ProtoDUNE-DP construction Schedule update

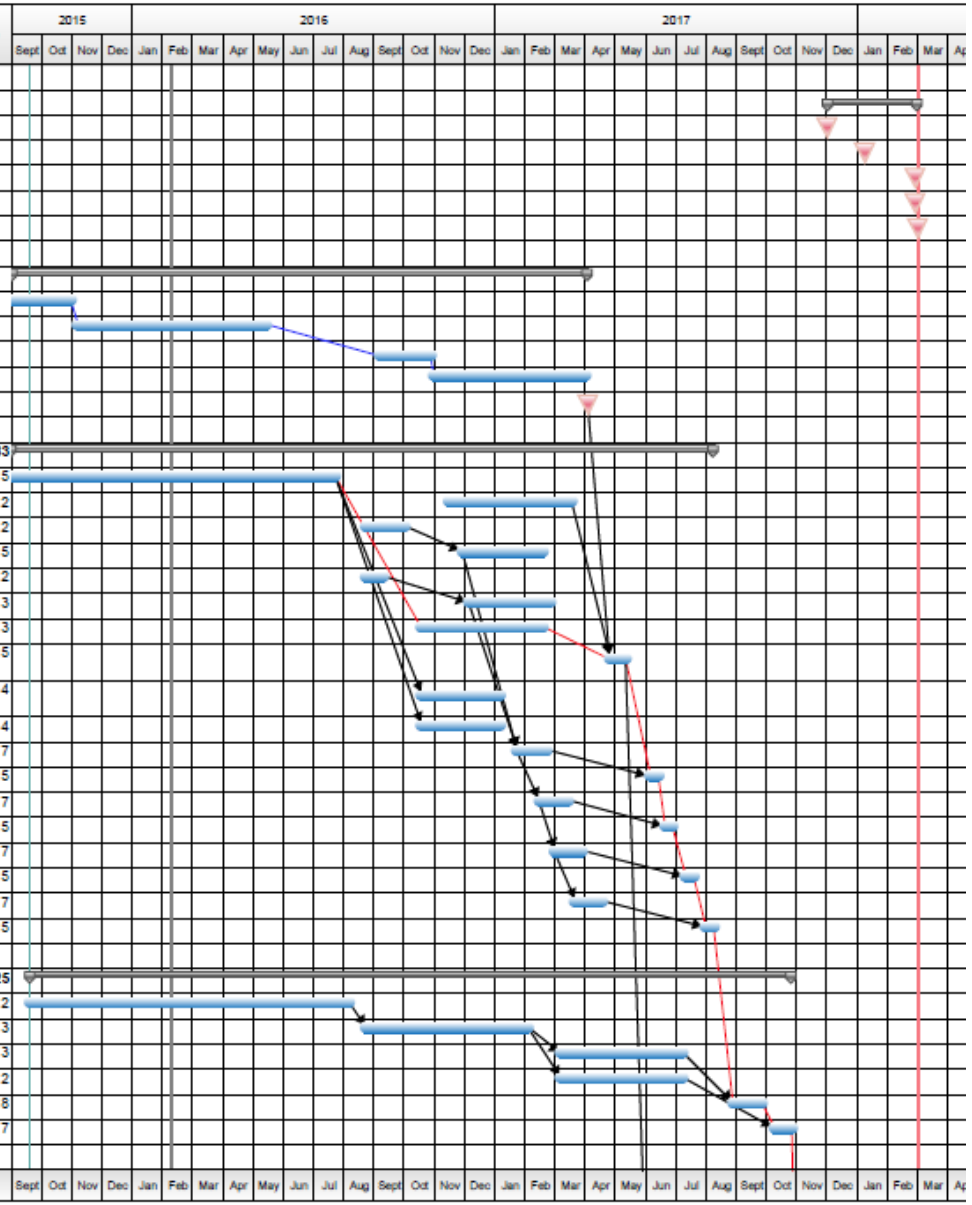
D. Duchesneau / S. Murphy

- The general construction and installation schedule has been revised
- The last official schedule was issued on August 2nd 2016
- The outcome was to seal the TCO on Dec 1st 2017

