Istituto Nazionale di Fisica Nucleare

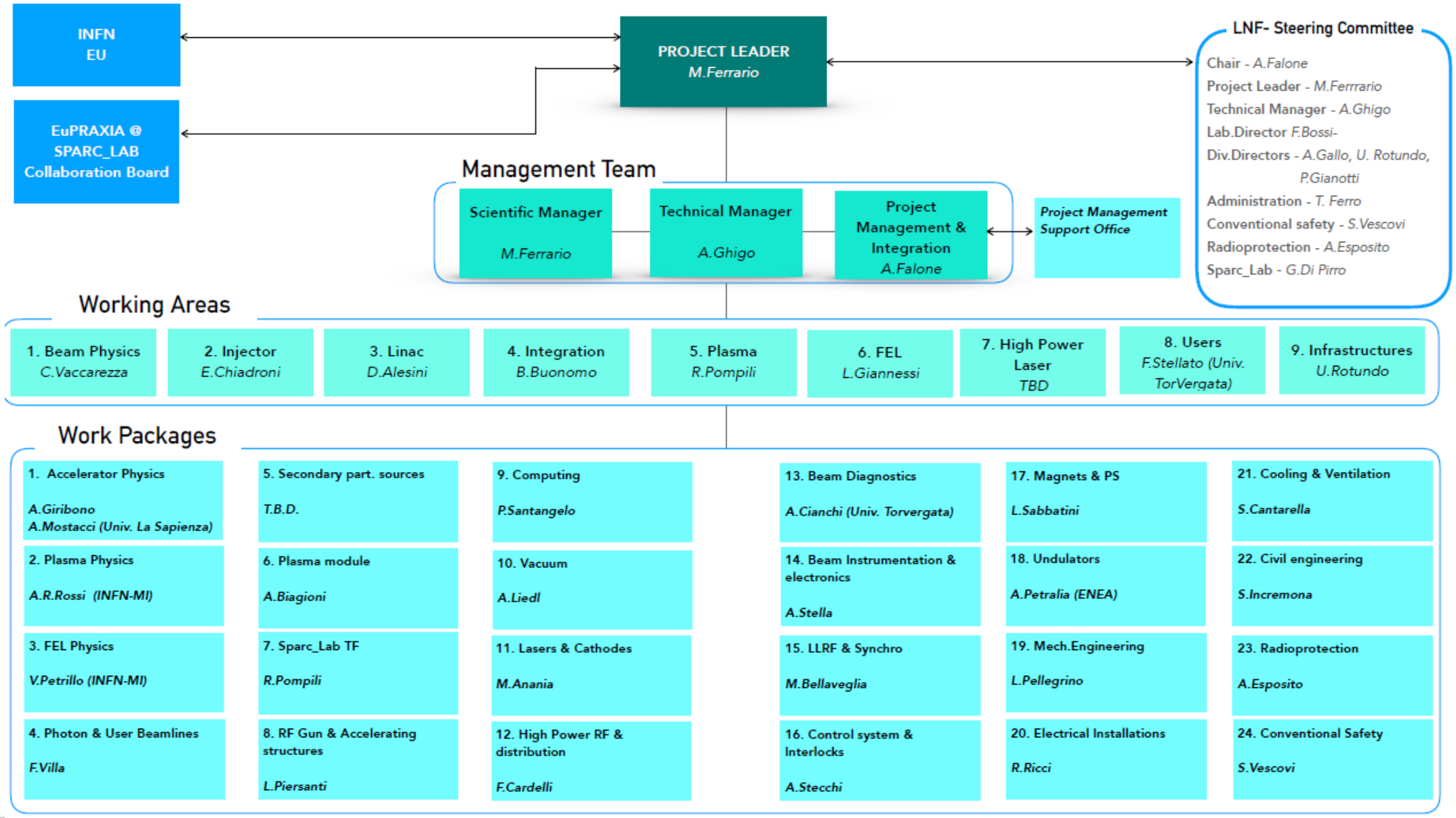
WA9 - Infrastructures

TDR Review Committee – First meeting

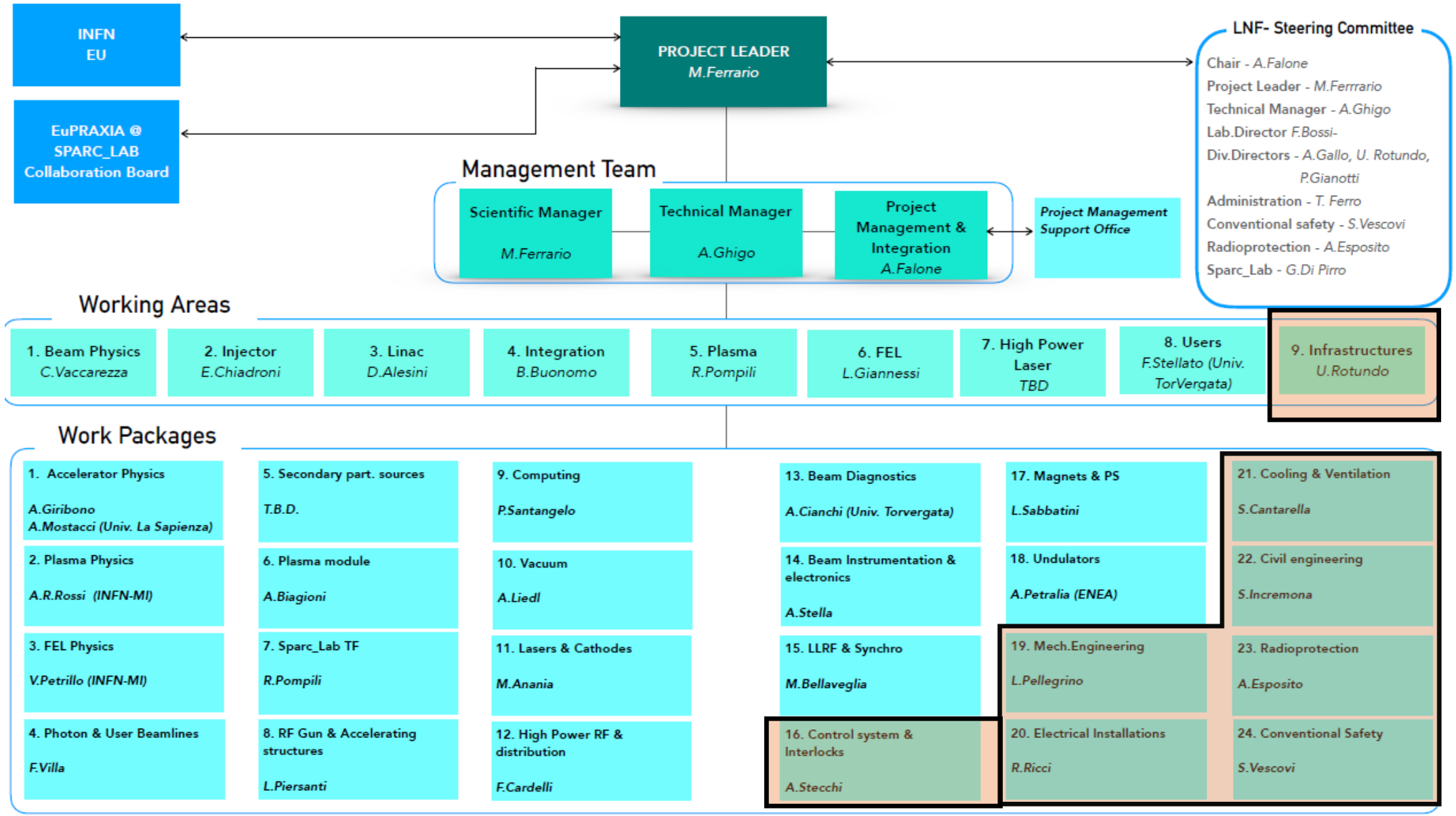
Outline

- WA 9 structure
- Milestones
- Building Final Draft status
- Beam DUMPs
- Authorization process (Permitting)
- Planning

