



Progress update for TANb installation

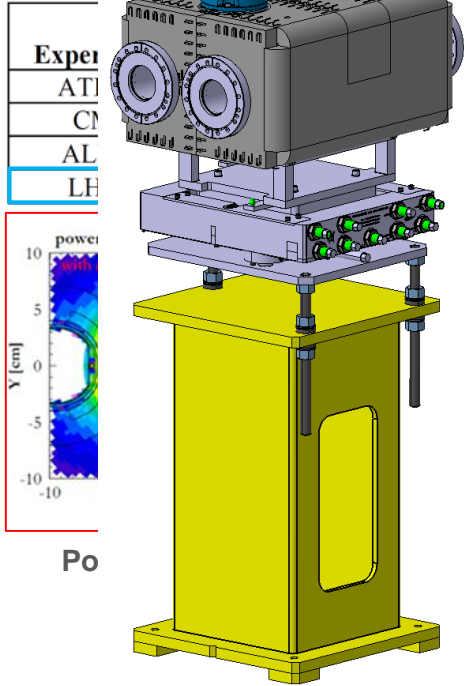
*F. Sanchez Galan
for WP8 & installation team*

Big thanks to M. Lino Diogo dos Santos & M. Jose Luque Porras

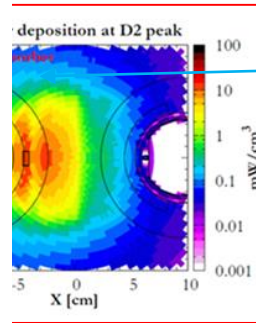
TANB

- LHCb will be upgraded after LS2
- Several protection schemes for D2 were studied by WP10, and integrated between WP12, WP15, WP8 & A4R8 & A4L8 equipment owners.
- PRR hold may 2018. Strong support from WP1 (big thanks to Hector)
- EDR & Differential layouts (LHCLJ_8U0032 & LHCLJ_8U0033)
- Installation activities started 15th May

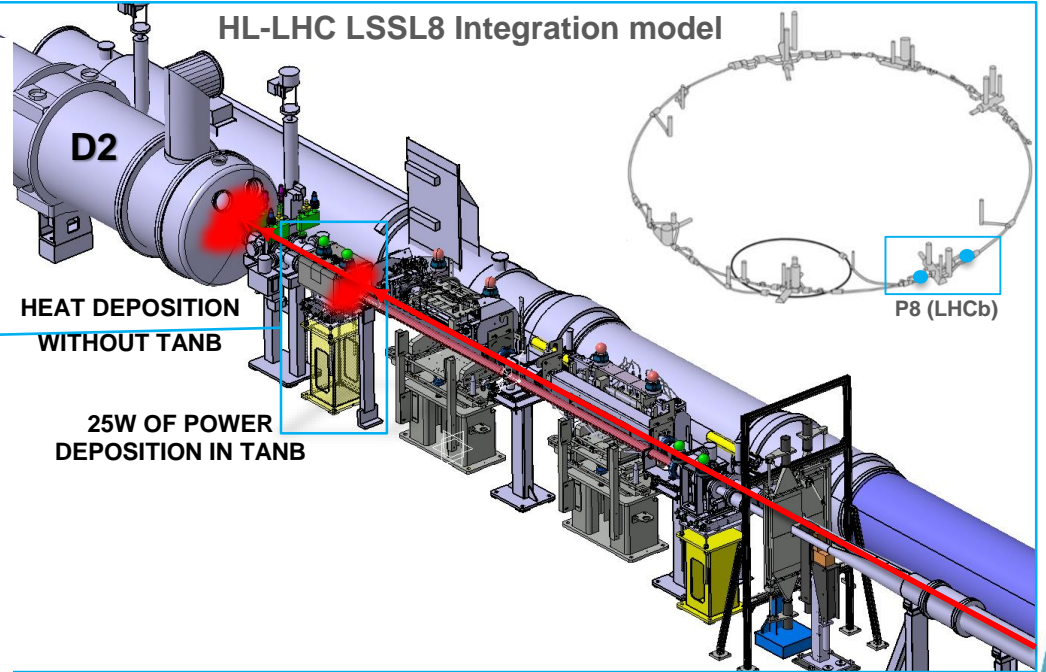
TANB Neutral Absorber



Exper	cm ² s ⁻¹	IP
ATI	2 × 10 ³⁴	1
CM	2 × 10 ³⁴	5
AL	1 × 10 ³¹	2
LH	4 × 10 ³²	8

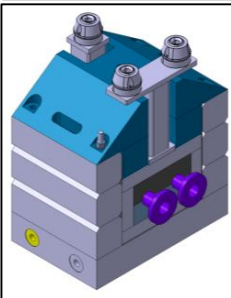
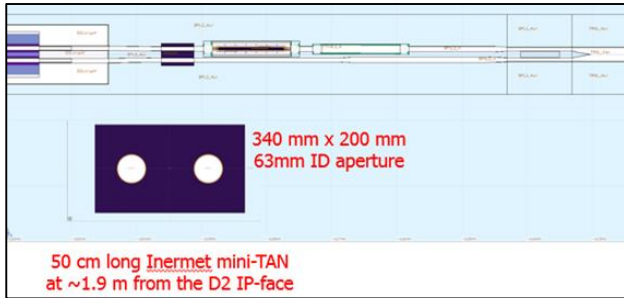
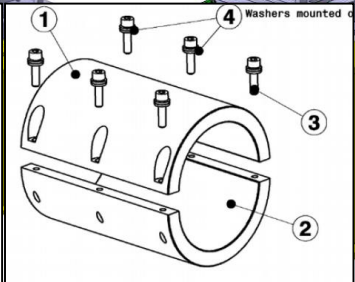
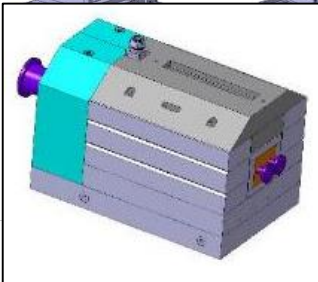
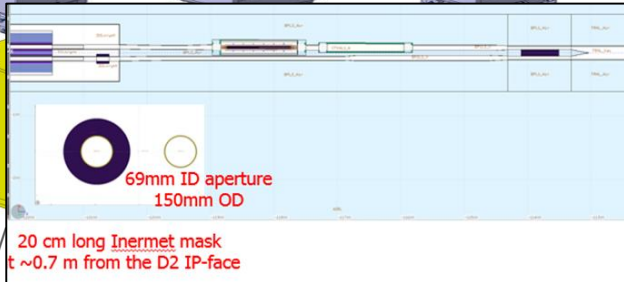
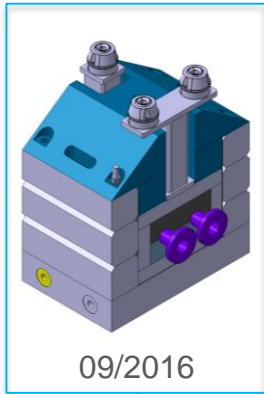
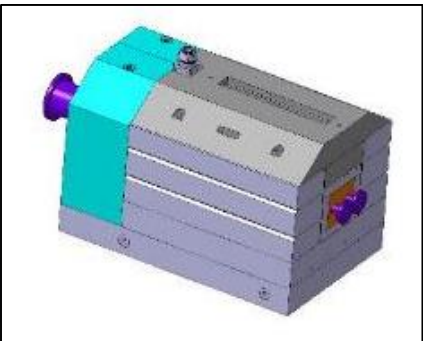
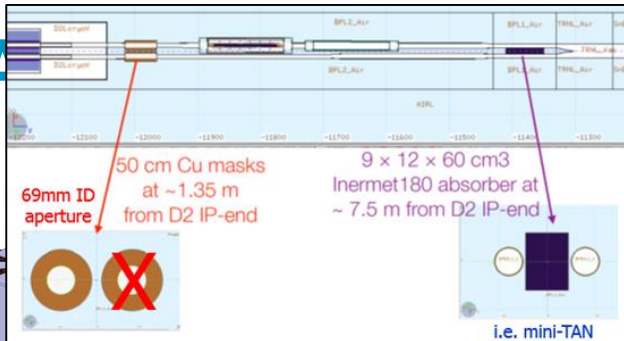


