	Full chain tests								
					CTP	CRU	FLP	PDP	EPN		PDP		QC	Trigger inputs
	JCOP FW update	FRED implementation			trigger, clock, HB distribution	readout via CRU (common FW, user FW)	Data Flow up to FLP STFB	FLP Local Processing	Data Flow up to EPN	Data Flow up to Storage	EPN Global Processing (detector reco.)	EPN Global Processing (detector calib.)		
CPV														N/A
EMCal		N/A												
FDD	N/A	N/A												
FT0	N/A	N/A												
FV0	N/A	N/A												
HMPID		N/A												N/A
ITS	N/A													N/A
MCH														N/A
MID														N/A
MFT	N/A													N/A
PHOS		N/A												
TOF		N/A												
TPC														
TRD														N/A
ZDC														N/A

Legend:
- not yet started
- on going
- completed
- issues, problems, being fixing

A Large Ion Collider Experiment

- Please make entries (link) when you will need LTUs!!
- LTU availability
  - Now we have 2 LTUs in the pit.

LTU needs at P2 or lab. from January to March 2020 (Please feel free to add your subsytem if you need to use a LTU for commissioning)

		w49	w50	w51	w1	w2	w3	w4	w5	w6	w7	w8	w9	w10	w11	w12	w13	w14	w15	w16	w17	w18	w19	w20	w21	w22	w23	w24	w25	w26	w27
		1.12 - 7.12	8.12-14.12	15.12-21.12	29.12 - 4.1	5.1-11.1	12.1-18.1	19.1-25.1	26.1-1.2	2.2-8.2	9.2-15.2	16.2-22.2	23.2-29.2	1.3-7.3	8.3-14.3	15.3-21.3	22.3 - 28.3	29.3 - 4.4	5.4 - 11.4	12.4 - 18.4	19.4 - 25.4	26.4 - 2.5	3.5 - 9.5	10.5 - 16.5	17.5 - 23.5	24.5 - 30.5	31.5 - 6.6	7.6 - 13.6	14.6 - 20.6	21.6 - 27.6	28.6 - 4.7
CTP	maximum available LTU	1	1	1	1	1	1	1	2	2	2	2	3	3	5	5	5	5	5	5	5	5	Full LTU will be available for all subsystems								
HMP		1	1				1			1																					
MCH																															
TOF				1							1		1					1													
TRD											1	1		1	1			1	1			1	1	1	1	1	1	1	1	1	1
MID																	1	1	1	1	1	1	1	1						
EMCAL												1	1																		
PHOS												1	1	1																	
FIT																										1	1				
TPC																							1	1	1						
MFT																															
ITS																															
CPV													1																		
ZDC																			1	1	1	1	1	1	1	1					
VS																															

need to use one LTU for standalone commissioning at P2
need to use one LTU for integration slice tests (full chain tests) at P2
need to use one LTU for readout tests in the Lab

A **L**arge **I**on **C**ollider **E**xperiment

- **O2-FLP**
  - Early commissioning
    - progressing with TOF, MCH, HMP, CPV, DCal, and CTP (LTU control).
    - First TRD FLP in use. PHOS FLPs ready to be cabled.
  - User Requirements for FLPs/CRUs low-level access: final summary published.
  - O2/FLP suite v0.6 released and installed on VS.
- **O2-EPN**
  - DataDistribution: RPM(v0.7.2), ansible recipe ready, installed on the ITS setup
  - TPC readout : working on TPC DPL workflow (pedestal calibration) and QC
  - VS FLP tests: readout and StfBuilder validation underway
  - Network + EOS connectivity benchmarking and optimization ongoing

A **L**arge **I**on **C**ollider **E**xperiment

- **O2-PDP**
  - Ongoing work for items related to commissioning / slice-test
    - Working on Zero Suppression Encoder in DPL workflow
    - Working on transcoder to convert temporary ZS format to final format.
- **O2-Vertical Slice**
  - Basic tests of ECS on FLP
  - IPoverIB being setup on FLP
  - More tests on the EPN to EOS link ongoing
  - DataDistribution was installed in 3 FLPs. VS tests ongoing up to FLP (StfBuilder)
- **O2-QC**
  - QC v0.21 released: new features, bug fixes and new documentation
  - Development on-going: CTP, FIT, EMC, ITS, MCH, MFT, MID, PHS, TOF, TPC, TRD

- **CTP**
  - 2 boards out of 5 2nd-production boards being tested. 3 boards will come soon.
  - 2 boards for EMC and PHOS/CPV delivered
  - FW development ongoing
  - Production of 24 boards end of March.
- **DCS**
  - Modifications in CR3 ongoing. New servers and new network in April.
  - WinCC and Framework upgrades (central systems, TRD, TOF, LHC I/F, TPC, MCH, CPV, HMPID, EMC)
- **LHC_IF**
  - Commissioning the new version of the ALICE UI
  - Designing the new software architecture of the project
  - Start discussion with different projects in a few weeks.