Technical Board 15/03/2017

Previous schedule: Planning_666_V4 Aug 2 2016

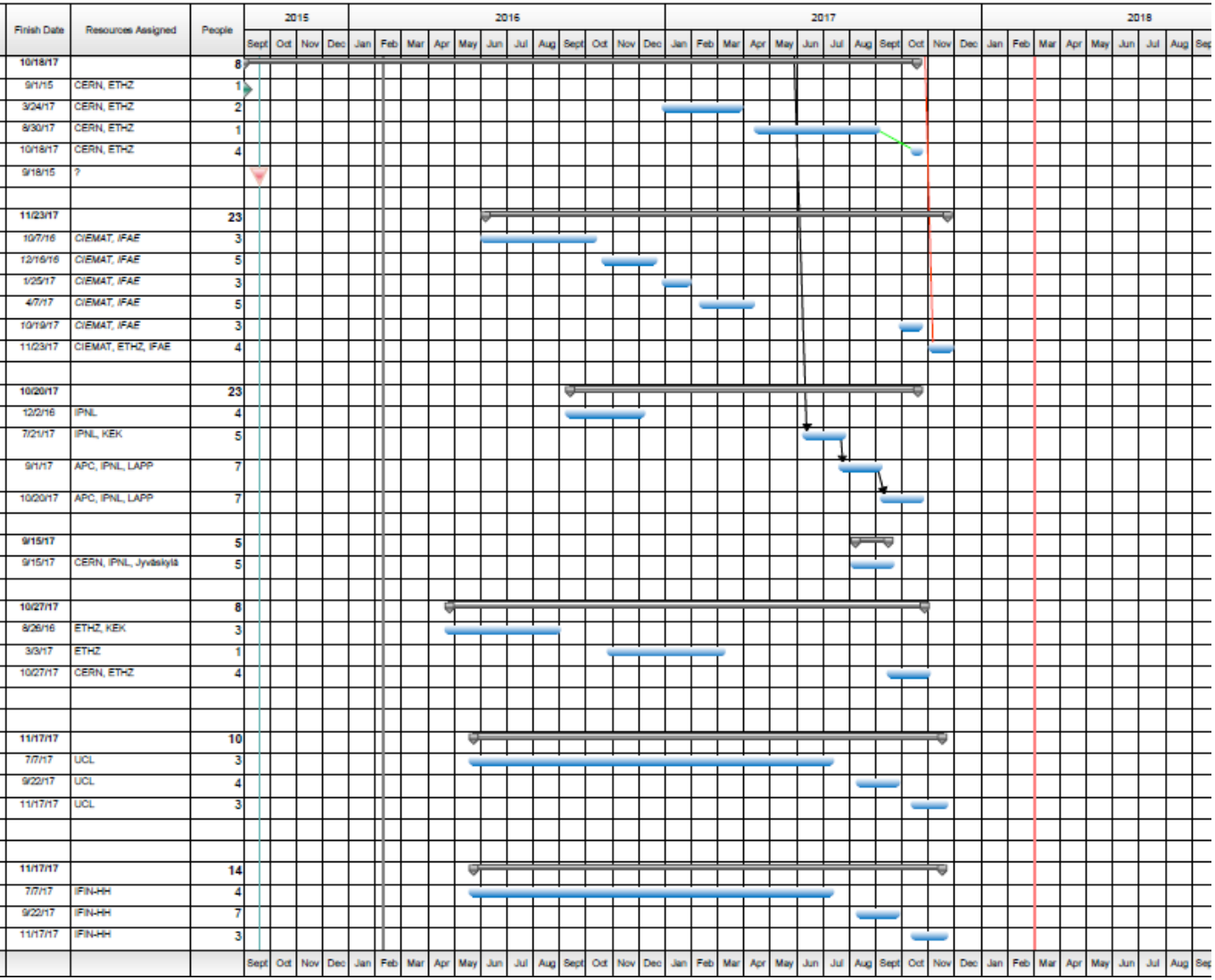
	Activity Name	Duration (Days)	Start Date	Finish Date	Resources Assigned	People
1	**WA666 v4 8/2/16 / AR**					
2	**Detector Comissioning EHN1**	64.00	12/1/17	3/1/18		
3	*Ready to seal TCO & cryostat*	0.00	12/1/17	12/1/17		
4	*Start of cryogenic operation*	0.00	1/8/18	1/8/18		
5	*LAr purity achieved in side cryostat*	0.00	2/26/18	2/26/18		
6	*Cosmic tracks recorded*	0.00	2/26/18	2/26/18		
7	*Ready for beam*	0.00	3/1/18	3/1/18		
8						
9	**EHN1 cryostat activities**	**414.00**	**9/1/15**	**4/3/17**		
10	*Cold vessel specification*	44.00	9/1/15	10/30/15		
11	*GTT study*	136.00	11/5/15	5/13/16		
12	*Warm vessel assembly*	39.30	9/5/16	10/28/16		
13	*Membrane construction*	110.00	10/31/16	3/31/17		
14	*Cryostat ready for detector installation*	0.00	4/3/17	4/3/17		
15						
16	**Charge readout system**	507.00	8/31/15	8/8/17		83
17	*Design of CRP*	235.00	8/31/15	7/22/16	ETHZ, IRFU, LAPP	5
18	*Signal chimneys + flanges procurement*	90.00	11/14/16	3/17/17	ETHZ	2
19	*LEM procurement market survey*	30.00	8/22/16	9/30/16	ETHZ, IRFU	2
20	*no. 144 LEM procurement*	60.00	11/28/16	2/17/17	ETHZ, IRFU	5
21	*Anode procurement market survey*	15.00	8/22/16	9/9/16	ETHZ, IRFU	2
22	*no. 144 Anode procurement*	60.00	12/5/16	2/24/17	ETHZ, IRFU	3
23	*Procurement CRP hanging system*	90.00	10/17/16	2/17/17	ETHZ, LAPP	3
24	*Installation feedthrough towers in chimneys + CRP hanging systems*	14.00	4/24/17	5/11/17	CERN, ETHZ, KEK	5
25	*Extraction grid preparation (no. 4000 wires)*	60.00	10/17/16	1/6/17	ETHZ, LAPP	4
26	*CRP frames procurement*	60.00	10/17/16	1/6/17	ETHZ, LAPP	4
27	*CRP 3x3 #1 module assembly Big 185*	21.00	1/23/17	2/20/17	ETHZ, IRFU, LAPP	7
28	*CRP 3x3 #1 module installation*	7.00	6/5/17	6/13/17	ETHZ, IRFU, LAPP	5
29	*CRP 3x3 #2 module assembly Big 185*	21.00	2/13/17	3/13/17	ETHZ, IRFU, LAPP	7
30	*CRP 3x3 #2 module installation*	7.00	6/19/17	6/27/17	ETHZ, IRFU, LAPP	5
31	*CRP 3x3 #3 module assembly Big 185*	21.00	2/27/17	3/27/17	ETHZ, IRFU, LAPP	7
32	*CRP 3x3 #3 module installation*	7.00	7/10/17	7/18/17	ETHZ, IRFU, LAPP	5
33	*CRP 3x3 #4 module assembly Big 185*	21.00	3/20/17	4/17/17	ETHZ, IRFU, LAPP	7
34	*CRP 3x3 #4 module installation*	7.00	7/31/17	8/8/17	ETHZ, IRFU, LAPP	5
35						
36	**Drift cage**	550.00	9/18/15	10/26/17		25
37	*PMMA/ITO/TPB R&D*	231.00	9/18/15	8/5/16	ETHZ	2
38	*Field cage and anode design*	120.00	8/22/16	2/3/17	CERN, ETHZ	3
39	*Field cage procurement*	90.00	3/6/17	7/7/17	CERN, ETHZ	3
40	*Cathode procurement*	90.00	3/6/17	7/7/17	CERN, ETHZ	2
41	*Field cage assembly*	21.00	8/28/17	9/25/17	CERN, ETHZ	8
42	*Cathode assembly*	14.00	10/9/17	10/26/17	CERN, ETHZ	7
43						



Previous schedule: Planning_666_V4

Aug 2 2016

	Activity Name	Duration (Days)	Start Date	Finish Date	Resources Assigned	People
44	**HV system**	557.00	9/1/15	10/18/17		8
45	*300 kV power supply*	0.00	9/1/15	9/1/15	CERN, ETHZ	1
46	*HVFT design*	60.00	1/2/17	3/24/17	CERN, ETHZ	2
47	*HVFT procurement*	98.00	4/17/17	8/30/17	CERN, ETHZ	1
48	*Installation on detector*	3.00	10/16/17	10/18/17	CERN, ETHZ	4
49	*600 kV power supply*	0.00	9/18/15	9/18/15	?	
50						
51	**Light readout system**	384.00	6/6/16	11/23/17		23
52	*PMT no.36 procurement*	90.00	6/6/16	10/7/16	CIEMAT, IFAE	3
53	*PMT no.36 coating*	40.00	10/24/16	12/16/16	CIEMAT, IFAE	5
54	*PMT base soldering*	18.00	1/2/17	1/25/17	CIEMAT, IFAE	3
55	*PMT testing*	40.00	2/13/17	4/7/17	CIEMAT, IFAE	5
56	*PMT support system*	14.00	10/2/17	10/19/17	CIEMAT, IFAE	3
57	*PMT installation & cabling*	14.00	11/6/17	11/23/17	CIEMAT, ETHZ, IFAE	4
58						
59	**Front-end electronics**	290.00	9/12/16	10/20/17		23
60	*micro-TCA no.12 procurement*	60.00	9/12/16	12/2/16	IPNL	4
61	*F/E electronics installation (insertion of the cards in the chimeneys and cabling)*	30.00	6/12/17	7/21/17	IPNL, KEK	5
62	*micro-TCA installation (installation of the crates, insertion of the cards ad cabling)*	30.00	7/24/17	9/1/17	APC, IPNL, LAPP	7
63	F/E DAQ Commissioning	30.00	9/11/17	10/20/17	APC, IPNL, LAPP	7
64						
65	**Back-end system+network**	30.00	8/7/17	9/15/17		5
66	*computers*	30.00	8/7/17	9/15/17	CERN, IPNL, Jyväskylä	5
67						
68	**Slow control**	395.00	4/25/16	10/27/17		8
69	*HV LEM+anodes power supplies*	90.00	4/25/16	8/26/16	ETHZ, KEK	3
70	*SCFT chimneys + flanges procurement*	90.00	10/31/16	3/3/17	ETHZ	1
71	*Cabling & testing*	30.00	9/18/17	10/27/17	CERN, ETHZ	4
72	*Slow control system*					
73						
74	**Purity monitor**	390.00	5/23/16	11/17/17		10
76	*Design and construction*	295.00	5/23/16	7/7/17	UCL	3
78	*Installation*	30.00	8/14/17	9/22/17	UCL	4
77	*Comissioning*	25.00	10/16/17	11/17/17	UCL	3
78						
79						
80	**Large Area Trigger Counters**	390.00	5/23/16	11/17/17		14
81	*Design and construction*	295.00	5/23/16	7/7/17	IFIN-HH	4
82	*Installation*	30.00	8/14/17	9/22/17	IFIN-HH	7
83	*Comissioning*	25.00	10/16/17	11/17/17	IFIN-HH	3