in Point 8 with
(right)



P8 TANB Left section configuration to be installed during Q2 2019

TAN



10/2018

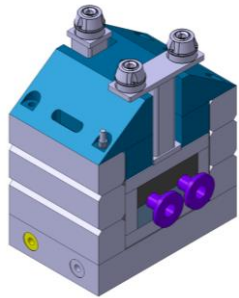
Conceptual design
Based on a smaller TAN
(P1 and P5) like absorber

F. Cerutti

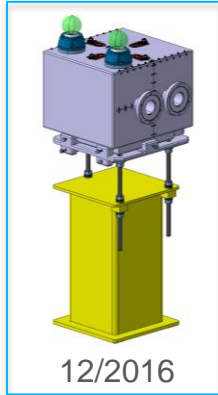


TANB Neutral Absorber development

From concept to final design



09/2016



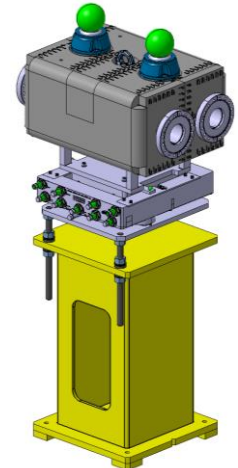
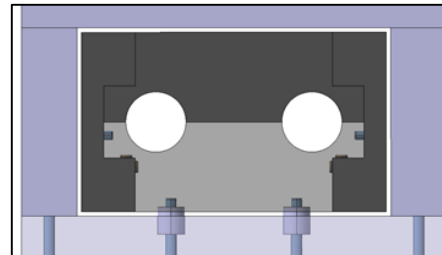
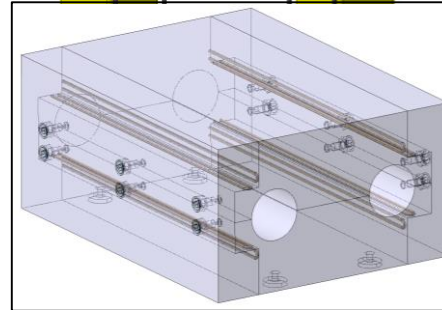
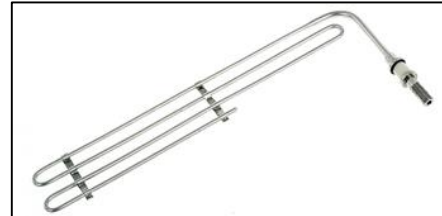
12/2016



04/2017

07/2017

Definition of sections and interfaces according to studies on the Thermocoax bakeout solution, separation of SS shield and functional specifications. Division of absorber in 4 blocks



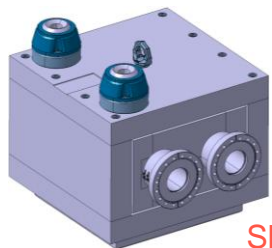
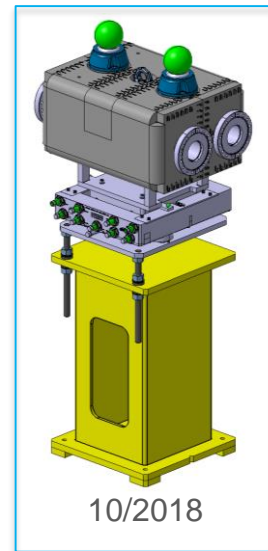
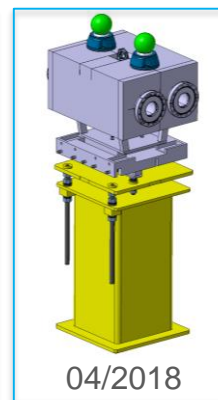
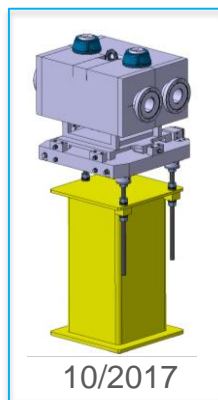
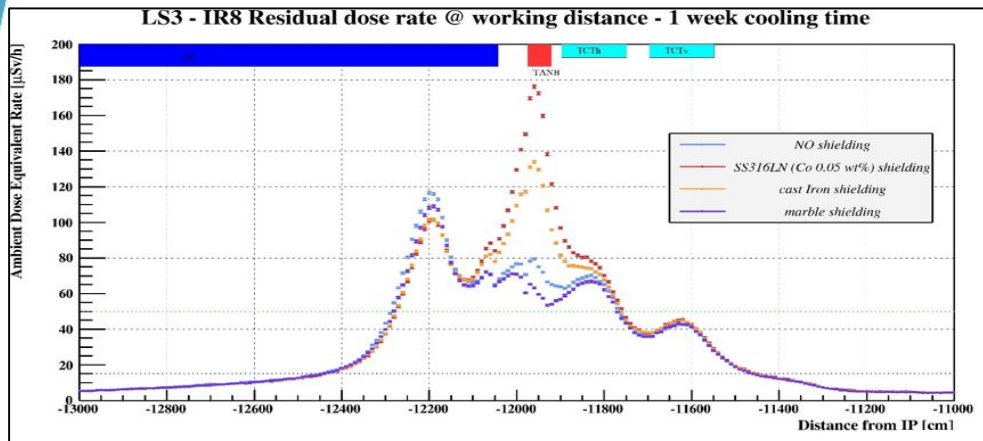
10/2018