WA 9 Structure



WA 9 Structure



Milestones

- Input to WA 9
  - Frist Modulator Technical Data Sheet Approved
  - Functional Utilities Matrix (FUM) Approval
- WA 9 Output
  - Machine Components' First Installation
  - Building Handover
  - Utilities Hooked and Commissioned

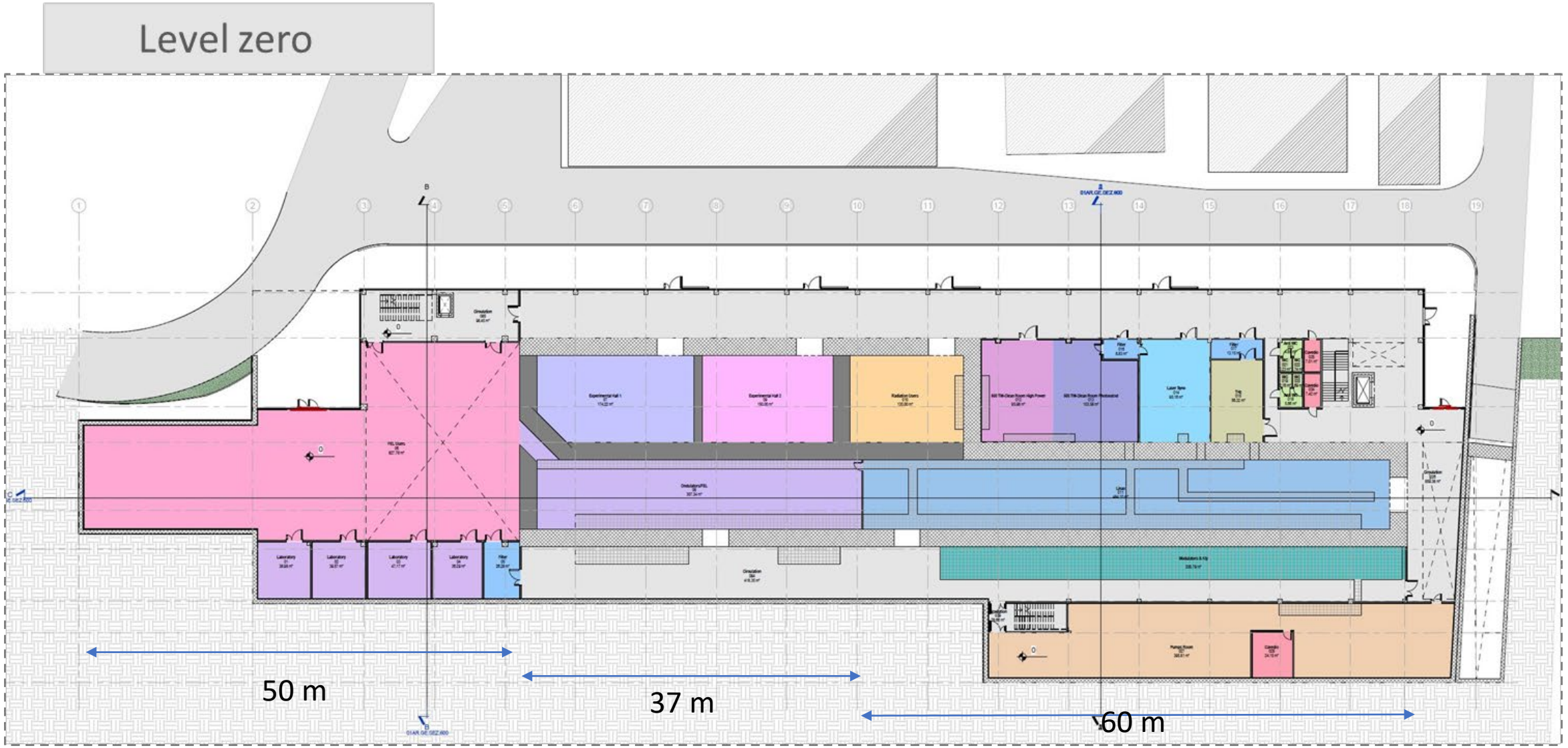
Building Final Draft status

- Final Draft delivered by the Designer
- INFN review needed, especially (but not only…) plants
- Cost evaluation review needed for impact on next phases (project validation, DED development, tender for construction preparation)