The updated schedule is based on the following changes and assumptions:

- Delays on various infrastructures have been taken into account
  - Bldg 185 clean room in April 2017
  - end of the cryostat construction in EHN1 in May 2017

- More detailed construction and installation procedures are known for the different parts

- Material orders timescale and delays

- Documents provided for LEM production
- Etc…

(small remark: don't worry some text in French from my Office install => will be changed (just to know for Today: 'jour' == 'day' in english)

This updated schedule focuses mostly on the integration and construction phase

Main lines on the schedule

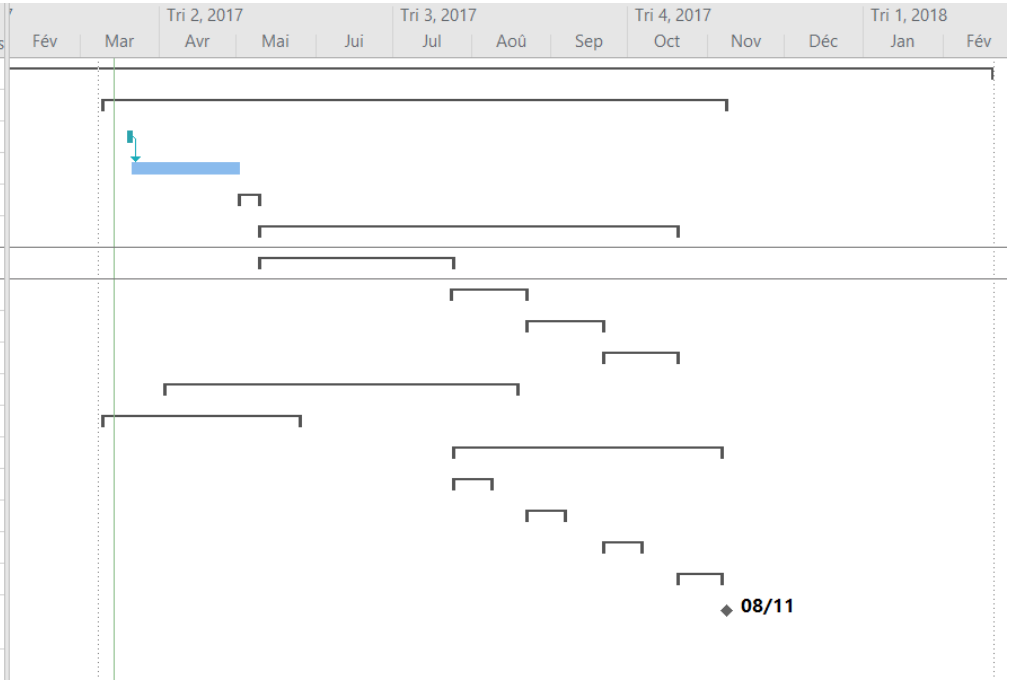
Tasks	start date	end date
ProtoDUNE-DP	**09/01/2017**	**20/02/2018**
CRP Production & Installation	**10/03/2017**	**08/11/2017**
Drift Cage Production and Installation	**01/05/2017**	**15/01/2018**
HV system	**27/11/2017**	**11/12/2017**
PMT and Light Read Out System	**09/01/2017**	**05/02/2018**
Chimneys and feedthroughs	**24/04/2017**	**04/08/2017**
Front End electonics	**11/09/2017**	**01/12/2017**
Slow control	**04/12/2017**	**26/01/2018**
Ground grid installation	05/02/2018	07/02/2018
Purity monitor	**08/01/2018**	**19/02/2018**
Beam plug installation	07/02/2018	14/02/2018
Ready to seal TCO & cryostat	19/02/2018	20/02/2018
Large Area Trigger Counters	**13/11/2017**	**22/12/2017**

CRP Production and Installation

Detailed processes are now included

Example:

Nom de la tâche	Durée	Début	Fin	Prédécesseurs
ProtoDUNE-DP	**281,71 jours?**	**09/01/2017**	**20/02/2018**	
CRP Production & Installation	**173,71 jours**	**10/03/2017**	**08/11/2017**	
CR185 material order	1 jour	20/03/2017	20/03/2017	
Clean Room Material reception	30 jours	21/03/2017	01/05/2017	3
CR185 preparation	**6 jours**	**02/05/2017**	**09/05/2017**	
CRP assembly in CR185	**117,71 jours**	**10/05/2017**	**20/10/2017**	
CRP #1	**54 jours**	**10/05/2017**	**24/07/2017**	
CRP #2	**21,57 jours**	**24/07/2017**	**22/08/2017**	
CRP #3	**21,57 jours**	**22/08/2017**	**21/09/2017**	
CRP #4	**21,57 jours**	**21/09/2017**	**20/10/2017**	
LAS Supply	**100 jours**	**03/04/2017**	**18/08/2017**	
Cryostat preparation	**55 jours**	**10/03/2017**	**25/05/2017**	
CRP installation in the cryostat	**74,71 jours**	**25/07/2017**	**06/11/2017**	
CRP #1 Installation in Cryostat	**11 jours**	**25/07/2017**	**08/08/2017**	
CRP #2 Installation in Cryostat	**11 jours**	**22/08/2017**	**06/09/2017**	
CRP #3 Installation in Cryostat	**11 jours**	**21/09/2017**	**06/10/2017**	
CRP #4 Installation in Cryostat	**11 jours**	**20/10/2017**	**06/11/2017**	
CRP lateral position adjustment (warm conditions)	2 jours	06/11/2017	07/11/2017	172



If one selects this line

CRP #1	**54 jours**	**10/05/2017**	**24/07/2017**	
Parts reception in CR185	1 jour	10/05/2017	10/05/2017	8
Supporting structure assembly	1 jour	11/05/2017	11/05/2017	11
Invar frame on supporting stucture	4 hr	12/05/2017	12/05/2017	12
G10 assembly on optical table	1 jour	11/05/2017	11/05/2017	11
G10 and Invar connection	1 jour	12/05/2017	15/05/2017	13;14
LAS assembly on CRP	4 jours	26/06/2017	29/06/2017	15;78
Instrumentation assembly	2 jours	30/06/2017	03/07/2017	16
Grid weaving	5 jours	04/07/2017	10/07/2017	17
Grid Installation	5 jours	04/07/2017	10/07/2017	17
Planarity tuning	4 jours	11/07/2017	14/07/2017	19
Electrical Tests	5 jours	17/07/2017	21/07/2017	20
Packing in transport box	1 jour	24/07/2017	24/07/2017	21