77th Hilumi TCC, Progress on TANB installation

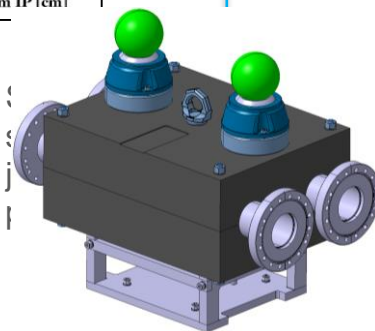
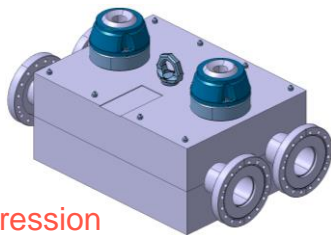
TANB Neutral Absorber development

From concept to final design

Courtesy of C. Adorisio

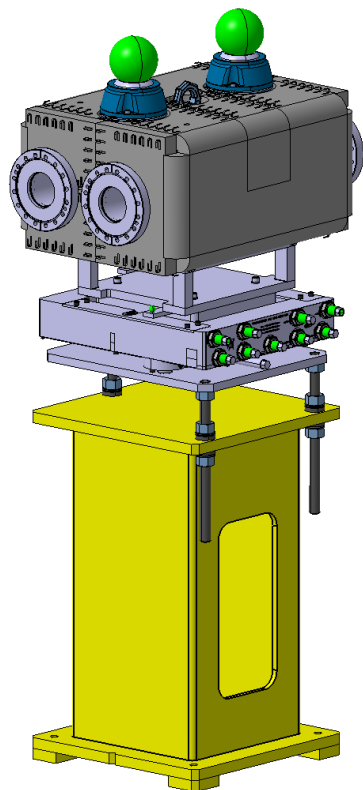


Shielding suppression



ATE integration
and bakeout
chambers
Final Design. Bakeout jacket
design Production drawings
WEPLATE, Interfaces and
support details finalized
dimensions fixed

TANB Neutral Absorber



TANB.4L8 ST0839850_01

ASSEMBLY	SUB-ASSEMBLY	COMPONENT
TANB	Vacuum chambers	VCRLV
		Copper Foil 500mmx211mmx0.1mm
	Absorbers	Absorber Upper section
		Absorber Lower section
		Threaded Rod M12
		Ecrou H style1 grade A M12
		Conical Spring Washer M12
		Parallel pin unhardened 12x40
		RUD-VRS-M16
		Reference socket cup
		Normal PL washer_6x12
		Vis CHC_M6x35
		Vis CHC_M8x70
		Spring Lock Washer M08 (GROWER)
		Interface supports
	Interface support connecting bars	
	Interface support plate	
	Vis CHC_M8x20	
	Bakeout Jackets	Spring Lock Washer M08 (GROWER)
		Heating Jacket TANB LSS8 Part1
		Heating Jacket TANB LSS8 Part2
	TANB Support	Thermocouples
		TANB Support Pillar
		Tige filetee M20x1.5 l=440
		Ecrou H style1 grade A M20
		SPHERICAL WASHER M20 DIN 6319 C
		CONICAL SEAT WASHER M20 DIN 6319D
M12x110mm CHEMICAL ANCHOR		
NORMAL PL WASHER 12X24		
TANB Support Template		
TANB Alignment plate	Alignment Plate User Interface	
	Alignment Plate	

TANB Full assembly dimensions [mm]

Length (flange to flange)	605
Width (with bakeout jacket)	400
Hight (beam chambers aligned)	1230

TANB Full Assembly weight [kg]