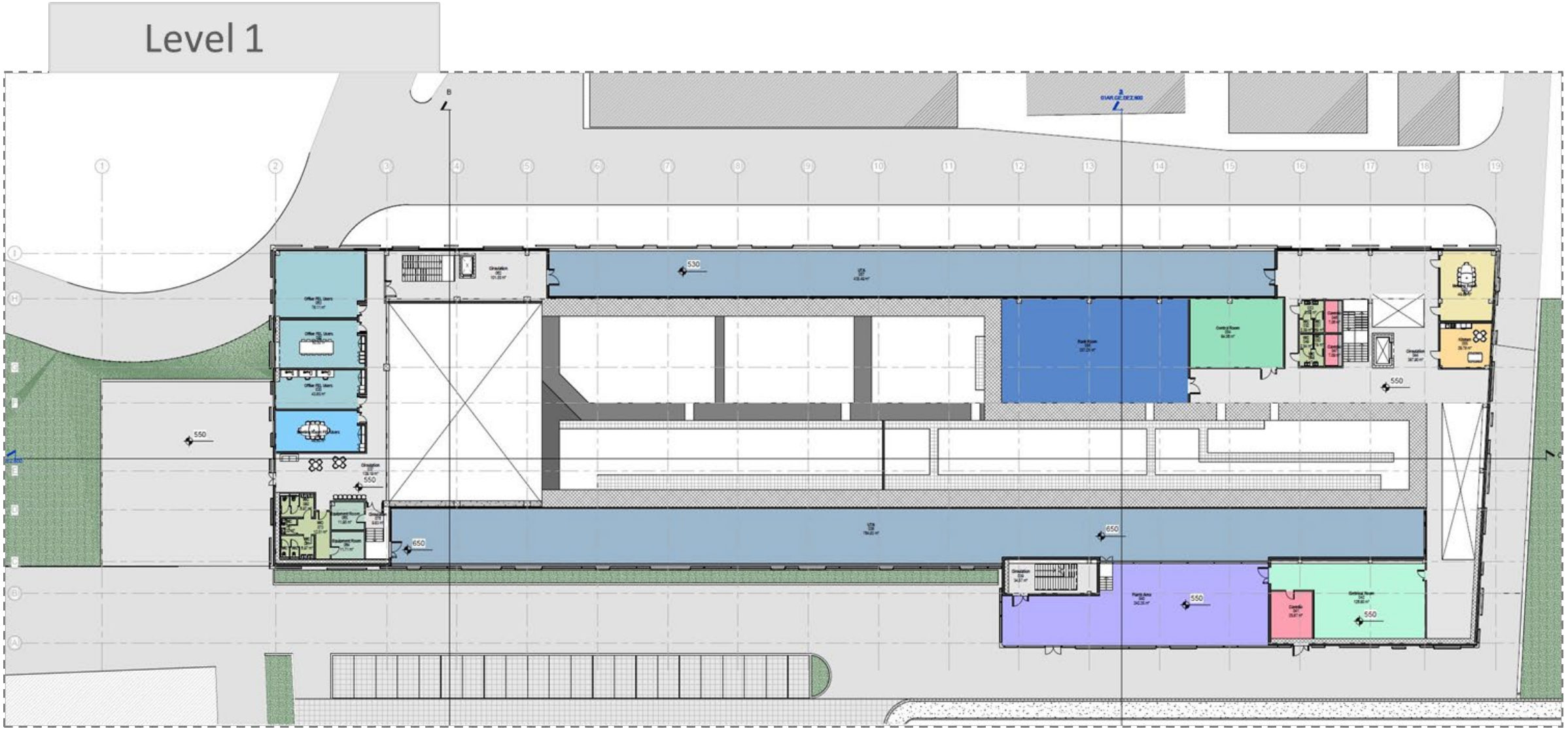
Building Final Draft status

Building Final Draft status

Building Final Draft status

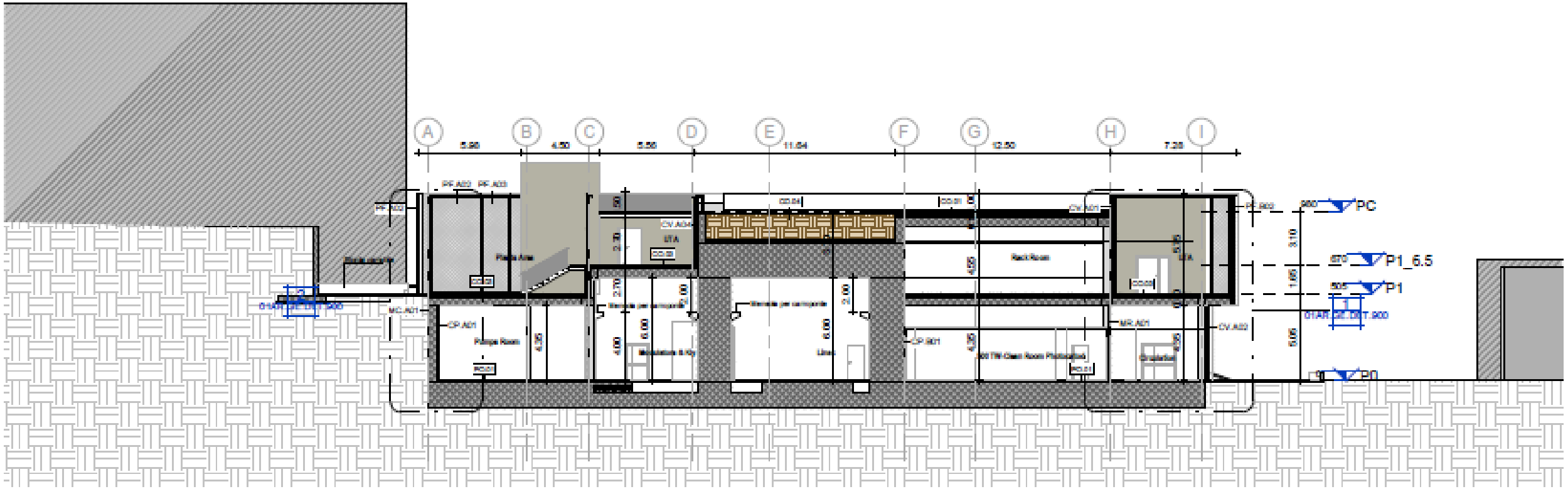


Building Final Draft status



Building Final Draft status

Section



SEZIONE LONGITUDINALE AA' - scala 1:200

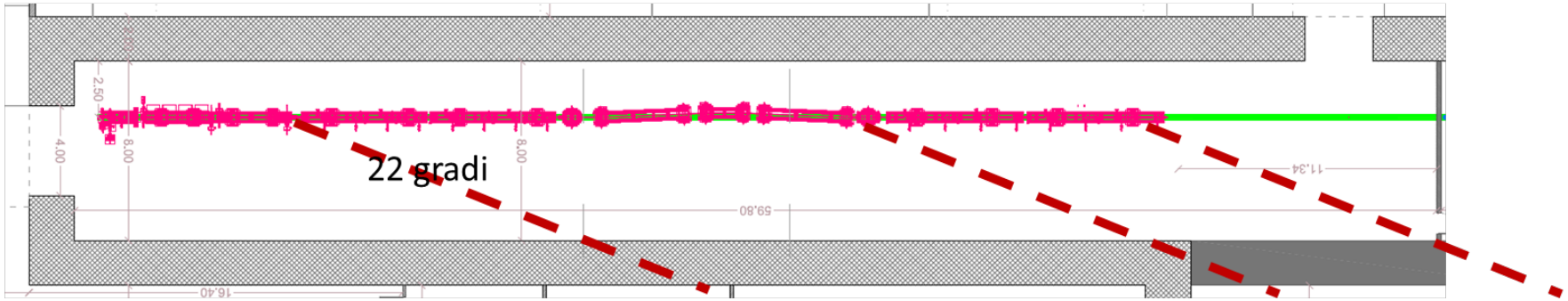
Beam DUMPs

Max Values	DUMP_1.1	DUMP_1.2	DUMP_1.3	DUMP_2	DUMP_3
Location	Injector Exit	Compressor Exit	Plasma Exit	FEL Exit	Compton/Positron Sources Exit?
Energy [GeV]	0.3	0.8	1.2	1.2	5
Q [pC]	500	500	500	500	50
Peak Current [kA]	3	3	3	3	3
Rep. Rate [Hz]	100	100	100	100	100
Average Current [nA]	50	50	50	50	5
Beam Power [W]	15	40	60	60	25

All the five dumps foreseen at the present serve to avoid that the primary beam hits the shielding walls and to absorb the electromagnetic cascade.

Dumps layout are mainly determined by parameters of the impinging beam as listed in table as well as by angle of electron deflection and dose constraints for external areas.