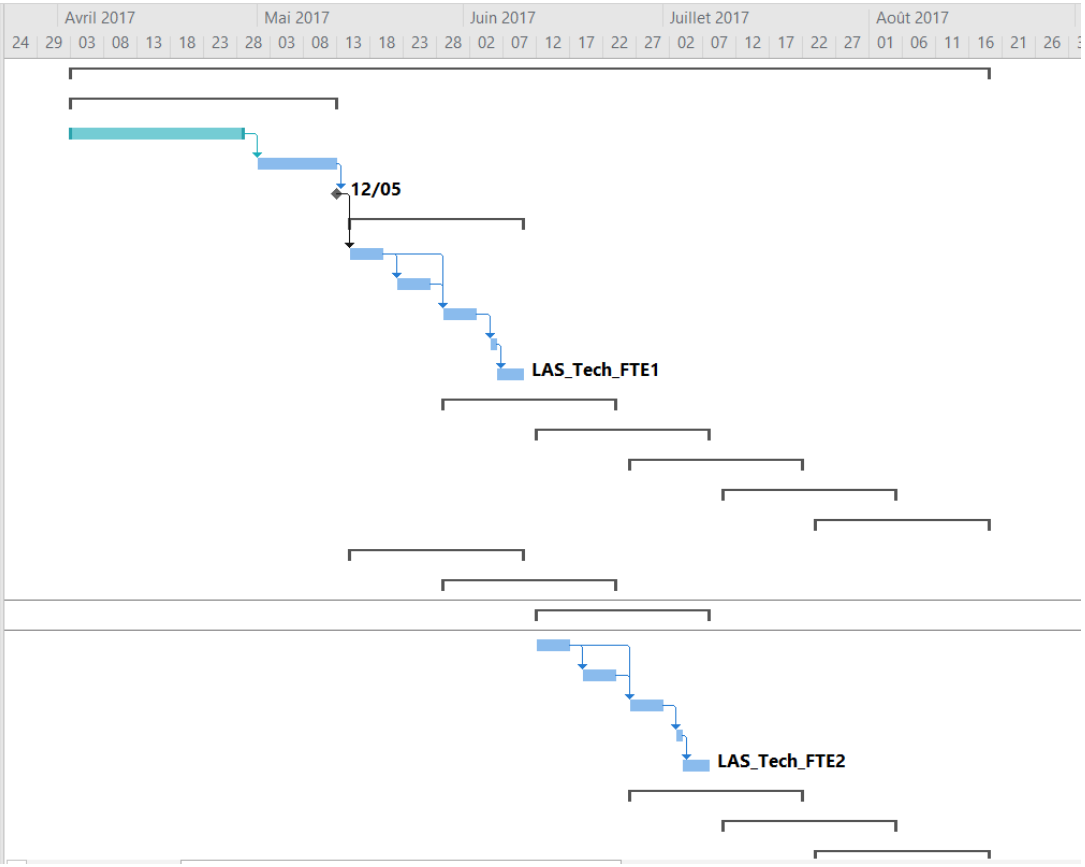
For this line see next slide

LEM Anode Sandwich Production

Dependence on LEM and Anode production

All the timing is based on the LEM tender document provided by CEA

Nom de la tâche	Durée	Début	Fin	Prédécesseurs
LAS Supply	**100 jours**	**03/04/2017**	**18/08/2017**	
LAS Production Validation	**30 jours**	**03/04/2017**	**12/05/2017**	
LEM production (Preserie 6 LEMs)	20 jours	03/04/2017	28/04/2017	
LEM Preserie Tests	10 jours	01/05/2017	12/05/2017	64
LEM Production Validated	0 jour	12/05/2017	12/05/2017	65
12 LAS production	**20 jours**	**15/05/2017**	**09/06/2017**	
6 LEM Batch production	5 jours	15/05/2017	19/05/2017	66
6 LEM Batch production	5 jours	22/05/2017	26/05/2017	68
12 LAS Processing at Saclay	5 jours	29/05/2017	02/06/2017	68;69
12 LAS send to CERN	1 jour	05/06/2017	05/06/2017	70
12 LAS Assembly at CERN	4 jours	06/06/2017	09/06/2017	71
12 LAS production	**20 jours**	**29/05/2017**	**23/06/2017**	
12 LAS production	**20 jours**	**12/06/2017**	**07/07/2017**	
12 LAS production	**20 jours**	**26/06/2017**	**21/07/2017**	
12 LAS production	**20 jours**	**10/07/2017**	**04/08/2017**	
12 LAS production	**20 jours**	**24/07/2017**	**18/08/2017**	
12 LAS production	**20 jours**	**15/05/2017**	**09/06/2017**	
12 LAS production	**20 jours**	**29/05/2017**	**23/06/2017**	
12 LAS production	**20 jours**	**12/06/2017**	**07/07/2017**	
6 LEM Batch production	5 jours	12/06/2017	16/06/2017	111
6 LEM Batch production	5 jours	19/06/2017	23/06/2017	116
12 LAS Processing at Saclay	5 jours	26/06/2017	30/06/2017	116;117
12 LAS send to CERN	1 jour	03/07/2017	03/07/2017	118
12 LAS Assembly at CERN	4 jours	04/07/2017	07/07/2017	119
12 LAS production	**20 jours**	**26/06/2017**	**21/07/2017**	
12 LAS production	**20 jours**	**10/07/2017**	**04/08/2017**	
12 LAS production	**20 jours**	**24/07/2017**	**18/08/2017**	



Crucial items to be interleaved with the CRP mounting sequence in Bldg 185

Drift Cage Production and Installation

ETH **Drift cage assembly** WA10

test assembly in UTA:
mechanics:
24 modules, 6 per month, 2FTE 4 months may to September
Shipping dismounted modules mid-september
electronics:
PCB production + testing in cold, 1 FTE 4 months
->Shipping October

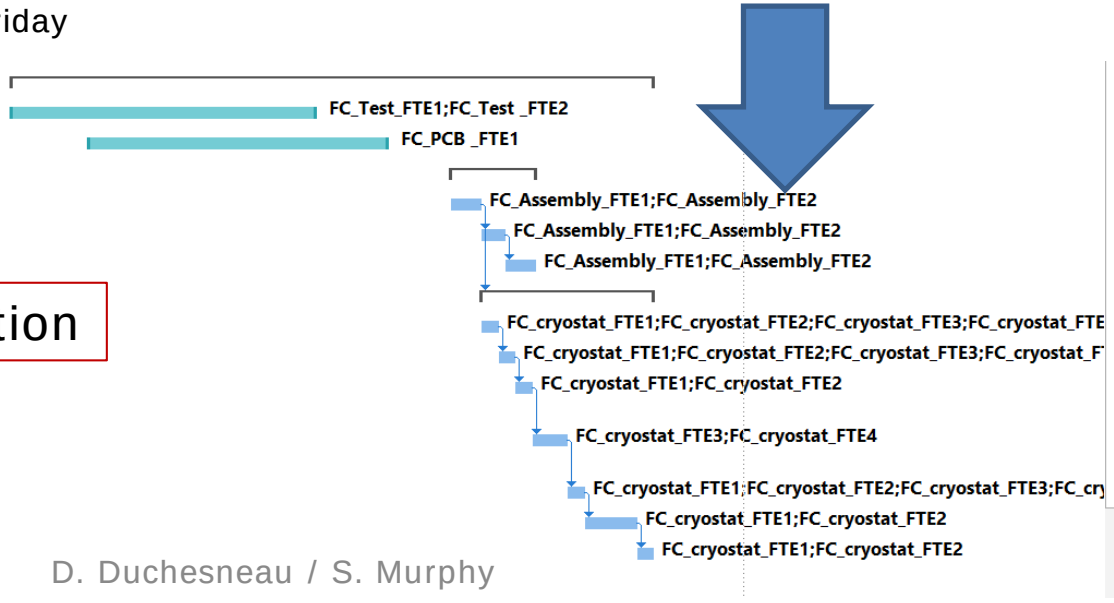
Assembly in CRB 2 FTE
1 module per day 2 FTE. 24 modules->**24 days with 2 FTE**