670

3 main sub-assemblies

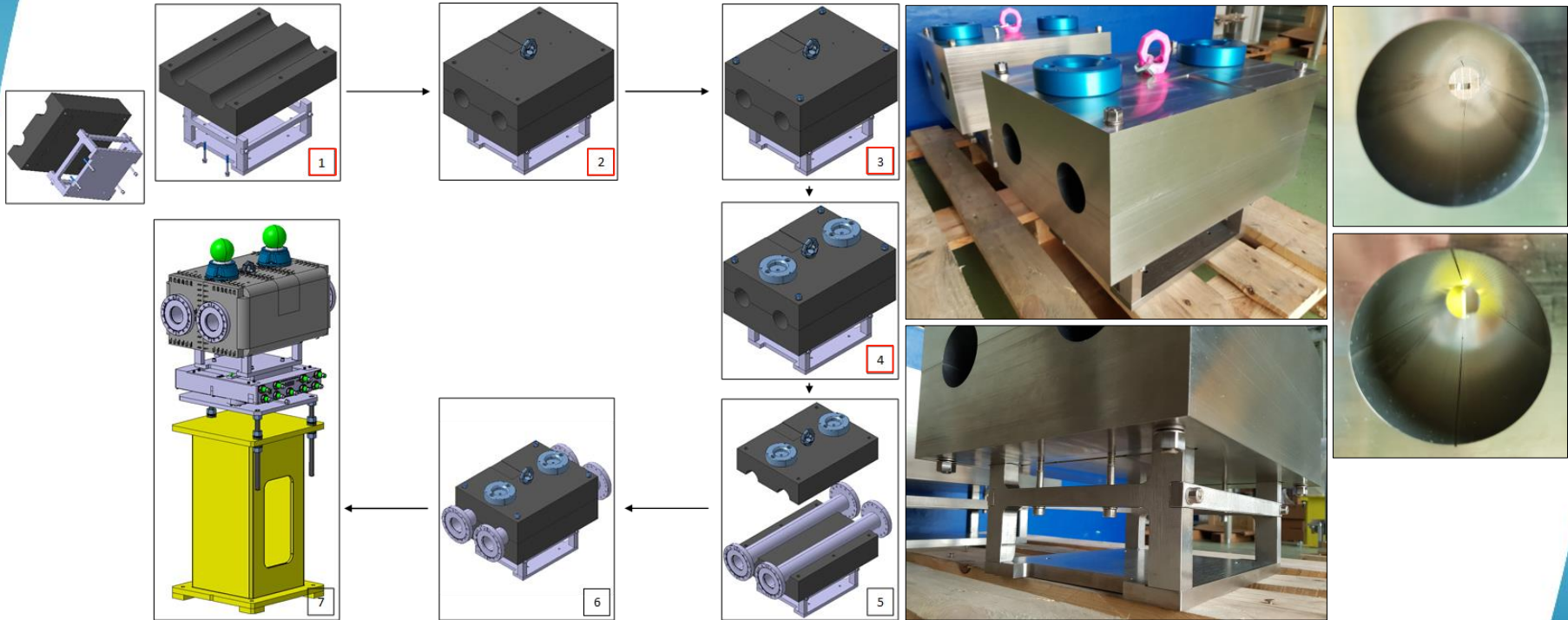
30 components + WEPLATE

TANB.4L8 – Left side of IP8

TANB.4R8 – Right side of IP8

TANB Neutral Absorber

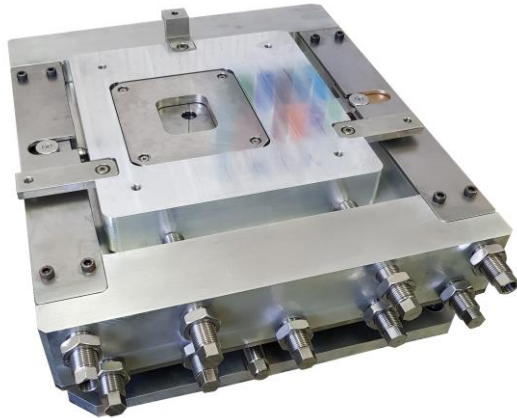
TANB Absorber assembly



WEPLATE

Overview

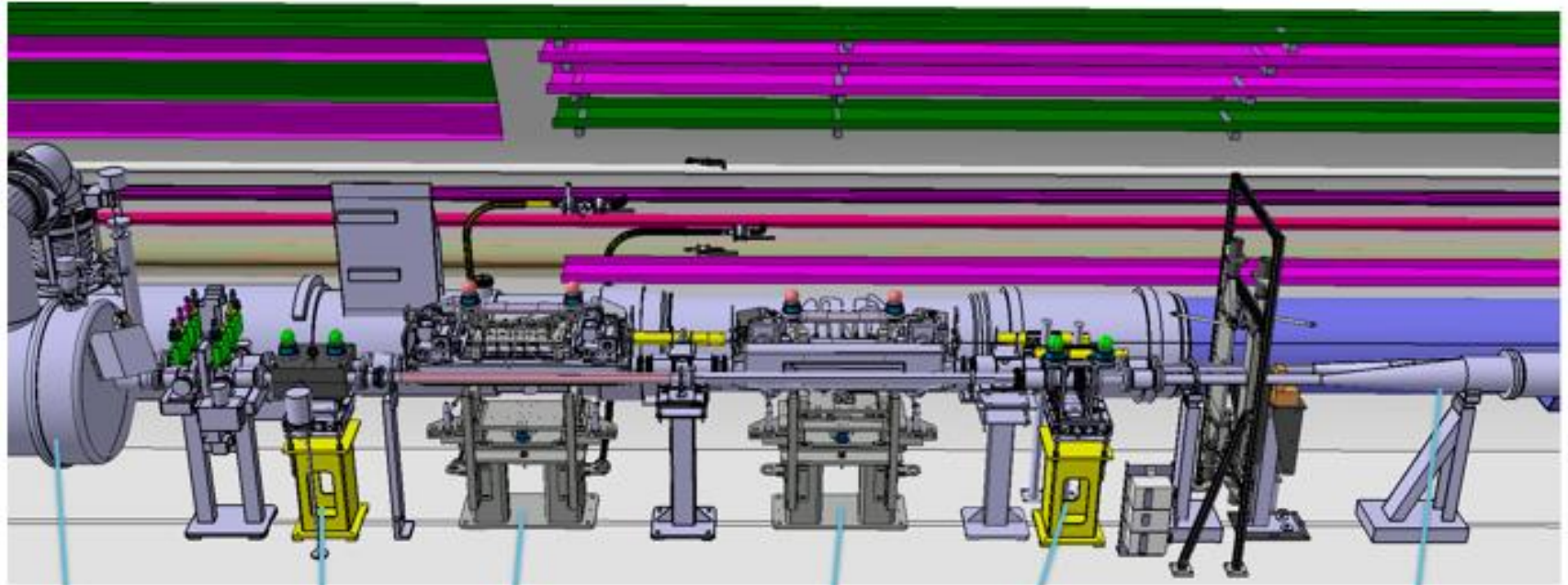
- **WePlatE Platform design completed, tested and validated**
- 4 platforms to be installed during LS2 in the LSSL8 and LSSR8 for 2 different equipments
 - 6DOF manually operated
 - Full locking
 - Independent axis movements
 - Displacement range:
 - Beam (X) : +/-10mm, 0.4mm p/turn
 - Radial (Z) : +/-25mm, 1.5mm p/turn
 - Vertical (Y) : +/-6mm, 0.28mm, p/turn
 - Roll, Pitch and Yaw: : >>14mrad
 - Repeatability $\leq 0.2\text{mm}$
 - Service load 750kg (designed for TANB)
 - Radiation compliant (no lubrication, mainly aluminum construction)
 - Standardized bolts heads
 - User interface instructions on the platform (laser engraved plate)