Main features of a dump:
Absorption efficiency, lifetime, compactness, simple fabrication method, induced radioactivity, thermal characteristics of dump materials, dump handling



Courtesy A. Esposito

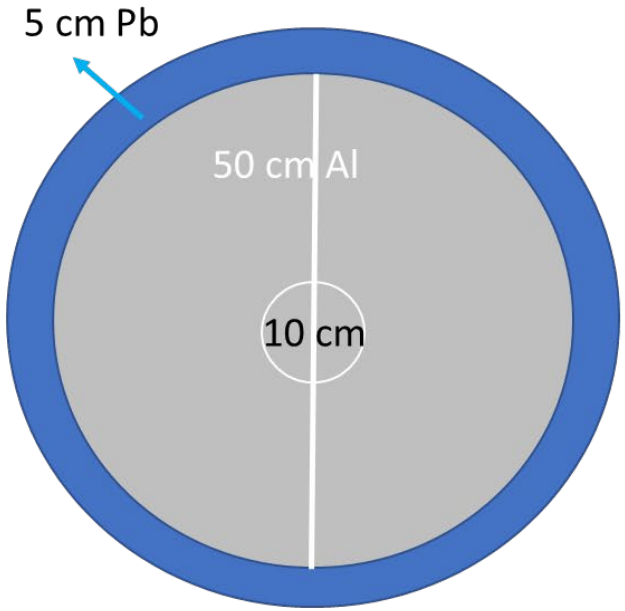
Beam DUMPs

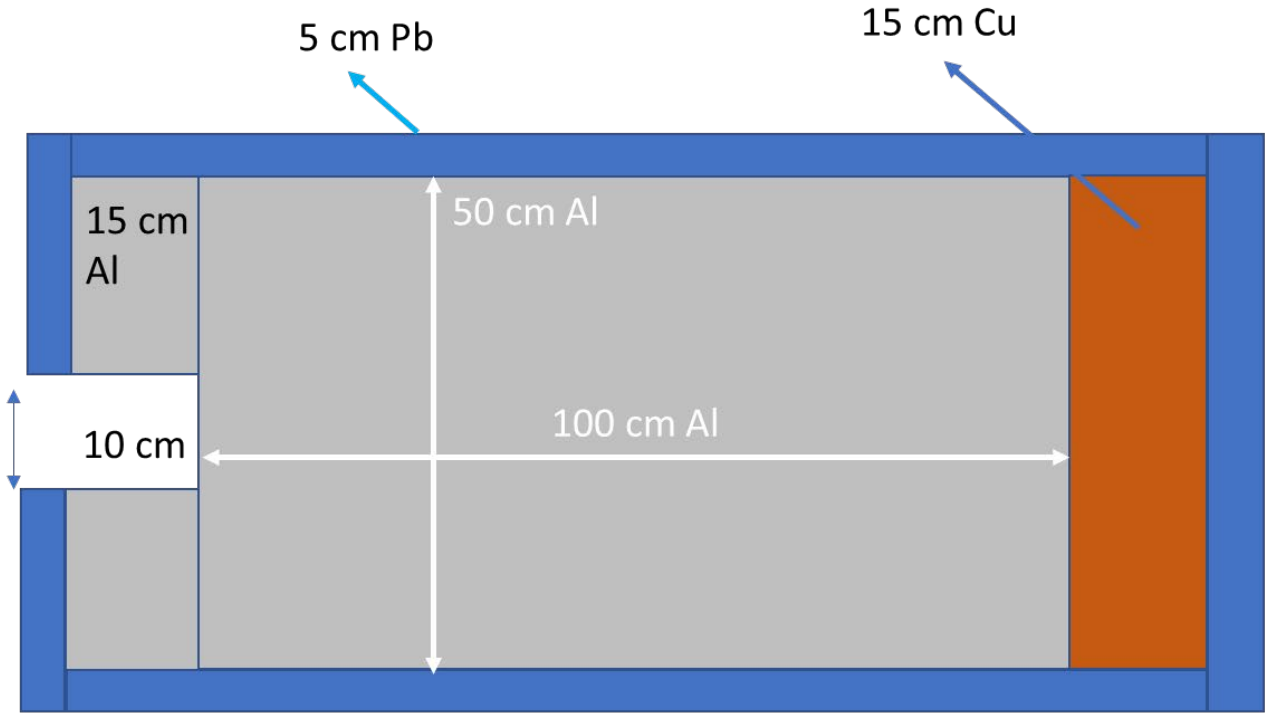
Energy 1GeV power 60 watt

Energy 5 GeV power 25 watt

Dumps with graphite instead the aluminum are also being considered

No cooling should be necessary considering the powers involved but a calculation with Ansys should be done



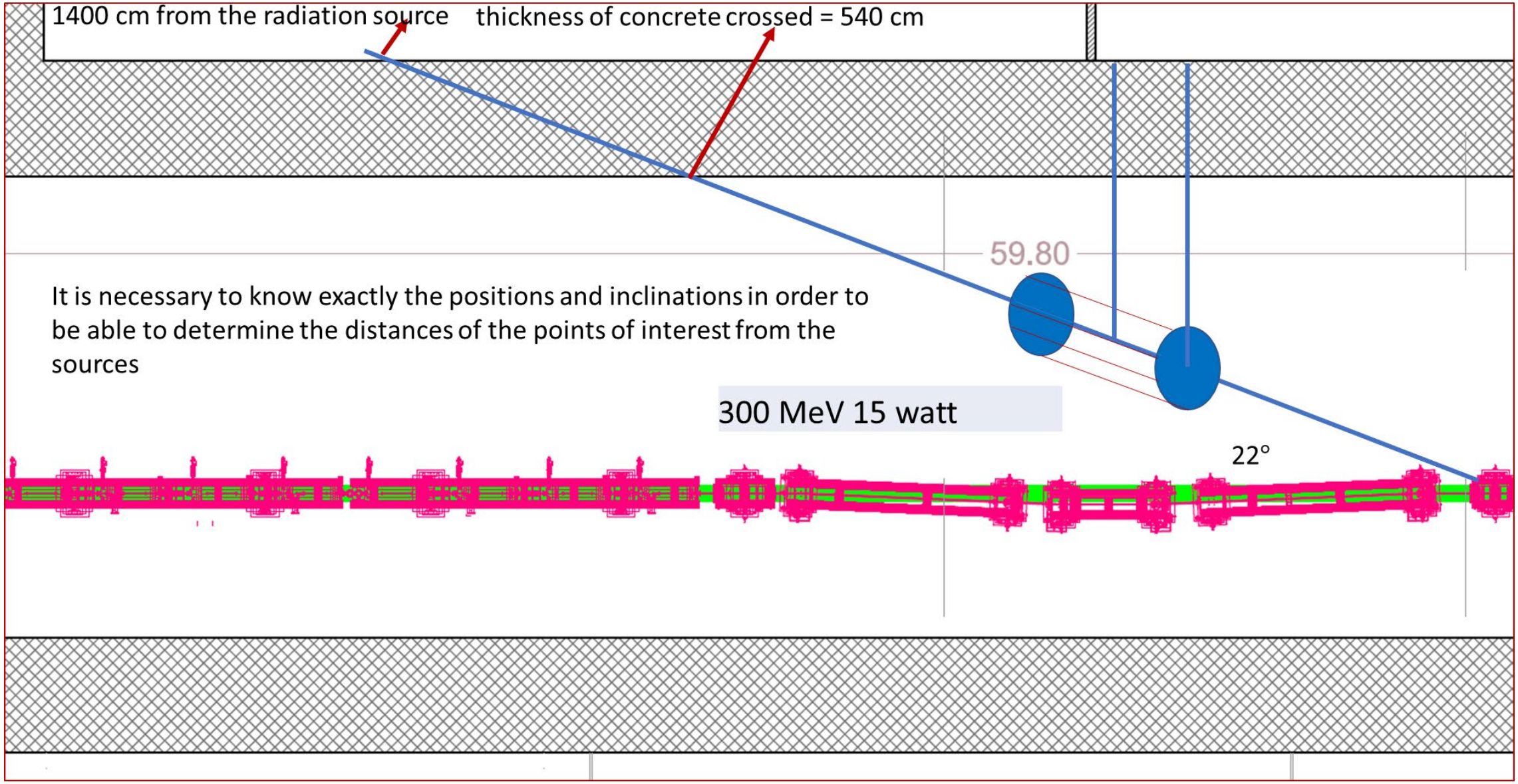


Total weight kg 2400

In the lower energy cases, a thickness of Al equal to 50 cm and 25 cm was used. Total weight 1680 and 1300 kg