Installation in cryostat 4 FTE (can be parallelised with assembly in CRB)
bring inside, put in place hook and lift. 2 people bottom, 2 people top.
-1 week for lifting 8 submodules (1 row) 4 FTE
-1 week for lifting the next 8 submodules (2nd row) 4FTE
-1 week for fixing clips + contacting divider (2 scissor lifts with one person on each side drift cage) 2 FTE
-2 weeks to bring and install cathode + GND grid 4FTE?
-1 week for installing last row 4 FTE
-1 week for fixing clips + electronics on last row 4 FTE
-1 week HVFT + degraders 2 FTE?
-1 week beam plug 2 FTE?
=>Total installation in cryostat 9 weeks 4 FTE in average

Sebastien Murphy ETHZ 13

Drift Cage Production and Installation	**175,71 jours**	**01/05/2017**	**15/01/2018**
Mechanical Test assembly in UTA	89 jours	01/05/2017	31/08/2017
PCB production and testing in cold	87 jours	01/06/2017	29/09/2017
Assembly in CRB	**24 jours**	**25/10/2017**	**28/11/2017**
First 8 submodules	8 jours	25/10/2017	06/11/2017
Second 8 submodules	8 jours	06/11/2017	16/11/2017
Third 8 submodules	8 jours	16/11/2017	28/11/2017
Installation in cryostat	**40 jours**	**06/11/2017**	**15/01/2018**
Lifting First 8 submodules	5 jours	06/11/2017	13/11/2017
Lifting Second 8 submodules	5 jours	13/11/2017	20/11/2017
Fix clips and contacting dividers and reinforcements	5 jours	20/11/2017	27/11/2017
Bring and install cathode and GND grid	10 jours	27/11/2017	11/12/2017
Instal last 8 submodules	5 jours	11/12/2017	18/12/2017
Fix clips and electronics on last row	5 jours	18/12/2017	08/01/2018
HVFT and degraders	5 jours	08/01/2018	15/01/2018

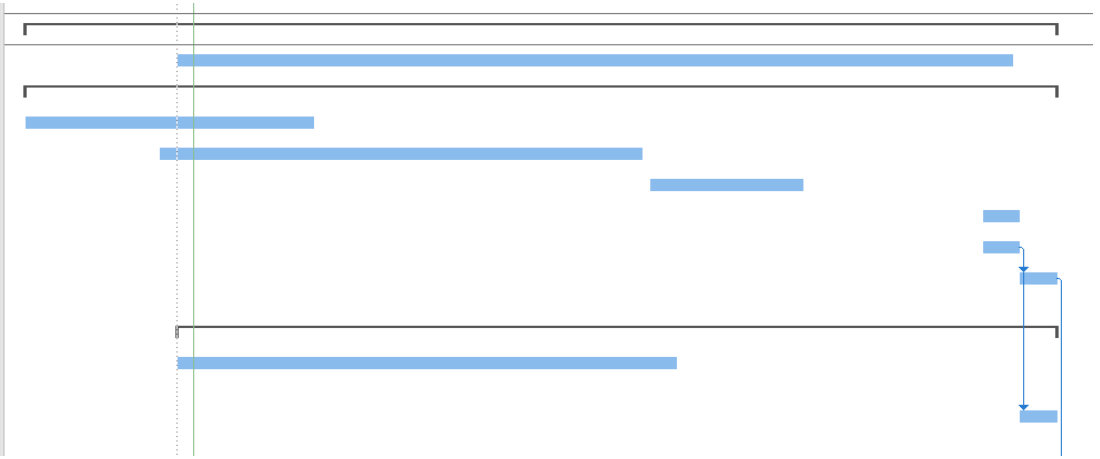
From Jae, Adamo and Sebastien last Friday



Example of work integration

Light Readout System

PMT and Light Read Out System	**270,71 jours?**	**09/01/2017**	**05/02/2018**	
LRO electronics	218 jours	08/03/2017	19/01/2018	
PMTs preparation and installation	**270,71 jours?**	**09/01/2017**	**05/02/2018**	
PMT base design and manufacturing	80 jours?	09/01/2017	28/04/2017	
PMTs characterization	132 jours?	01/03/2017	31/08/2017	
TPB coating	42 jours	04/09/2017	31/10/2017	
Splitter tests and installation	10 jours	08/01/2018	22/01/2018	188
PMT support structure	10 jours	08/01/2018	22/01/2018	188
PMT installation in cryostat and cabling	10 jours	22/01/2018	05/02/2018	201
Light calibration system	**228,71 jours**	**08/03/2017**	**05/02/2018**	
fibers, light source tests and procurement	136 jours	08/03/2017	13/09/2017	
Fiber calibration system installation	10 jours	22/01/2018	05/02/2018	201