Run2 configuration



Run3 configuration



D2

TANB

TCTPH

TCTPV

BPMs

Y-chamber

Completed tasks

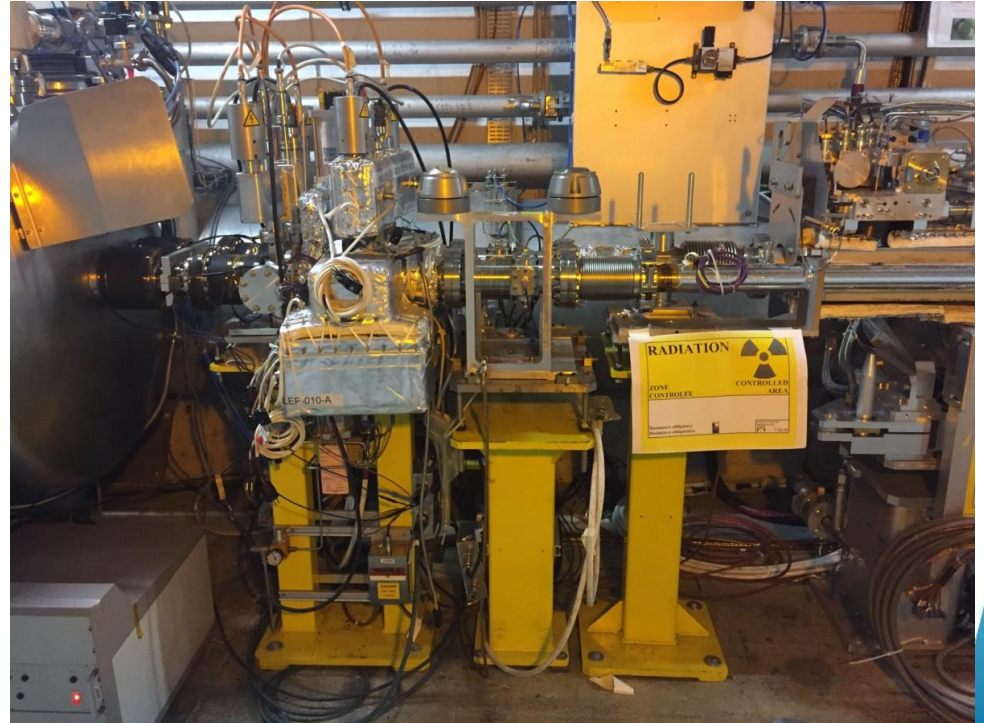
% Complete	Task Name	Duration	Start	Finish	Groups involved	Responsible	Required
90%	TANB Neutral Absorber at LHC	267 d	06-08-18	13-08-19			
99%	1 TANB Production	231 d	06-08-18	24-06-19			
100%	1.1 Procurement of components	205 d	06-08-18	17-05-19			
100%	1.1.1 Alignment Plates for TANB and Beam Position Monitor (BPM)	175 d	06-08-18	05-04-19			
100%	1.1.2 TANB Absorber	155 d	04-09-18	08-04-19			
100%	1.1.3 Vacuum Chambers, Modules, Components, Sector Valves and Supports	180 d	10-09-18	17-05-19			
100%	1.1.4 TANB and BPM Supports	80 d	17-12-18	05-04-19			
100%	1.1.5 TANB and BPM Interface Support	73 d	12-12-18	22-03-19			
100%	1.1.6 Bake out jackets	70 d	26-11-18	01-03-19			
71%	1.2 Testing	56 d	08-04-19	24-06-19			
100%	1.2.1 Mechanical tests of alignment plates	17 d	08-04-19	30-04-19	WP8	M.Santos	
100%	1.2.2 Stability tests of alignment plates	7 d	02-05-19	10-05-19	EN-SMM	J.Fuchs	M.Santos
100%	1.2.3 BPM supports assembly tests	1 d	15-05-19	15-05-19	WP8,BE-BI	M.Krupa	M.Santos
100%	1.3 Assembly of BPM supports and TANB in B186	8 d	15-05-19	24-05-19			
100%	1.3.1 BPMs supports arrival at B186	0 d	15-05-19	15-05-19	BE-BI	M.Krupa	M.Santos
100%	1.3.2 Assembly of all the parts of TANB	1 d	24-05-19	24-05-19	WP8,EN-HE,TE-VSC	M.Santos	J.Grenard,N.Zelko
10%	2 Right TANB Installation in A4R8 of section RA87	73 d	22-04-19	31-07-19			
100%	2.1 EN-EL Previous works	1 d	22-04-19	22-04-19			
100%	2.1.1 Displacement of electrical box	4 h	22-04-19	22-04-19	EN-EL	P.Santos	Y.Maurer,N.Latif
100%	2.1.2 Rerouting of cabling	4 h	22-04-19	22-04-19	EN-EL	P.Santos	Y.Maurer,N.Latif
100%	2.2 Other previous works	0 d	22-05-19	22-05-19			
100%	2.2.1 Beam Loss Monitor (BLM) deinstallation	0 d	22-05-19	22-05-19	BE-BI	C.Zamantzas	
100%	2.3 Vacuum venting and removal	3 d	20-05-19	22-05-19			
100%	2.3.1 Vacuum venting and removal	3 d	20-05-19	22-05-19	TE-VSC	E.Page	
43%	2.4 BPM deinstallation	14 d	29-05-19	17-06-19			
100%	2.4.1 Removal of BPMs	2 h	29-05-19	29-05-19	BE-BI	C.Boccard,M.Krupa	
100%	2.4.2 Removal of support	4 h	05-06-19	05-06-19	BE-BI	C.Boccard,M.Krupa	
8%	3 Left TANB Installation in A4L8 of section RA83	82 d	22-04-19	13-08-19			
100%	3.1 EN-EL Previous works	26 d	22-04-19	27-05-19			
100%	3.1.1 Displacement of electrical boxes	4 h	22-04-19	22-04-19	EN-EL	P.Santos	Y.Maurer,N.Latif
100%	3.1.2 Dismounting of electrical boxes	4 h	27-05-19	27-05-19	EN-EL	P.Santos	Y.Maurer,N.Latif
100%	3.2 Other previous works	10 d	08-05-19	22-05-19			
100%	3.2.1 Deinstallation of the existing PMIL	0 d	08-05-19	08-05-19	HSE-RP	C.Adorasio	
100%	3.2.2 Beam Loss Monitor (BLM) deinstallation	0 d	22-05-19	22-05-19	BE-BI	C.Zamantzas	
100%	3.3 Vacuum venting and removal	2 d	23-05-19	24-05-19			
100%	3.3.1 Vacuum venting and removal	2 d	23-05-19	24-05-19	TE-VSC	E.Page	
43%	3.4 BPM deinstallation	14 d	29-05-19	17-06-19			
100%	3.4.1 Removal of BPMs	2 h	29-05-19	29-05-19	BE-BI	C.Boccard,M.Krupa	
100%	3.4.2 Removal of support	4 h	05-06-19	05-06-19	BE-BI	C.Boccard,M.Krupa	