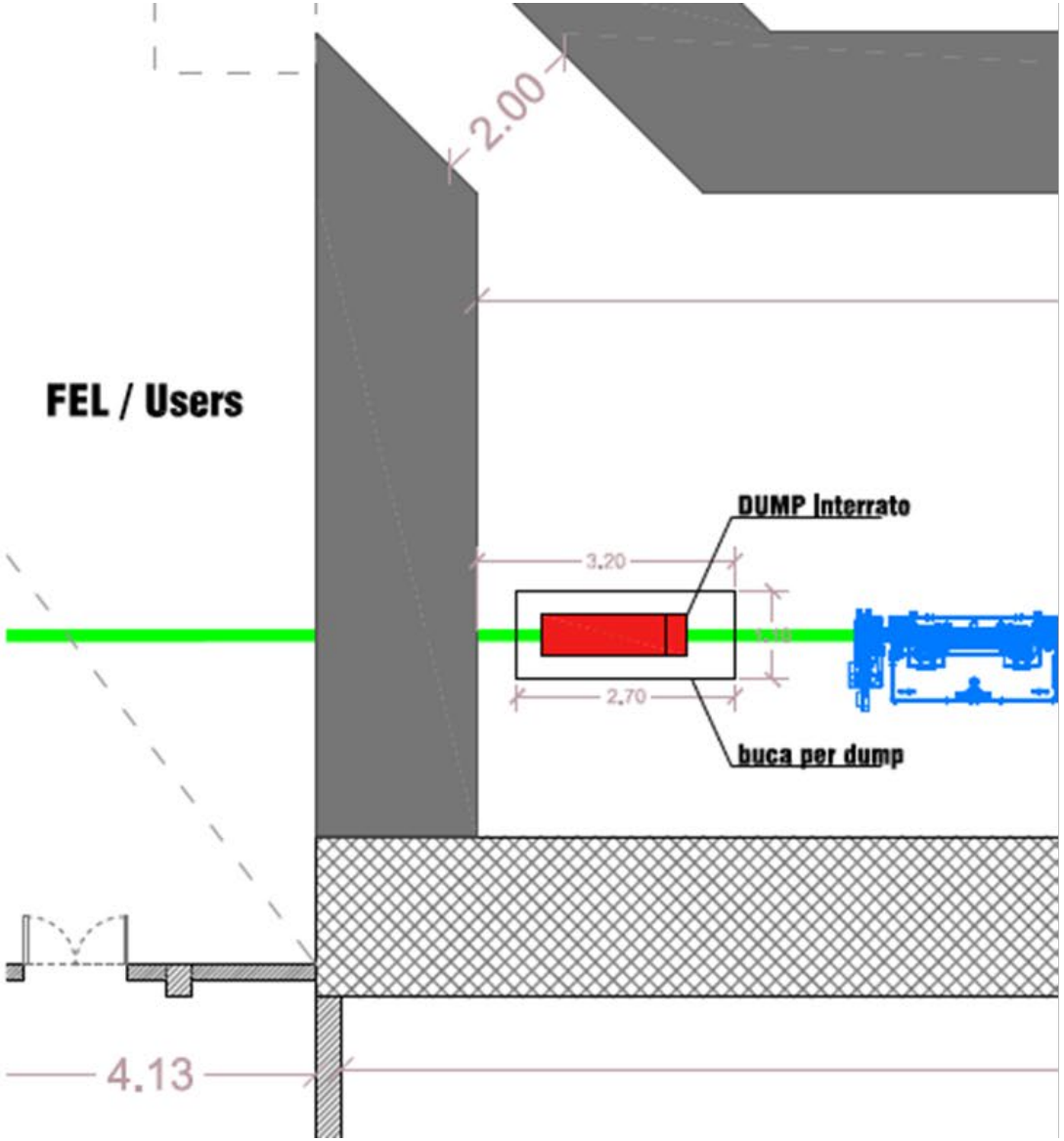
Courtesy A. Esposito

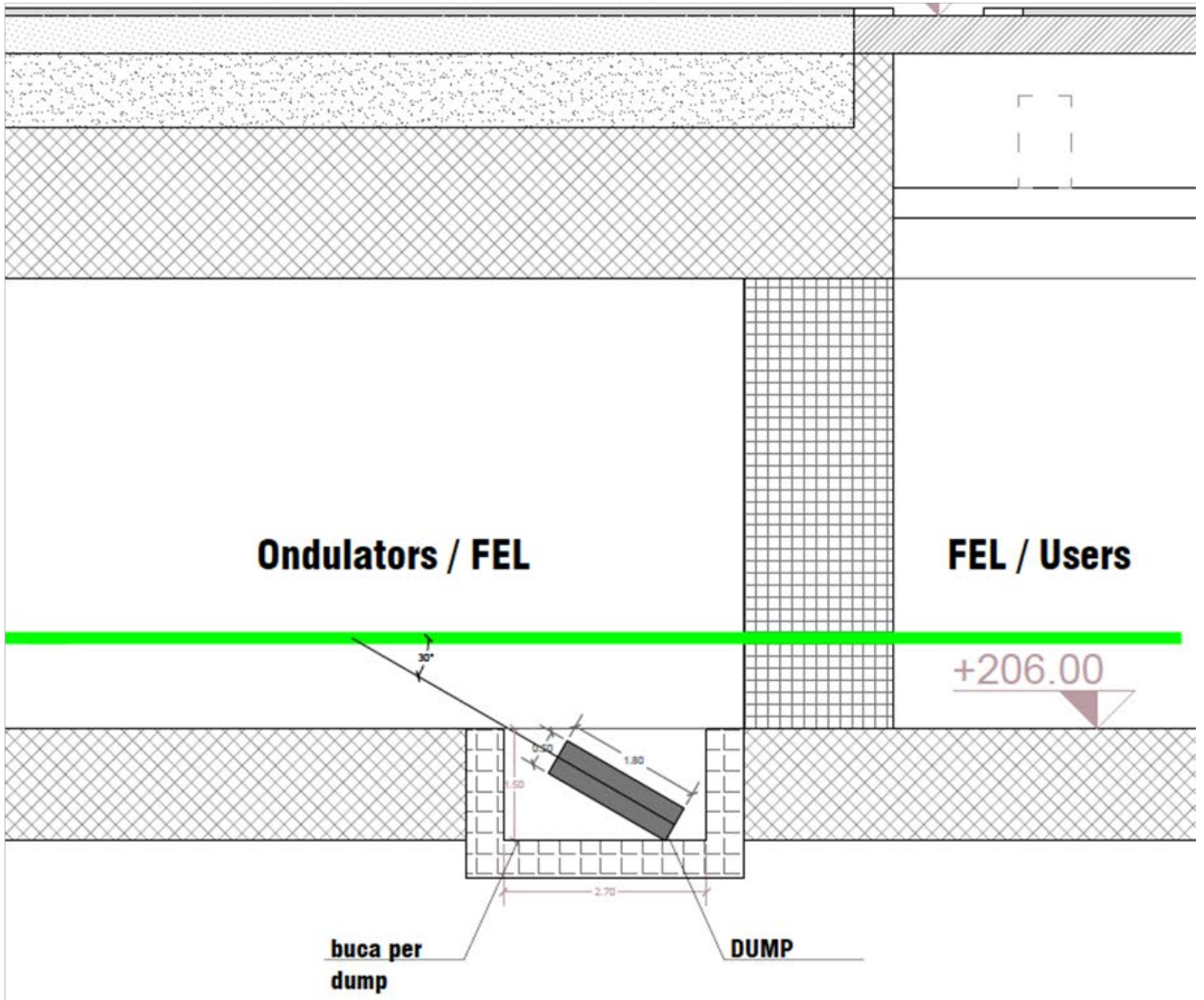
Beam DUMPs



Courtesy A. Esposito

Beam DUMPs


2.00
FEL / Users
DUMP Interrato
3.20
2.70
buca per dump
4.13


Ondulators / FEL
FEL / Users
+206.00
30°
1.80
2.70
buca per dump
DUMP

Permitting

- With the Final Draft approval the request for the Building construction permitting can be issued (Conferenza dei Servizi).
  - Also from the conventional safety point of view, in order to present the Prevention and Emergency Plan to the Internal Affaires Ministry – Fire Department, a ***detailed*** technical and functional description of each and every space (LINAC bunker, Clean Rooms, Experimental Halls, Control Rooms, etc.) is needed.