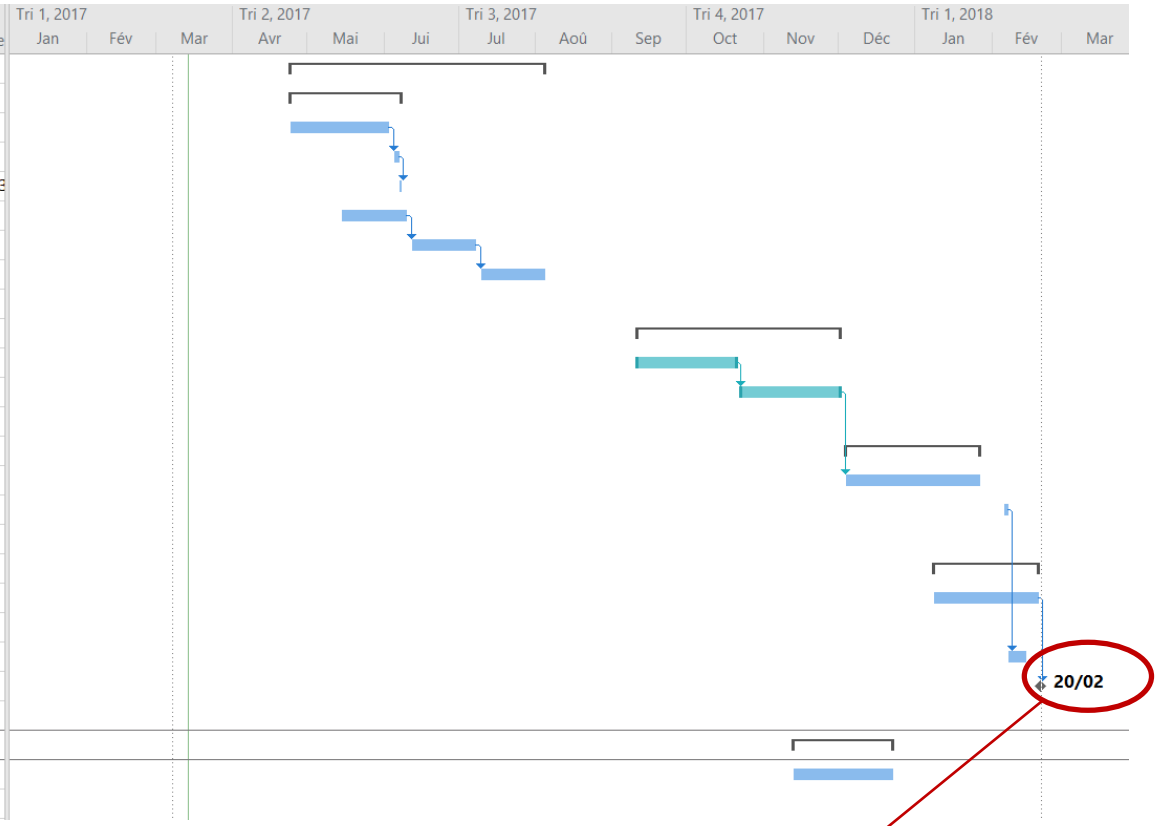


From meetings with the LRO team in the last month

Chimneys and Feedthroughs
FE electronics, slow control, purity monitor

Some items need to be developed in more details

Nom de la tâche	Durée	Début	Fin	Prédéce
Chimneys and feedthroughs	**75 jours**	**24/04/2017**	**04/08/2017**	
SPFT Production & Installation	**33 jours**	**24/04/2017**	**07/06/2017**	
SPFT production	30 jours	24/04/2017	02/06/2017	
SPFT Pre-Assembly	2 jours	05/06/2017	06/06/2017	209
SPFT Assembly on Cryostat Roof	1 jour	07/06/2017	07/06/2017	210;143
Signal Feedthrough SGFT	20 jours	15/05/2017	09/06/2017	
TANK_INST	20 jours	12/06/2017	07/07/2017	212
CRP_INST	20 jours	10/07/2017	04/08/2017	213
Front End electonics	**60 jours**	**11/09/2017**	**01/12/2017**	
F/E electronics installation	30 jours	11/09/2017	20/10/2017	
microTCA installation	30 jours	23/10/2017	01/12/2017	217
Slow control	**30 jours**	**04/12/2017**	**26/01/2018**	
cabling and testing	30 jours	04/12/2017	26/01/2018	218
Ground grid installation	2 jours	05/02/2018	07/02/2018	202
Purity monitor	**30 jours**	**08/01/2018**	**19/02/2018**	
Installation	30 jours	08/01/2018	19/02/2018	188
Beam plug installation	5 jours	07/02/2018	14/02/2018	222
Ready to seal TCO & cryostat	1 jour	19/02/2018	20/02/2018	225
Large Area Trigger Counters	**30 jours**	**13/11/2017**	**22/12/2017**	
Installation	30 jours	13/11/2017	22/12/2017	



The new date for TCO ready to seal: Feb 20th 2018

3 months later than the previous planning (dec 1st 2017) but be careful: it includes 2 weeks without activity during christmas shutdown

Some remarks about the main changes wrt previous schedules

Items shifted:

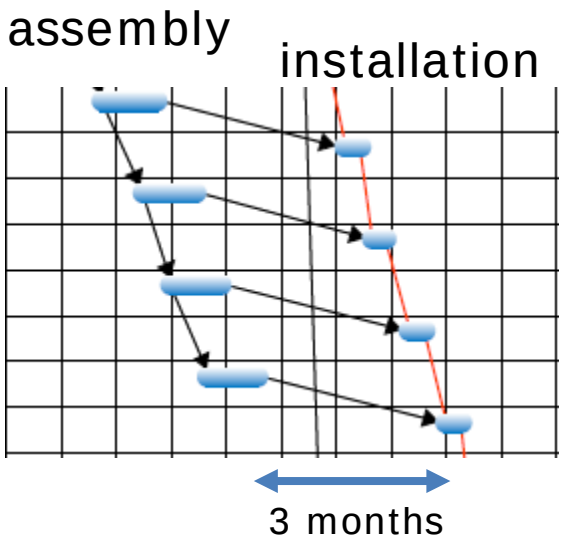
- Cryostat ready for detector installation: + 2 months
- Availability of Bldg 185 Clean Room: + 3 months
- CRP construction: + 5.5 months

To be noted: in the previous schedule there were 3 months waiting time between the end of CRP construction and the installation in cryostat to wait for the cryostat to be ready. This is not anymore the case.
=> The net shift corresponds to about 3 months.

CRP Production and Installation comparison

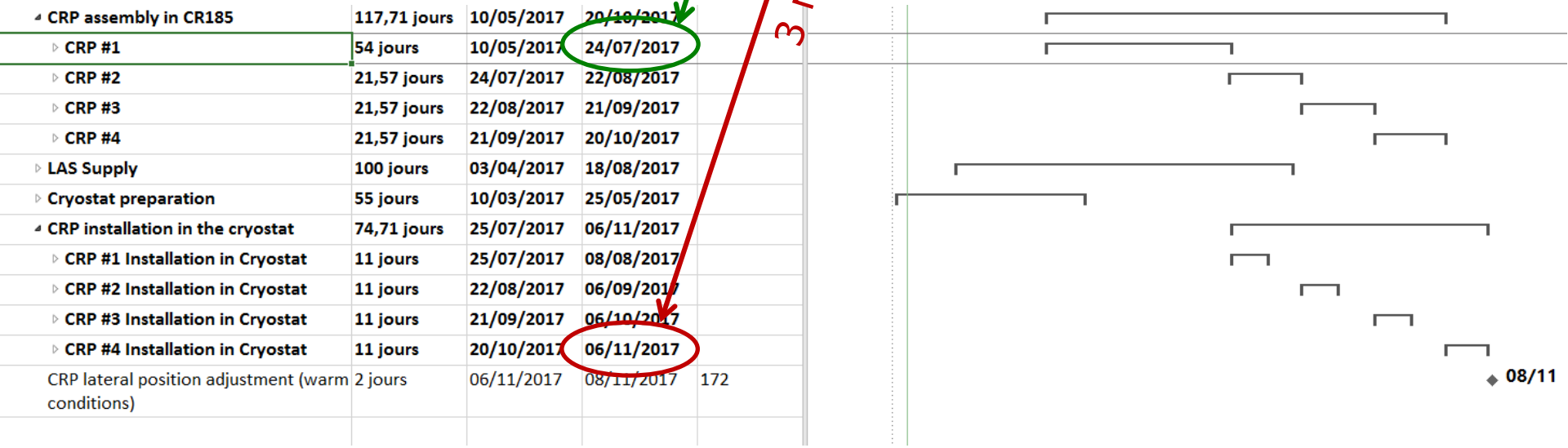
Previous schedule

27	CRP 3x3 #1 module assembly Blg 185	21.00	1/23/17	2/20/17	E
28	CRP 3x3 #1 module installation	7.00	6/5/17	6/13/17	E
29	CRP 3x3 #2 module assembly Blg 185	21.00	2/13/17	3/13/17	E
30	CRP 3x3 #2 module installation	7.00	6/19/17	6/27/17	E
31	CRP 3x3 #3 module assembly Blg 185	21.00	2/27/17	3/27/17	E
32	CRP 3x3 #3 module installation	7.00	7/10/17	7/18/17	E
33	CRP 3x3 #4 module assembly Blg 185	21.00	3/20/17	4/17/17	E
34	CRP 3x3 #4 module installation	7.00	7/31/17	8/8/17	E