LEFT SIDE: PMIL
BEFORE



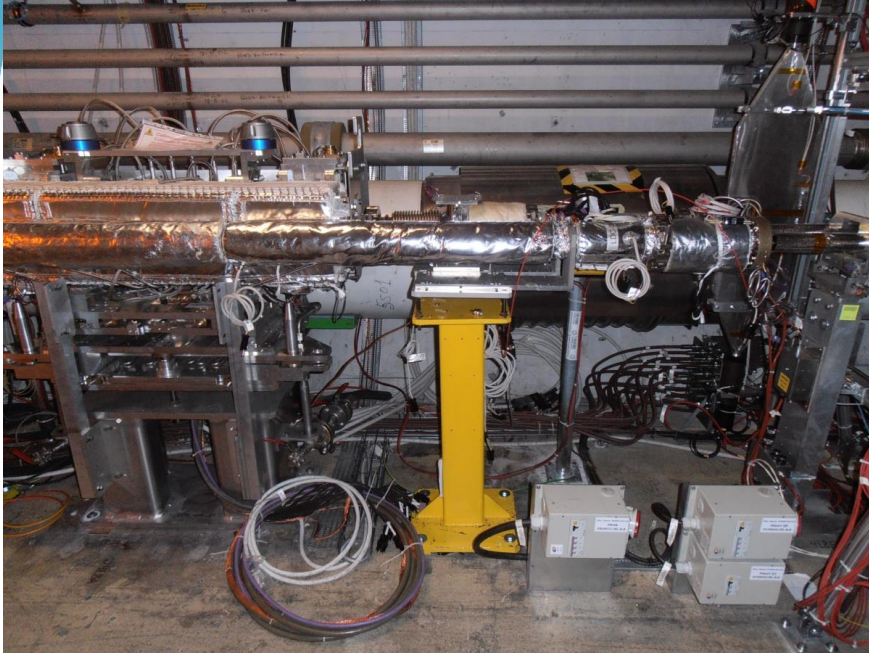
Status

AFTER

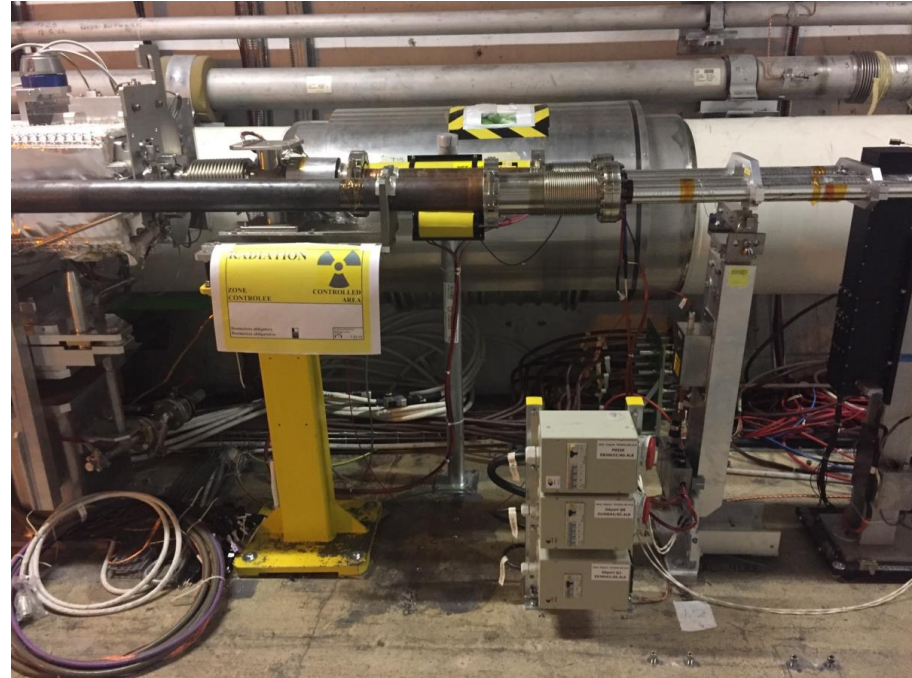


Status

LEFT SIDE: ELECTRICAL BOXES
BEFORE



AFTER

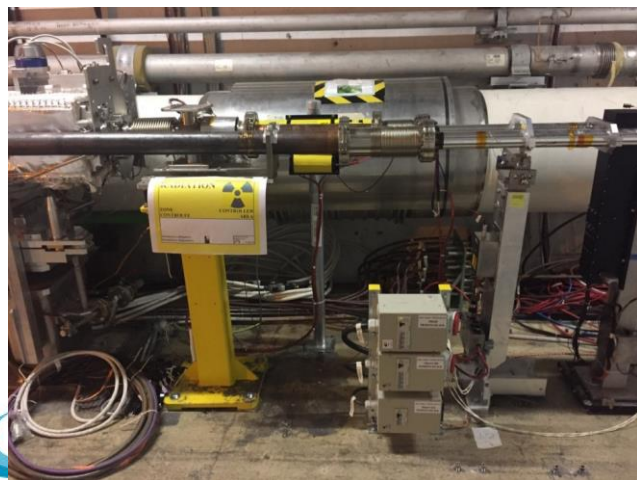
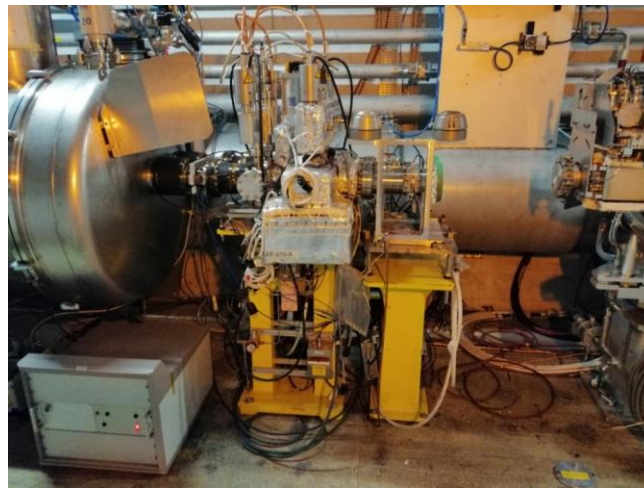