- In order to obtain the Authorization from the combination of Ministries involved in the process concerning the **Operation** of radiation producing machines, a ***detailed*** and "***frozen***" (any change implies new permitting process) description of all the possible configurations of operation is needed (recently renewed BTF2 installation).

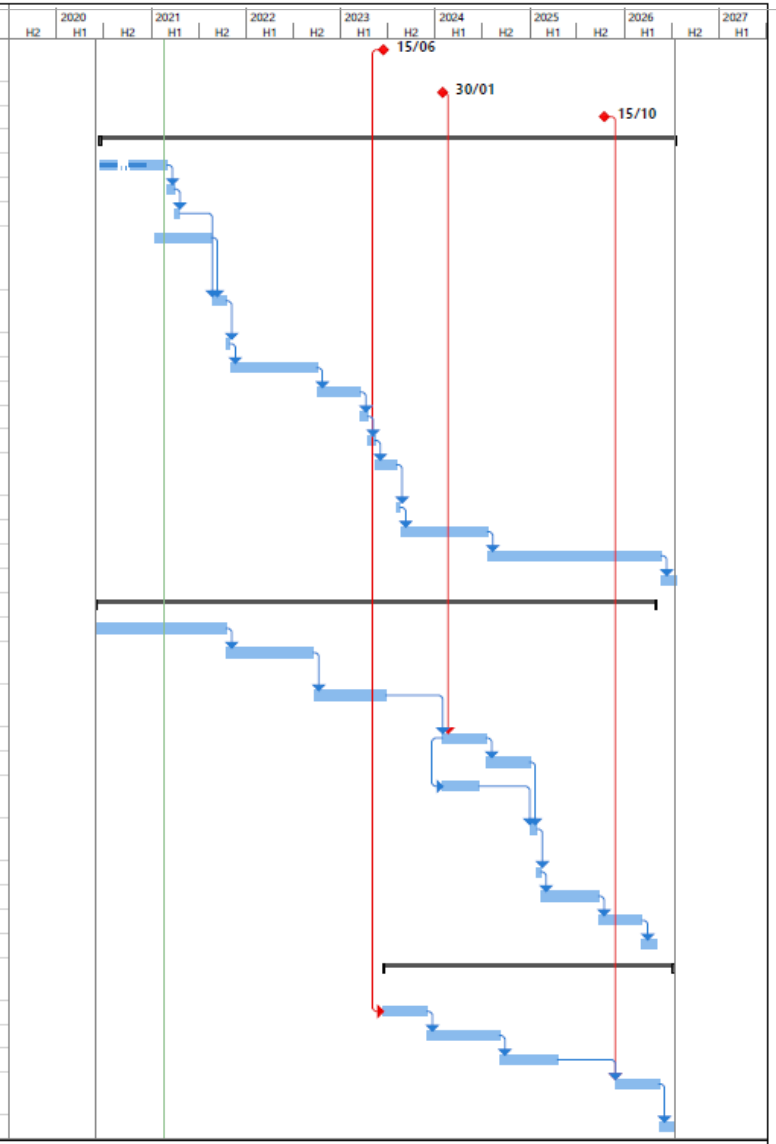
Permitting

- For authorization purposes, as far as the IAM – FD area is concerned, the Eupraxia complex design, both from the architectural point of view and from the accelerating machine point of view was analysed in accordance to the requirements of the new Fire Prevention Code issued by the D.M. of 03/08/2015 and s.i. .
- Preliminary contacts with the Command were already made in order to obtain, by means of the Certified Report, the Start of the Activity to operate the Machine pursuant to the D.P.R. 1551/2011
- At present, no problems in obtaining the necessary authorizations are envisaged.

