LS2 status update

A.Tauro

FRI

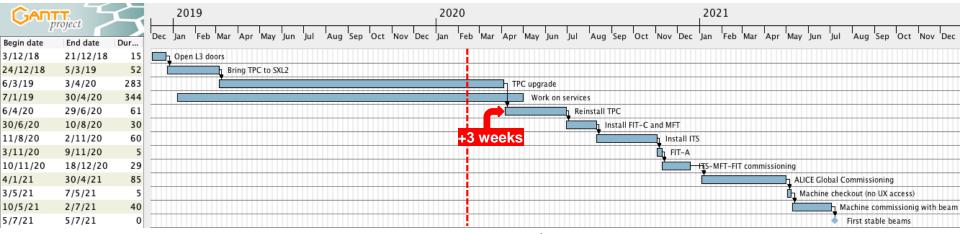
ALICE LS2 schedule (v36)



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 th 2020
Installation of ITS:	Aug. 11 th 2020
Start of global commissioning:	Jan. 4 th 2021
End of access to the cavern:	May 1 st 2021

 \rightarrow 116 days of global commissioning = 17 weeks = 4 months



TPC upgrade sequence



		7	2020		_	_								_	_	_					_		
× 0		Duration	Week 2 05.01.20	Week 3	Week 4	Week 5	Week 6	Week 7 09.02.20	Week 8 16.02.20	Week 9	Week 10	Week 11	Week 12 15.03.20	Week 13	Week 14	Week 15	Week 16	Week 17 19.04.20	Week 18 26.04.20	Week 19 03.05.20	Week 20	Week 21	w
	19.01.20	14	05.01.20	12.01.20				ctors at tim		23.02.20	01.03.20	08.03.20	15.03.20	22.03.20	29.03.20	05.04.20	12.04.20	19.04.20	26.04.20	03.05.20	10.05.20	17.05.20	24
20.01.20	22.01.20	3			1	18kV and 3	.3kV mainte	enance (gen	.services)	no access P	2											_	Ξ.
23.01.20	26.01.20	4				LV ne	etwork main	ntenance (e:	xp.networ) – limited a	ccess P2												-
27.01.20	27.01.20	1				AU	G test 2020	- no access	5 P 2														
23.01.20	03.02.20	12			•		On	C side: Sect	tor tests, 2	sectors at ti	me (cont)												
28.01.20	31.01.20	4					Prepare	6 sectors fo	or IROC ex	hange (A01,	A02, A03, A	06, A07, A0	8)										
03.02.20	03.02.20	1					Uni Uni	mount A sid	e scaffold	ng													
04.02.20	04.02.20	1					o 🔄	pen roof: Pi	repare for	ROC exchan	ge, remove	scaffolding	and close ro	of									
04.02.20	06.02.20	3						Replace g	as mixture	with air													
05.02.20	05.02.20	1					۲ ۵ ,	Clean clean	nroom														
07.02.20	07.02.20	1					[HIOC rep	placement	A02, A07													
10.02.20	12.02.20	3							Remove se	rvices, FECs,	FEC frames	A00, A17, A	.16										
13.02.20	13.02.20	1							Clean cl	anroom													
14.02.20	14.02.20	1	0						HROC r	placement A	A17												
17.02.20	17.02.20	1							L o	pen roof, ren	nove tooling	put scaffol	ding										
18.02.20	21.02.20	4								Reinstal	I FEC frame	, FECs, servi	ces in A00,	A01, A02, A	03, A06, A0	7, A08, A16	and A17						
19.02.20	20.02.20	2								Laser cab	ling												
20.02.20	21.02.20	2								Remove	services, FE	Cs and FEC f	rames A09										
24.02.20	25.02.20	2								υ υ	nmount sca	ffolding. Op	en roof, inst	all infrastru	cture for O	ROC A08 ex	change						
26.02.20	26.02.20	1								i 🔍	Clean clean	room											
27.02.20	27.02.20	1									Prepare O	ROC exchar	ge										
28.02.20	28.02.20	1									- OROC A	08 exchange											
02.03.20	02.03.20	1									D Op	en roof, rem	ove tooling,	put scaffol	ding								
03.03.20	13.03.20	9									ļ		Reinstall	FEC frames	, FECs, servi	ces in A00,	A01, A02, A	03, A06, A0	7, A08, A09	, A16 and A	17		
02.03.20	13.03.20	10									Ĺ		FII TPC v	vith Ne CO2	N2								
16.03.20	17.03.20	2											Re Re	move scaff	olding, put 2	nacelles o	n A side. Ins	tall blocks	for ITS inser	tion test			
18.03.20	31.03.20	10	_												Te	st A00, A01	, A02, A03,	A06, A07, A	08, A16 and	d A17			
01.04.20	01.04.20	1													i, i)isconnect (gas system						
02.04.20	03.04.20	2													Ļ	Finalize:	Put covers,	cooling con	nections, te	st for leaks	, secure fibe	rs and cables	å
	30.03.20	9													ints i	nsertion te	st						
31.03.20	01.04.20	2													<i>ا</i> ا	djust TPC p	position						