LEFT SIDE: VACUUM COMPONENTS

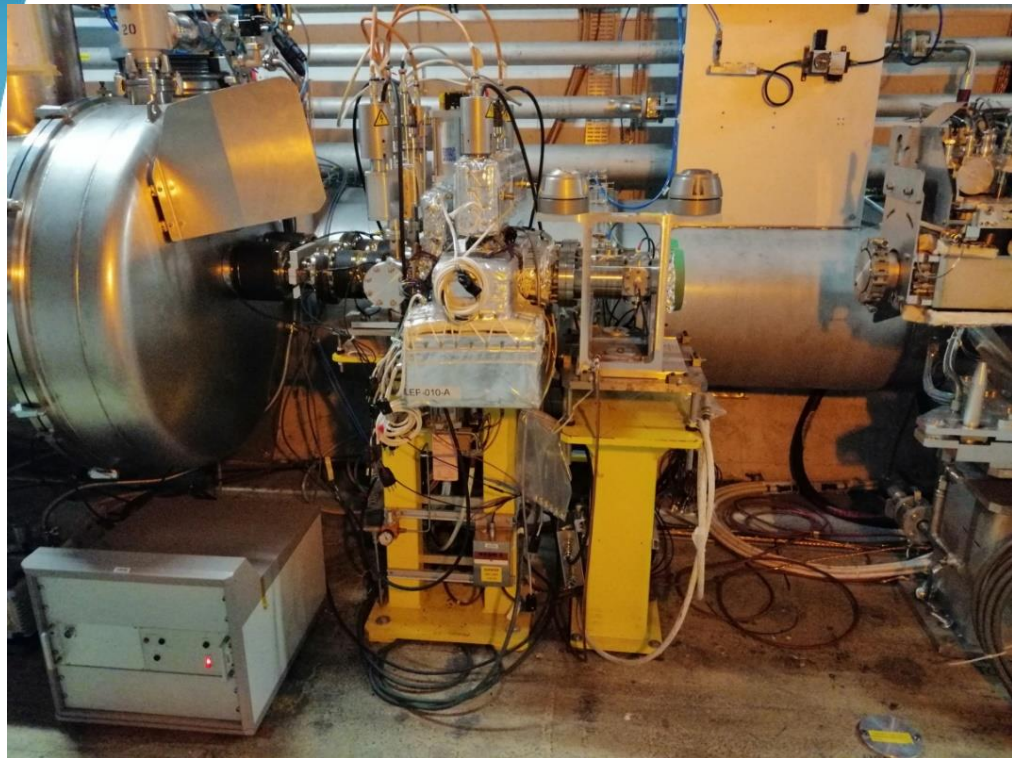
Status

AFTER

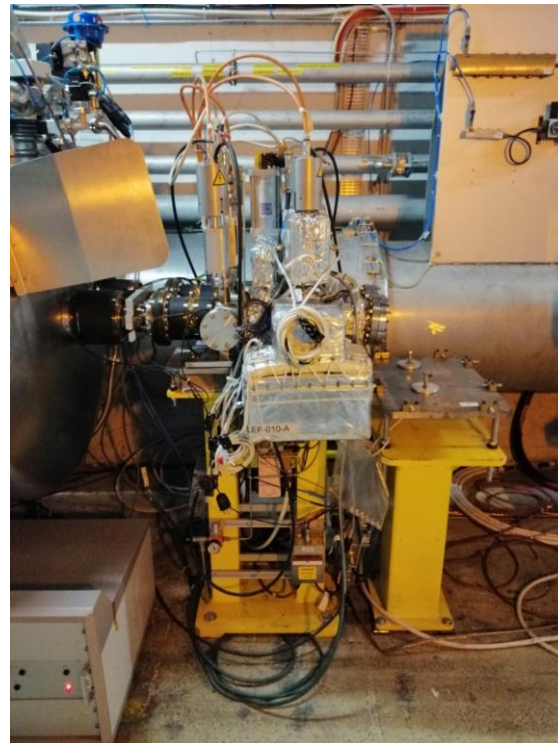
BEFORE



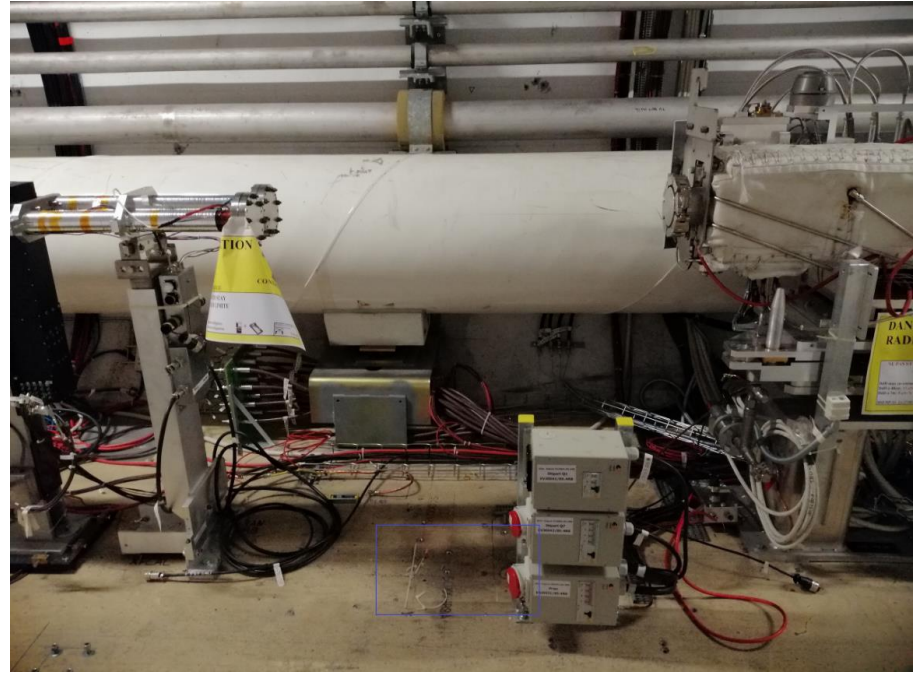
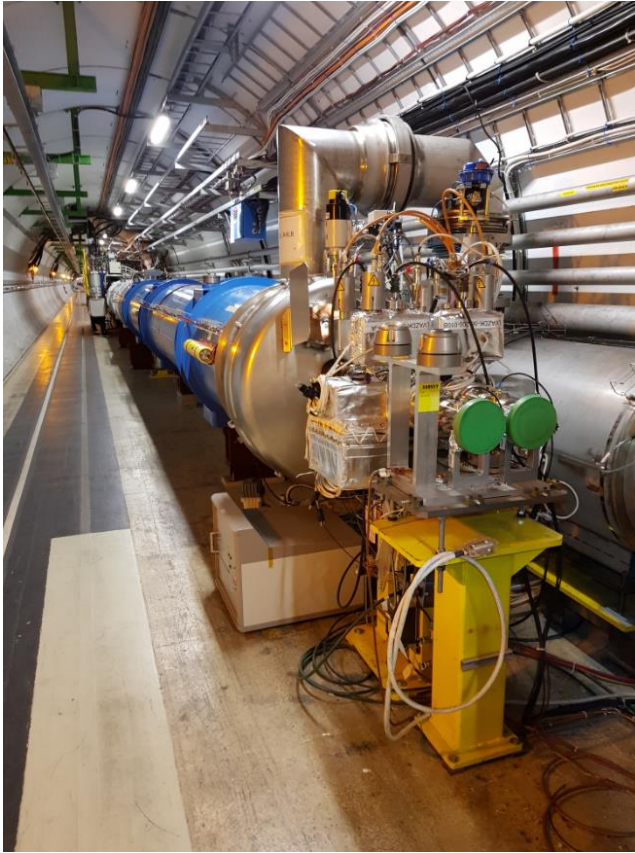
LEFT SIDE: BPM
BEFORE