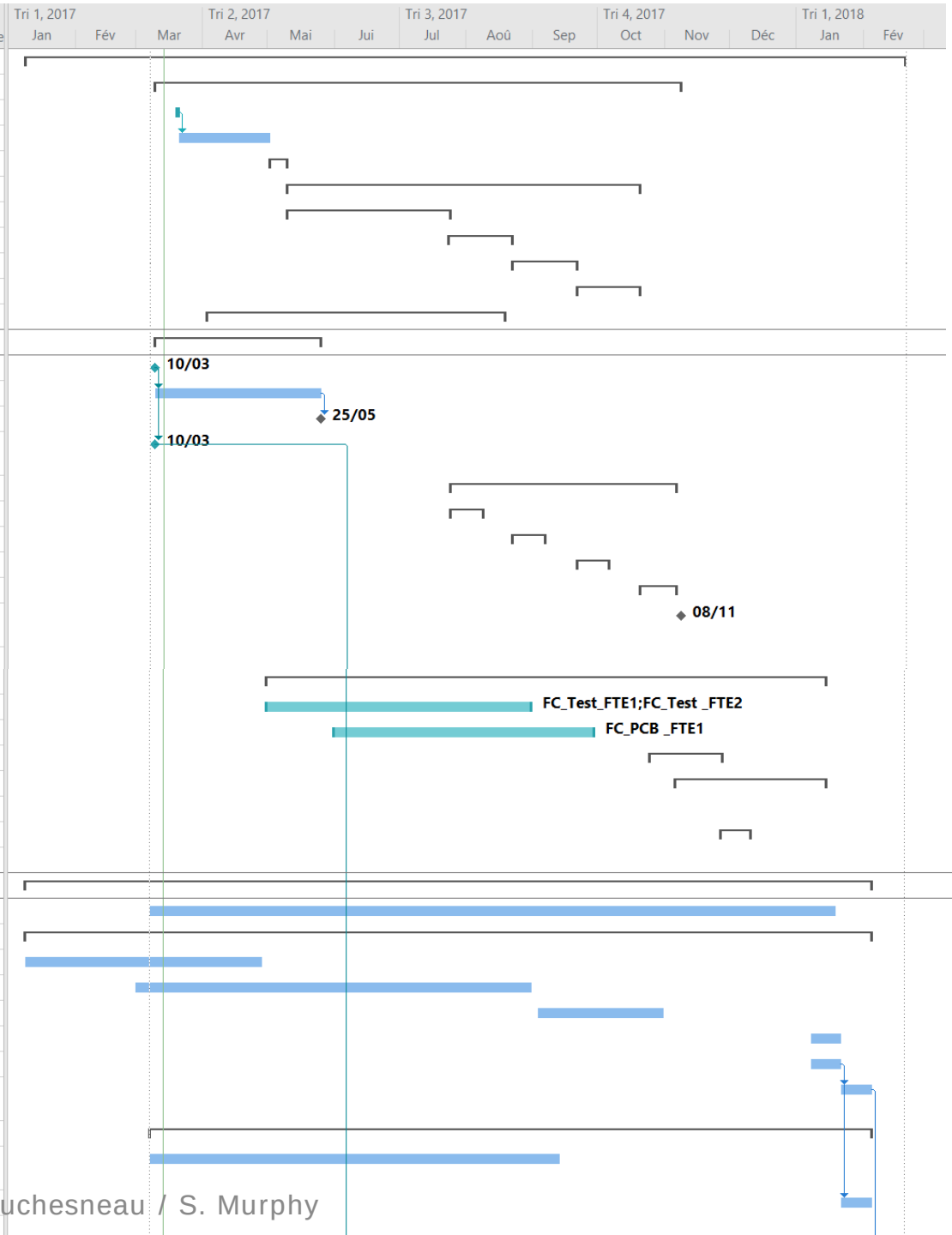


New schedule

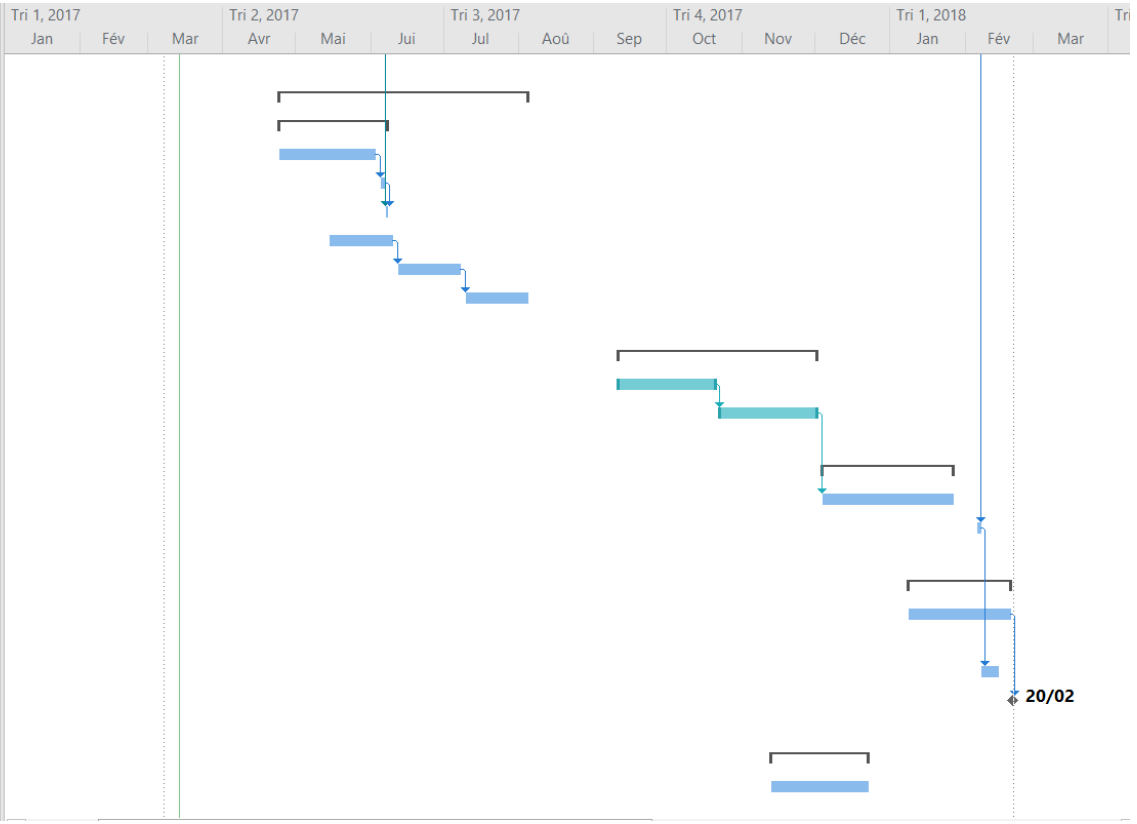
CRP assembly in CR185	117,71 jours	10/05/2017	20/10/2017	
CRP #1	54 jours	10/05/2017	24/07/2017	
CRP #2	21,57 jours	24/07/2017	22/08/2017	
CRP #3	21,57 jours	22/08/2017	21/09/2017	
CRP #4	21,57 jours	21/09/2017	20/10/2017	
LAS Supply	100 jours	03/04/2017	18/08/2017	
Cryostat preparation	55 jours	10/03/2017	25/05/2017	
CRP installation in the cryostat	74,71 jours	25/07/2017	06/11/2017	
CRP #1 Installation in Cryostat	11 jours	25/07/2017	08/08/2017	
CRP #2 Installation in Cryostat	11 jours	22/08/2017	06/09/2017	
CRP #3 Installation in Cryostat	11 jours	21/09/2017	06/10/2017	
CRP #4 Installation in Cryostat	11 jours	20/10/2017	06/11/2017	
CRP lateral position adjustment (warm conditions)	2 jours	06/11/2017	08/11/2017	172