TPC & miniframe reinstallation sequence



	2020 #1365	ni ni
	February March April May June July August September	
Begin date End date D		
4/2/20 4/2/20	1 TPC: prepare IROC exchange (open CLR roof, install tooling, close roof)	
17/2/20 17/2/20	1 ThC: open CLR roof, remove tooling, close roof	
25/2/20 25/2/20	1 TPC: prepare OROC exchange (open CLR roof, install tooling, close roof)	Each 4th Apr 2rd complete TPC coase insertion test in SVI 2
28/2/20 28/2/20	1 Remove scaffolding laser platform (SX2)	Feb 4 th – Apr 3 rd - complete TPC, cage insertion test in SXL2
2/3/20 2/3/20	1 TPC: open CLR roof, remove tooling, close roof	clean report for TPC transportation
17/3/20 17/3/20	1 Remove tent (b.6952)	cleanroom, prepare for TPC transportation
17/3/20 17/3/20	TPC: install infrastructure for cage insertion test	
18/3/20 30/3/20 31/3/20 1/4/20	9 TPC: cage insertion test in CLR (roof open)	
	2 TPC: adjust TPC position inside DF 1 Remove staircase cheval (I-side)	
/4/20 3/4/20 /4/20 6/4/20	1 Bring TPC from cleanroom to SX2 (Frederici truck)	Apr 6 th - transportation TPC to SX2
/4/20 7/4/20		
/4/20 7/4/20	Transport TPC from SX2 to low-beta platform Remove MNF scaffolding interfering with DF (tbc)	
/4/20 7/4/20	I Displace ALTEAD cage (SX2)	
7/4/20 7/4/20	1 Displace ALTEAU Cage (Sk2)	
8/4/20 8/4/20	Transport TPC from low-beta to the DF base (in front of L3) remove low-beta fences and one survey t	
10/4/20 13/4/20		
14/4/20 20/4/20	2 Laster holidays 5 Align DF and install transfer rails (TRD people needed)	
21/4/20 21/4/20	1 Angri Dr and instan transier rans (ND people needed)	Apr 7 th - May 5 th - reinstall TPC
22/4/20 23/4/20	2 Move TPC to IP (remove omega platform)	
4/4/20 27/4/20	2 TPC survey and possible adjustment	TPC moved to IP, adjusted and put back to parking position
4/4/20 27/4/20	2 Install ITS table	
8/4/20 30/4/20	3 Move TPC to parking position and reinstall omega platform	
/5/20 1/5/20	1 Labour day	
/5/20 4/5/20	1 Install scaffolding inside baby frame	
/5/20 5/5/20	2 Fix A-side beampipe support to TPC (integration test)	
5/5/20 5/5/20	Long and the state of the	
5/5/20 12/5/20	5 Install cage and central beampipe	
3/5/20 18/5/20	4 Connect and align beampipe	
1/5/20 21/5/20	1 Ascension	Move Other hand 4st in stall as an analysis and a state has a set in stall
22/5/20 1/6/20	7 Bakeout central beampipe	May 6 th - Jun 1 st - install cage and central beampipe
1/6/20 1/6/20	1 Pentecote	
29/5/20 29/5/20	1 Clean and repair heat screens	
2/6/20 4/6/20	3 Move TPC to IP (r move omega and scaffolding)	Jun 2 nd - 4 th - move TPC to IP - start connection TPC to services
5/6/20 15/6/20	7 h Install A-side beampipe support, remove temp rails, align cage	
16/6/20 16/6/20	1 Install scaffolding inside baby-frame	
17/6/20 17/6/20	1 Remove transfer rails	
18/6/20 18/6/20	1 Remove DF (along with ITS table)	lup 5th 24th propers miniframe installation
19/6/20 19/6/20	1 Remove DF (along with it's table)	Jun 5 th - 24 th - prepare miniframe installation
22/6/20 22/6/20	1 histall miniframe rails	
23/6/20 24/6/20	2 Install laser platform	
22/6/20 22/6/20	1 Reinstall TPC VHV box and laser pipe inside baby-frame	Jun 25 th - 26 th - reinstall miniframe
,-,-0,0,20	2 Install miniframe	

CÉRN)