AFTER



Status



Foreseen tasks (weeks 24&25)

% Con	Task Name	Durat	Start	Finish	Groups involved	Responsible	Required
90%	▲ TANB Neutral Absorber at LHC	267 d	06-08-18	13-08-19			
99%	▲ 1 TANB Production	231 d	06-08-18	24-06-19			
71%	▲ 1.2 Testing	56 d	08-04-19	24-06-19			
0%	1.2.4 TANB Alignment Tests and fiducialisation	10 d	11-06-19	24-06-19	WP8,TE-VSC,EN-SMM	M.Santos/J.Fuchs	E.Page/C.Boccard
10%	▲ 2 Right TANB Installation in A4R8 of section RA87	73 d	22-04-19	31-07-19			
43%	▲ 2.4 BPM deinstallation	14 d	29-05-19	17-06-19			
0%	2.4.3 Input from metrology lab for fiducialisation	0 h	17-06-19	17-06-19	BE-BI	C.Boccard,M.Krupa	
0%	2.4.4 BPMs fiducialisation and installation in its alignment table on workshop	1 d	17-06-19	17-06-19	BE-BI,EN-SMM	C.Boccard,M.Krupa/J.	
0%	▲ 2.5 Marking	3 d	07-06-19	12-06-19			
0%	2.5.1 Input from Database Layout	0 d	07-06-19	07-06-19			
0%	2.5.2 DCUM marking on the floor	4 h	12-06-19	12-06-19	EN-SMM	J.Fuchs	
0%	2.5.3 Marking of TANB and BPM's equipment on the floor	4 h	12-06-19	12-06-19	EN-SMM	J.Fuchs	
0%	▲ 2.6 Drilling	1 d	14-06-19	14-06-19			
0%	2.6.1 Drilling of TANB holes in the tunnel	1 d	14-06-19	14-06-19	WP8,EN-ACE	WP8	M.Arnaud
0%	2.6.2 Drilling of BPMs holes in the tunnel	1 d	14-06-19	14-06-19	WP8,EN-ACE	WP8	M.Arnaud
8%	▲ 3 Left TANB Installation in A4L8 of section RA83	82 d	22-04-19	13-08-19			
43%	▲ 3.4 BPM deinstallation	14 d	29-05-19	17-06-19			
0%	3.4.3 Input from metrology lab for fiducialisation	0 h	17-06-19	17-06-19	BE-BI	C.Boccard,M.Krupa	
0%	3.4.4 BPMs fiducialisation and installation in its alignment table on workshop	1 d	17-06-19	17-06-19	BE-BI	C.Boccard,M.Krupa	
0%	▲ 3.5 Marking	1 d	13-06-19	13-06-19			
0%	3.5.1 DCUM marking on the floor	4 h	13-06-19	13-06-19	EN-SMM	J.Fuchs	
0%	3.5.2 Marking of TANB and BPM's holes on the floor	4 h	13-06-19	13-06-19	EN-SMM	J.Fuchs	
0%	▲ 3.6 Drilling	1 d	14-06-19	14-06-19			
0%	3.6.1 Drilling of TANB holes in the tunnel	1 d	14-06-19	14-06-19	WP8,EN-ACE	WP8	M.Arnaud
0%	3.6.2 Drilling of BPMs holes in the tunnel	1 d	14-06-19	14-06-19	WP8,EN-ACE	WP8	M.Arnaud

TANB installation dates

% Con	Task Name	Durat	Start	Finish	Groups involved	Responsible	Required
90%	▲ TANB Neutral Absorber at LHC	267 d	06-08-18	13-08-19			
10%	▲ 2 Right TANB Installation in A4R8 of section RA87	73 d	22-04-19	31-07-19			
0%	▲ 2.9 TANB Neutral Absorber installation	9 d	25-06-19	05-07-19			
0%	2.9.1 TANB Support installation	3 d	25-06-19	27-06-19	WP8,EN-HE	M.Santos	J.Grenard
0%	2.9.2 TANB Alignment plate installation and survey	3 d	28-06-19	02-07-19	WP8,EN-HE,EN-SMM	M.Santos	J.Grenard, J.Fuchs
0%	2.9.3 TANB Absorber installation	3 d	03-07-19	05-07-19	WP8,EN-HE	M.Santos	J.Grenard
8%	▲ 3 Left TANB Installation in A4L8 of section RA83	82 d	22-04-19	13-08-19			
0%	▲ 3.8 TANB Neutral Absorber installation	9 d	08-07-19	18-07-19			
0%	3.8.1 TANB Support installation	3 d	08-07-19	10-07-19	WP8,EN-HE	M.Santos	J.Grenard
0%	3.8.2 TANB Alignment plate installation and survey	3 d	11-07-19	15-07-19	WP8,EN-SMM,EN-HE	M.Santos	J.Grenard, J.Fuchs
0%	3.8.3 TANB Absorber installation	3 d	16-07-19	18-07-19	WP8,EN-HE	M.Santos	J.Grenard

Conclusions

Activities progressing according to schedule:

- Dismantling finished

- Currently leaning & marking on the floor

Next steps: Fiducialisation, marking on floor

Installation foreseen week 29, end week 34

So far, so good...