	Nom de la tâche	Durée	Début	Fin	Prédéce
1	**ProtoDUNE-DP**	**281,71 jours?**	**09/01/2017**	**20/02/2018**	
2	**CRP Production & Installation**	**173,71 jours**	**10/03/2017**	**08/11/2017**	
3	CR185 material order	1 jour	20/03/2017	20/03/2017	
4	Clean Room Material reception	30 jours	21/03/2017	01/05/2017	3
5	**CR185 preparation**	**6 jours**	**02/05/2017**	**09/05/2017**	
9	**CRP assembly in CR185**	**117,71 jours**	**10/05/2017**	**20/10/2017**	
10	**CRP #1**	**54 jours**	**10/05/2017**	**24/07/2017**	
23	**CRP #2**	**21,57 jours**	**24/07/2017**	**22/08/2017**	
36	**CRP #3**	**21,57 jours**	**22/08/2017**	**21/09/2017**	
49	**CRP #4**	**21,57 jours**	**21/09/2017**	**20/10/2017**	
62	**LAS Supply**	**100 jours**	**03/04/2017**	**18/08/2017**	
139	**Cryostat preparation**	**55 jours**	**10/03/2017**	**25/05/2017**	
140	Cryostat with penetrations is ready	0 jour	10/03/2017	10/03/2017	
141	CRB and insertion rail preparation	55 jours	10/03/2017	25/05/2017	140
142	CRB ready	0 jour	25/05/2017	25/05/2017	141
143	Cryostat is ready for CRP & SPFT installation	0 jour	10/03/2017	10/03/2017	140
144	**CRP installation in the cryostat**	**74,71 jours**	**25/07/2017**	**06/11/2017**	
145	**CRP #1 Installation in Cryostat**	**11 jours**	**25/07/2017**	**08/08/2017**	
152	**CRP #2 Installation in Cryostat**	**11 jours**	**22/08/2017**	**06/09/2017**	
159	**CRP #3 Installation in Cryostat**	**11 jours**	**21/09/2017**	**06/10/2017**	
166	**CRP #4 Installation in Cryostat**	**11 jours**	**20/10/2017**	**06/11/2017**	
173	CRP lateral position adjustment (warm conditions)	2 jours	06/11/2017	08/11/2017	172
174					
175	**Drift Cage Production and Installation**	**175,71 jours**	**01/05/2017**	**15/01/2018**	
176	Mechanical Test assembly in UTA	89 jours	01/05/2017	31/08/2017	
177	PCB production and testing in cold	87 jours	01/06/2017	29/09/2017	
178	**Assembly in CRB**	**24 jours**	**25/10/2017**	**28/11/2017**	**169**
182	**Installation in cryostat**	**40 jours**	**06/11/2017**	**15/01/2018**	**179**
190					
191	**HV system**	**10 jours**	**27/11/2017**	**11/12/2017**	
193					
194	**PMT and Light Read Out System**	**270,71 jours?**	**09/01/2017**	**05/02/2018**	
195	LRO electronics	218 jours	08/03/2017	19/01/2018	
196	**PMTs preparation and installation**	**270,71 jours?**	**09/01/2017**	**05/02/2018**	
197	PMT base design and manufacturing	80 jours?	09/01/2017	28/04/2017	
198	PMTs characterization	132 jours?	01/03/2017	31/08/2017	
199	TPB coating	42 jours	04/09/2017	31/10/2017	
200	Splitter tests and installation	10 jours	08/01/2018	22/01/2018	188
201	PMT support structure	10 jours	08/01/2018	22/01/2018	188
202	PMT installation in cryostat and cabling	10 jours	22/01/2018	05/02/2018	201
203	**Light calibration system**	**228,71 jours**	**08/03/2017**	**05/02/2018**	
204	fibers, light source tests and procurement	136 jours	08/03/2017	13/09/2017	
205	Fiber calibration system installation	10 jours	22/01/2018	05/02/2018	201
206					



	Nom de la tâche	Durée	Début	Fin	Prédéce
206					
207	**Chimneys and feedthroughs**	**75 jours**	**24/04/2017**	**04/08/2017**	
208	**SPFT Production & Installation**	**33 jours**	**24/04/2017**	**07/06/2017**	
209	SPFT production	30 jours	24/04/2017	02/06/2017	
210	SPFT Pre-Assembly	2 jours	05/06/2017	06/06/2017	209
211	SPFT Assembly on Cryostat Roof	1 jour	07/06/2017	07/06/2017	210;143
212	Signal Feedthrough SGFT	20 jours	15/05/2017	09/06/2017	
213	TANK_INST	20 jours	12/06/2017	07/07/2017	212
214	CRP_INST	20 jours	10/07/2017	04/08/2017	213
215					
216	**Front End electonics**	**60 jours**	**11/09/2017**	**01/12/2017**	
217	F/E electronics installation	30 jours	11/09/2017	20/10/2017	
218	microTCA installation	30 jours	23/10/2017	01/12/2017	217
219					
220	**Slow control**	**30 jours**	**04/12/2017**	**26/01/2018**	
221	cabling and testing	30 jours	04/12/2017	26/01/2018	218
222	Ground grid installation	2 jours	05/02/2018	07/02/2018	202
223					
224	**Purity monitor**	**30 jours**	**08/01/2018**	**19/02/2018**	
225	Installation	30 jours	08/01/2018	19/02/2018	188
226					
227	Beam plug installation	5 jours	07/02/2018	14/02/2018	222
228	Ready to seal TCO & cryostat	1 jour	19/02/2018	20/02/2018	225
229					
230	**Large Area Trigger Counters**	**30 jours**	**13/11/2017**	**22/12/2017**	
231	Installation	30 jours	13/11/2017	22/12/2017	



Update will be done regularly and ressources will be completed to follow the detector installation and construction