Key dates



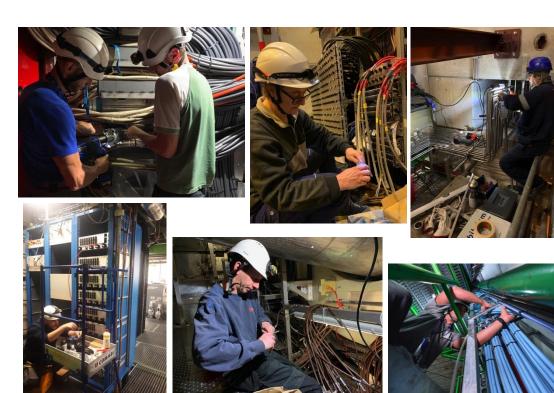
Activity	Date					
Move TPC to SX2	6 Apr 2020					
Install TPC (parking position)	7 – 30 Apr					
Install cage and central beampipe	4 May – 1 Jun					
Move TPC to IP	2 – 4 Jun					
Install Miniframe	25 – 26 Jun					
FIT-C & MFT installation and checks	30 Jun – 10 Aug					
ITS installation and checks	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)



Status of services installation





- LV cables:
 - Rework in the backframe (EN-EA) done
- Cooling:

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- 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 reinstallation June 25th 26th 2020