A **L**arge **I**on **C**ollider **E**xperiment

- **CPV**
  - Firmware development of Column Controller and Readout Unit ongoing in the lab
- **EMCal**
  - DCAL A-side commissioning completed
  - WinCC/JCOP FW upgraded completed
  - The first version of the Run3 SRU firmware received. Testing in the lab
- **HMPID**
  - Removal of the hot spot on the M3FEE17th 9th cards
  - Replacement of the Busy cable on the M5ROL
  - Replaced Column Controller M4ROL column 23rd
  - Attempt not successful to repair M4ROR 22nd and 23rd columns
  - FW and software development ongoing (TF filling, TTCrx, watchdog, column exclusion)

A **L**arge **I**on **C**ollider **E**xperiment

- **ITS**
  - Loss-of lock on GBT, meeting with the GBT team last week
  - Preparation of EPN ongoing, software and network ready, readout tests with detector scheduled for this week
  - OB: stave-by-stave verification, testing analogue performance – data transmission
- **MCH**
  - Station 4 assembly : CH7 (R+L) done, CH8L started
  - Station 3 commissioning
    - CH5, CH6R: commissioning (Readout, gas, HV) completed
    - Noise reduction (add resistor on HV line): done on CH5L, in progress on the other chambers
    - Cabling, assembly and commissioning of CH6L (after noise solution tested on all other chambers of Station 3)

- **MFT**
  - Top MFT commissioning: DTU optimization ongoing (will be finished this week)
  - Integration of LTU to readout chain at commissioning lab: under testing
- **MID**
  - 2nd round of full chain tests ongoing (1 CRU/FLP, 1 LTU, 1 ro crate with final Local and Regional cards, CRU user logic)
  - Production of the 300 Local cards completed. Production of the 23 (/25) remaining Regional cards ongoing
- **PHOS**
  - FEE commissioning of PHOS modules started.
  - The first version of SRU firmware received and will be tested in the lab.
  - WinCC upgrade by the beginning of March.

A **L**arge **I**on **C**ollider **E**xperiment

- **TOF**
  - Installation of DRM2/DCDC in crates 38, 39, 47 DONE last week.
    - Upgraded DRM/DCDC installed now in 68 crates (over 72)
  - Installation of the remaining 4 DRMs scheduled for end of March
- **TPC**
  - Pre-Commissioning on-going:
    - 3 IROCs have been replaced
    - X-Ray test continue for Field Cage
    - DCS development for CRU and FEC control in March.
    - Readout CRU FW: ZS and packetizer optimization ongoing; first version to be tested
- **TRD**
  - Readout tests of SM05 with CRU ongoing
  - no-load LV test of other sectors is in progress.

Summary and Outlook

- P2 and surface commissioning progressing well without any serious showstoppers.

- More will come.
  - Development of DataDistribution and DPL processing for TPC setup
  - Full chain tests for TPC and ITS (CRU FW + StfB/TfB/DPL processing)
  - Readout tests and development at P2 for TRD, MID, and TOF
  - More tests on the VS including ECS, DataDsitribution, and data storage. Initial tests with TOF, HMPID and MCH are also foreseen in concertation with the detectors
  - Continuous efforts at P2 for commissioning : TOF, MCH, and PHOS

backup

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
End of LS2 – stop UX25 access	**1 May 2021**
Start commissioning with beam – ALICE in super-safe	10 May 2021

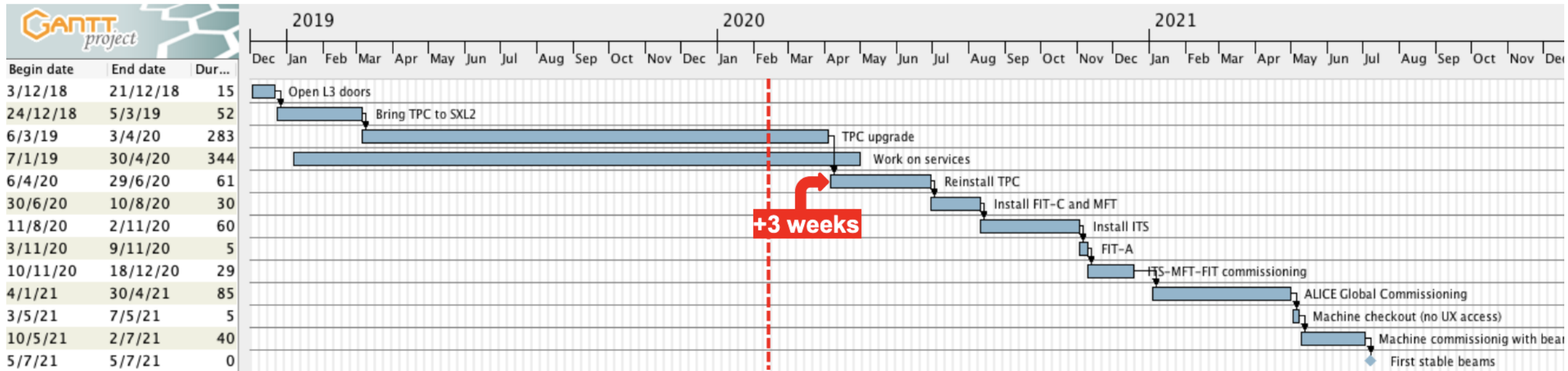* we need to redo tightness UX-RB26 before w35 (start cool down S23)

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

Begin date	End date	Dur...	Task
3/12/18	21/12/18	15	Open L3 doors
24/12/18	5/3/19	52	Bring TPC to SXL2
6/3/19	3/4/20	283	TPC upgrade
7/1/19	30/4/20	344	Work on services
6/4/20	29/6/20	61	Reinstall TPC
30/6/20	10/8/20	30	Install FIT–C and MFT
11/8/20	2/11/20	60	Install ITS
3/11/20	9/11/20	5	FIT–A
10/11/20	18/12/20	29	ITS–MFT–FIT commissioning
4/1/21	30/4/21	85	ALICE Global Commissioning
3/5/21	7/5/21	5	Machine checkout (no UX access)
10/5/21	2/7/21	40	Machine commissionig with bea...
5/7/21	5/7/21	0	First stable beams

Installation of TPC: **Apr. 6th 2020**

Installation of ITS: **Aug. 11th 2020**

Start of global commissioning: **Jan. 4th 2021**

End of access to the cavern: **May 1st 2021**

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