Courtesy S. Vescovi

Planning

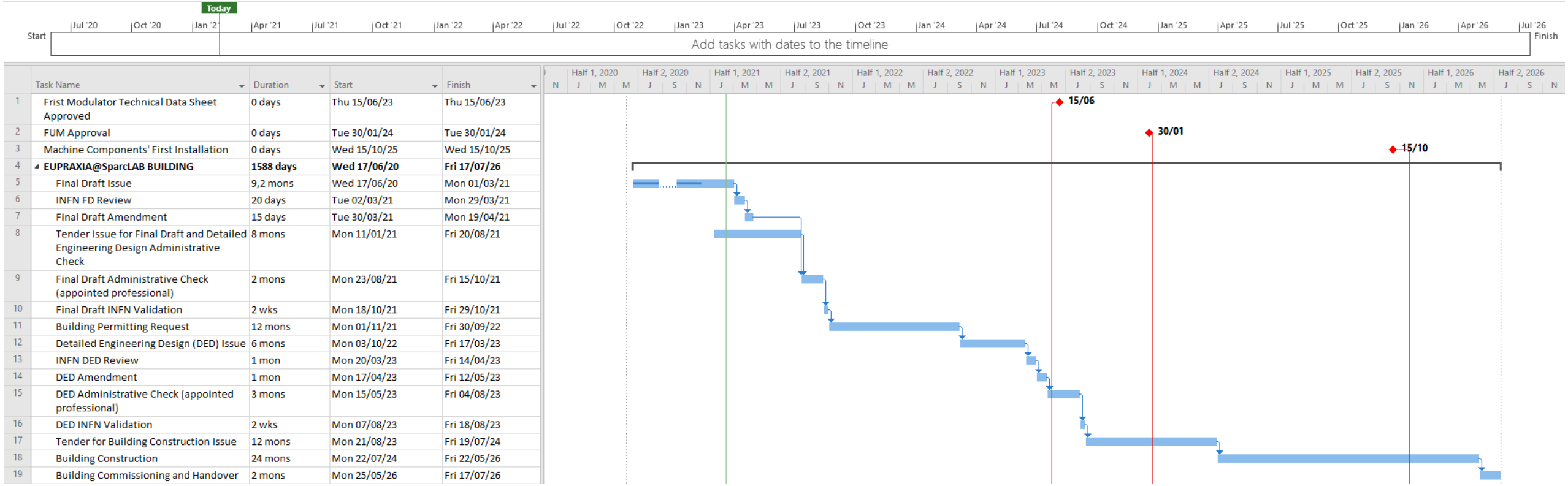
ID	Task Mode	WBS	Task Name	Duration	Start	Finish	Predecessors
1		1	Frist Modulator Technical Data Sheet Approved	0 days	Thu 15/06/23	Thu 15/06/23	
2		2	FUM Approval	0 days	Tue 30/01/24	Tue 30/01/24	
3		3	Machine Components' First Installation	0 days	Wed 15/10/25	Wed 15/10/25	
4		**4**	**EUPRAXIA@SparcLAB BUILDING**	**1588 days**	**Wed 17/06/20**	**Fri 17/07/26**	
5		4.1	Final Draft Issue	9,2 mons	Wed 17/06/20	Mon 01/03/21	
6		4.2	INFN FD Review	20 days	Tue 02/03/21	Mon 29/03/21	5
7		4.3	Final Draft Amendment	15 days	Tue 30/03/21	Mon 19/04/21	6
8		4.4	Tender Issue for Final Draft and Detailed Engineering Design Administrative Check	8 mons	Mon 11/01/21	Fri 20/08/21	
9		4.5	Final Draft Administrative Check (appointed professional)	2 mons	Mon 23/08/21	Fri 15/10/21	8;7
10		4.6	Final Draft INFN Validation	2 wks	Mon 18/10/21	Fri 29/10/21	9
11		4.7	Building Permitting Request	12 mons	Mon 01/11/21	Fri 30/09/22	10
12		4.8	Detailed Engineering Design (DED) Issue	6 mons	Mon 03/10/22	Fri 17/03/23	11
13		4.9	INFN DED Review	1 mon	Mon 20/03/23	Fri 14/04/23	12
14		4.10	DED Amendment	1 mon	Mon 17/04/23	Fri 12/05/23	13
15		4.11	DED Administrative Check (appointed professional)	3 mons	Mon 15/05/23	Fri 04/08/23	14
16		4.12	DED INFN Validation	2 wks	Mon 07/08/23	Fri 18/08/23	15
17		4.13	Tender for Building Construction Issue	12 mons	Mon 21/08/23	Fri 19/07/24	16
18		4.14	Building Construction	24 mons	Mon 22/07/24	Fri 22/05/26	17
19		4.15	Building Commissioning and Handover	2 mons	Mon 25/05/26	Fri 17/07/26	18
20		**5**	**HI-TECH COOLING & HVAC**	**1546 days**	**Mon 01/06/20**	**Mon 04/05/26**	
21		5.1	Requirements Collection	18 mons	Mon 01/06/20	Fri 15/10/21	
22		5.2	Feasibility Study [HI Stability Cooling R&D]	12 mons	Mon 18/10/21	Fri 16/09/22	21
23		5.3	INFN Front End Engineering Design (FEED)	10 mons	Mon 19/09/22	Fri 23/06/23	22
24		5.4	Tender Issue for Design Finalization	6 mons	Tue 30/01/24	Mon 15/07/24	23;2
25		5.5	FD & DED Issue	6 mons	Tue 16/07/24	Mon 30/12/24	24
26		5.6	Tender Issue for Design Administrative Check	5 mons	Tue 30/01/24	Mon 17/06/24	24SS
27		5.7	DED Administrative Check (appointed professional)	1 mon	Tue 31/12/24	Mon 27/01/25	26;25
28		5.8	DED INFN Validation	2 wks	Tue 28/01/25	Mon 10/02/25	27
29		5.9	Tender for Construction Issue	8 mons	Tue 11/02/25	Mon 22/09/25	28
30		5.10	Construction	6 mons	Tue 23/09/25	Mon 09/03/26	29
31		5.11	Commissioning and Start-up	2 mons	Tue 10/03/26	Mon 04/05/26	30
32		**6**	**HI-TECH ELECTRICAL INSTALLATIONS [HARMONIC REJECTION FILTERS]**	**800 days**	**Thu 15/06/23**	**Wed 08/07/26**	
33		6.1	Feasibility Study [R&D]	6 mons	Thu 15/06/23	Wed 29/11/23	1SS
34		6.2	INFN DED Issue	10 mons	Thu 30/11/23	Wed 04/09/24	33
35		6.3	Tender for Installation	8 mons	Thu 05/09/24	Wed 16/04/25	34
36		6.4	Supply and Installation + Machine Components' Hookup	6 mons	Thu 27/11/25	Wed 13/05/26	35FS+8 mons;3
37		6.5	Commissioning and Start-up	2 mons	Thu 14/05/26	Wed 08/07/26	36



Project: WA9 Road to TDR_v3_e
Date: Sat 20/02/21

Task | Split | Milestone | Summary
Project Summary | Inactive Task | Inactive Milestone | Inactive Summary
Manual Task | Duration-only | Manual Summary Rollup | Manual Summary
Start-only | Finish-only | External Tasks | External Milestone
Deadline | Progress | Manual Progress