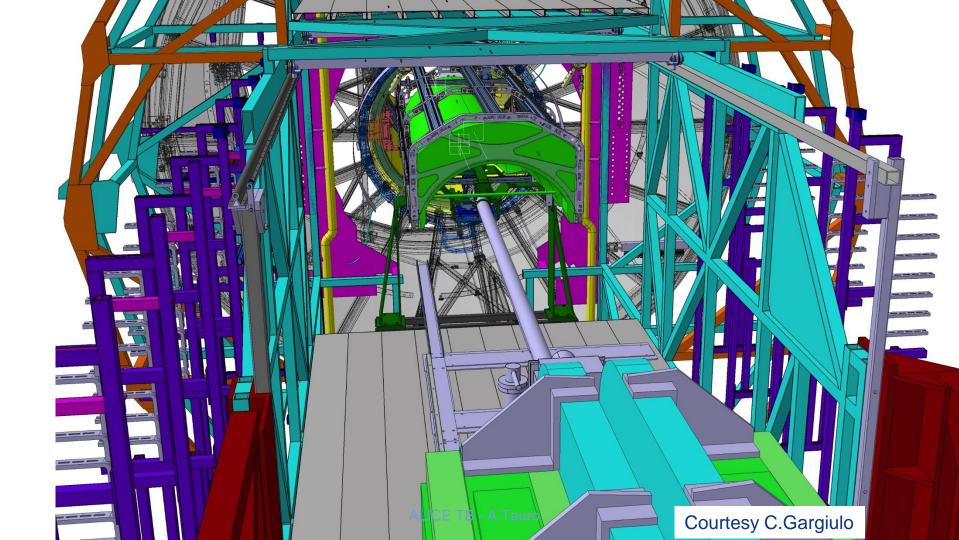


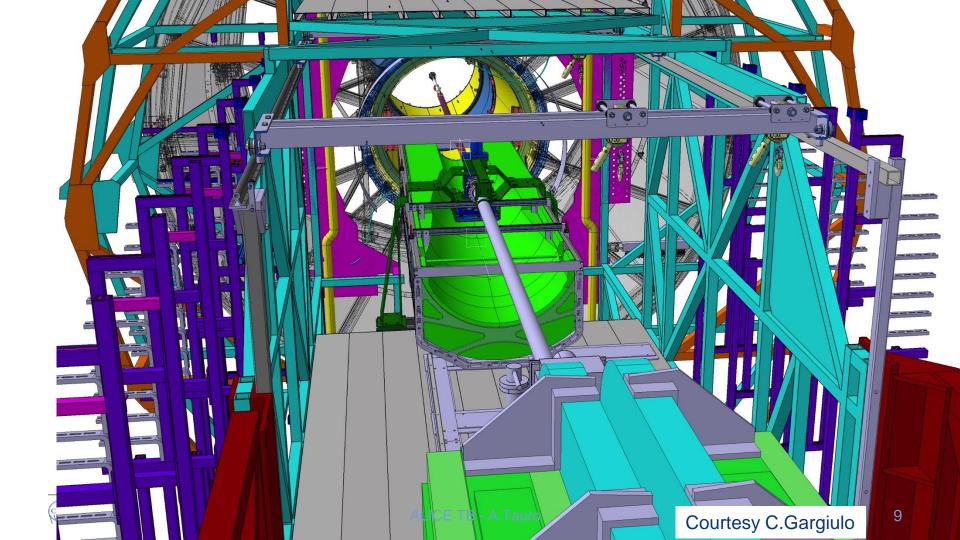








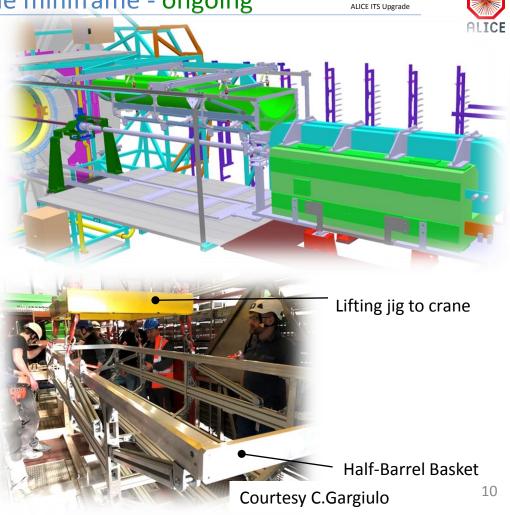




ITS & MFT barrels handling tests in the miniframe - ongoing

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

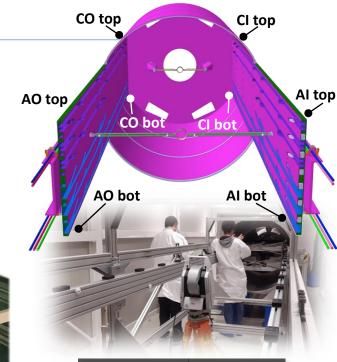




Cage load test – **DONE**

Scope: verify cage deformation under full load (≈ 500 kg) **Procedure:** survey unloaded cage, load cage, survey loaded cage

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



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	-
со тор	-0.12

Cage remote position adjusting – **DONE**

Scope: verify lifting/lowering of the cage fully loaded (≈ 500 kg) **Procedure:** load the cage, lift/lower the cage while recording displacement and applied torque

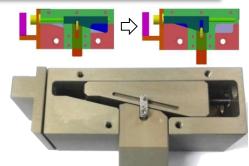
C	

Adjusting device	
	_

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C3

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



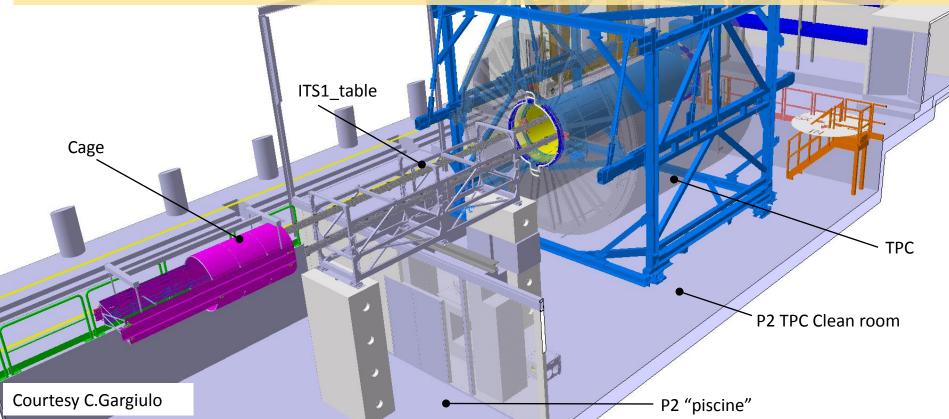
Cage insertion test in the TPC – 18 to 30 March

ALICE ITS Upgrade



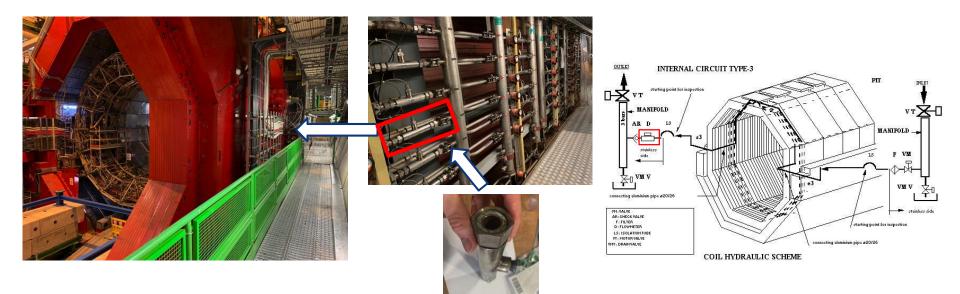
Scope: validation of 1.cage insertion in the TPC, 2. loading with detectors dummy mass (400 kg), 3.adjust cage position from remote adjusting devices

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 \rightarrow 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

ALICE TB - A.Tauro

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

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



Brass straight fitting (up to 12pcs/PS)



- 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 4th 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!