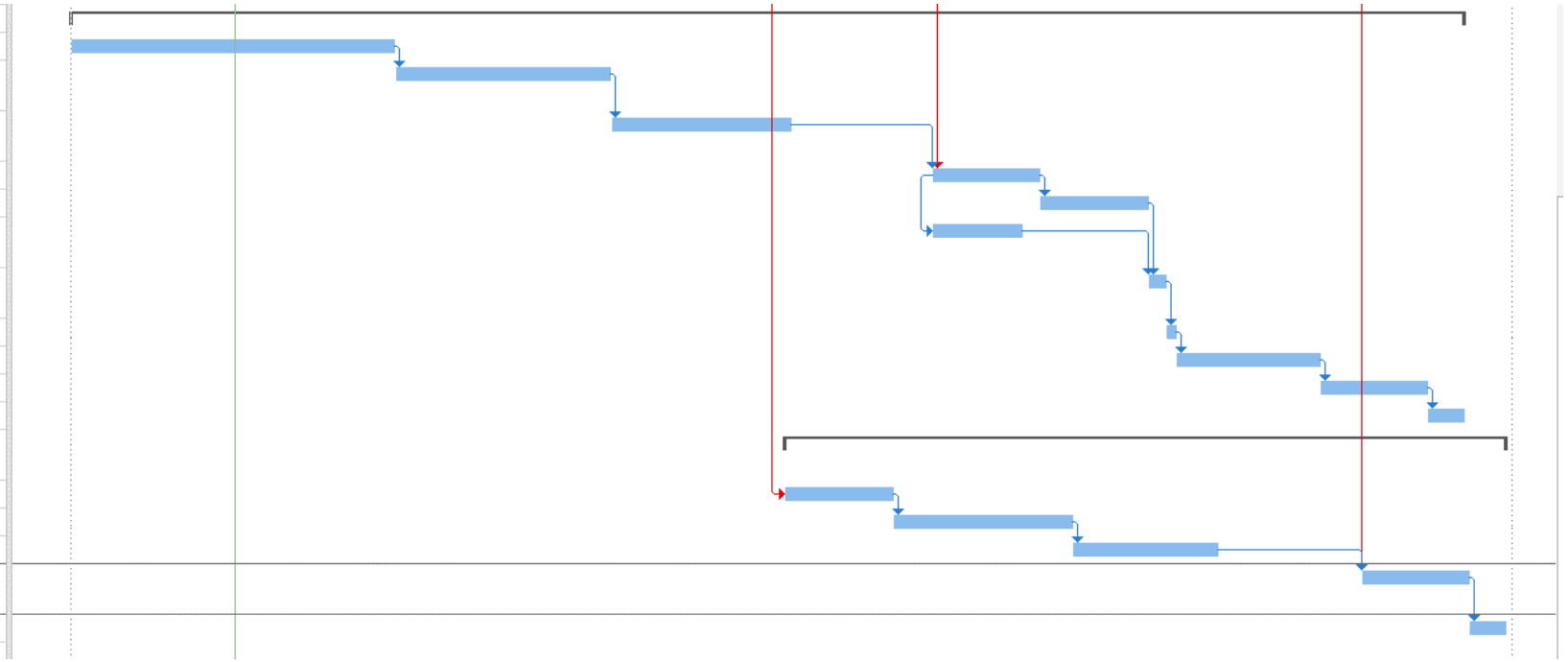
Planning



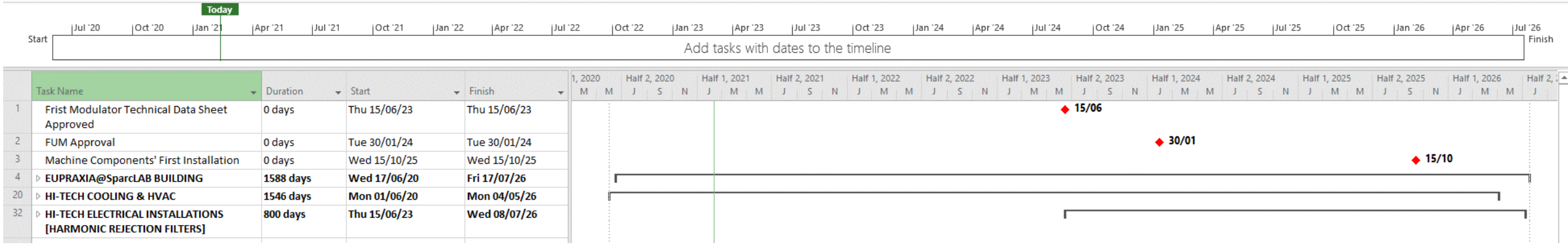
	Task Name	Duration	Start	Finish
1	Frist Modulator Technical Data Sheet Approved	0 days	Thu 15/06/23	Thu 15/06/23
2	FUM Approval	0 days	Tue 30/01/24	Tue 30/01/24
3	Machine Components' First Installation	0 days	Wed 15/10/25	Wed 15/10/25
4	**EUPRAXIA@SparcLAB BUILDING**	**1588 days**	**Wed 17/06/20**	**Fri 17/07/26**
5	Final Draft Issue	9,2 mons	Wed 17/06/20	Mon 01/03/21
6	INFN FD Review	20 days	Tue 02/03/21	Mon 29/03/21
7	Final Draft Amendment	15 days	Tue 30/03/21	Mon 19/04/21
8	Tender Issue for Final Draft and Detailed Engineering Design Administrative Check	8 mons	Mon 11/01/21	Fri 20/08/21
9	Final Draft Administrative Check (appointed professional)	2 mons	Mon 23/08/21	Fri 15/10/21
10	Final Draft INFN Validation	2 wks	Mon 18/10/21	Fri 29/10/21
11	Building Permitting Request	12 mons	Mon 01/11/21	Fri 30/09/22
12	Detailed Engineering Design (DED) Issue	6 mons	Mon 03/10/22	Fri 17/03/23
13	INFN DED Review	1 mon	Mon 20/03/23	Fri 14/04/23
14	DED Amendment	1 mon	Mon 17/04/23	Fri 12/05/23
15	DED Administrative Check (appointed professional)	3 mons	Mon 15/05/23	Fri 04/08/23
16	DED INFN Validation	2 wks	Mon 07/08/23	Fri 18/08/23
17	Tender for Building Construction Issue	12 mons	Mon 21/08/23	Fri 19/07/24
18	Building Construction	24 mons	Mon 22/07/24	Fri 22/05/26
19	Building Commissioning and Handover	2 mons	Mon 25/05/26	Fri 17/07/26

Planning

20	**HI-TECH COOLING & HVAC**	**1546 days**	**Mon 01/06/20**	**Mon 04/05/26**
21	Requirements Collection	18 mons	Mon 01/06/20	Fri 15/10/21
22	Feasibility Study [HI Stability Cooling R&D]	12 mons	Mon 18/10/21	Fri 16/09/22
23	INFN Front End Engineering Design (FEED)	10 mons	Mon 19/09/22	Fri 23/06/23
24	Tender Issue for Design Finalization	6 mons	Tue 30/01/24	Mon 15/07/24
25	FD & DED Issue	6 mons	Tue 16/07/24	Mon 30/12/24
26	Tender Issue for Design Administrative Check	5 mons	Tue 30/01/24	Mon 17/06/24
27	DED Administrative Check (appointed professional)	1 mon	Tue 31/12/24	Mon 27/01/25
28	DED INFN Validation	2 wks	Tue 28/01/25	Mon 10/02/25
29	Tender for Construction Issue	8 mons	Tue 11/02/25	Mon 22/09/25
30	Construction	6 mons	Tue 23/09/25	Mon 09/03/26
31	Commissioning and Start-up	2 mons	Tue 10/03/26	Mon 04/05/26
32	**HI-TECH ELECTRICAL INSTALLATIONS [HARMONIC REJECTION FILTERS]**	**800 days**	**Thu 15/06/23**	**Wed 08/07/26**
33	Feasibility Study [R&D]	6 mons	Thu 15/06/23	Wed 29/11/23
34	INFN DED Issue	10 mons	Thu 30/11/23	Wed 04/09/24
35	Tender for Installation	8 mons	Thu 05/09/24	Wed 16/04/25
36	Supply and Installation + Machine Components' Hookup	6 mons	Thu 27/11/25	Wed 13/05/26
37	Commissioning and Start-up	2 mons	Thu 14/05/26	Wed 08/07/26



Planning



	Task Name	Duration	Start	Finish
1	Frist Modulator Technical Data Sheet Approved	0 days	Thu 15/06/23	Thu 15/06/23
2	FUM Approval	0 days	Tue 30/01/24	Tue 30/01/24
3	Machine Components' First Installation	0 days	Wed 15/10/25	Wed 15/10/25
4	**EUPRAXIA@SparcLAB BUILDING**	**1588 days**	**Wed 17/06/20**	**Fri 17/07/26**
20	**HI-TECH COOLING & HVAC**	**1546 days**	**Mon 01/06/20**	**Mon 04/05/26**
32	**HI-TECH ELECTRICAL INSTALLATIONS [HARMONIC REJECTION FILTERS]**	**800 days**	**Thu 15/06/23**	**Wed 08/07/26**

Thank you for your attention