EuPRAXIA @ SPARC_LAB

Project Management

Antonio Falone

F.Cioeta

M.Iungo

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TDR Review Committee, 26/10/2021.

Outline

- Highlights
- Project Management Plan for the TDR - Phased approach.
  - Project Organization
  - Project Planning baseline
  - Project cost baseline
  - Risk management
- Manpower current allocation & estimation of additional resources required.
- Project Management & Integration ongoing activities

Highlights

EuPRAXIA - European Plasma Research Accelerator with Excellence in Applications, a distributed, compact and innovative accelerator facility based on plasma technology, set to construct an electron-beam-driven plasma accelerator in the metropolitan area of Rome, followed by a laser-driven plasma accelerator in European territory

After a long and challenging evaluation process, EuPRAXIA has been included in the ESFRI 2021 Roadmap - ranking HIGH

Application to the preparatory phase on going. 3M€ to support the TDR work. Deadline 20/01/2022

Highlights

EuPRAXIA @ SPARC LAB
Project Office

- Additional manpower to fill up the Project office - Financial officer is about to be hired.
- Project Management Plan, for EuPRAXIA@SPARC_LAB presented to the INFN management board
- Monitoring & Control activities started
- Integration activities started (Functional layout, naming convention etc…).
- Some update to the Organization Breakdown Structure

Highlights

- Building final design - accomplished
- Final review for approval is scheduled tomorrow
- Authorization process will start afterwards
- Risk mitigation actions implemented (see risk section and U.Rotundo Talk)
- Need for re-baselining the project.

A dedicated review meeting with an expert panel will take place by the end of the year to validate the main technical choices.

Project Management Plan

DocID	Rev.	Validità
EuPRAXIA-PO-PMP-001	1.2	Approved

Data 20/04/2021

Project Management Office

EuPRAXIA@SPARC_LAB Project Management Plan towards TDR

This document summarizes scope, cost & schedule for the completion of the Technical Design Report of EuPRAXIA@SPARC_LAB

Autore	Verificato da	Approvato da
A.Falone	A.Falone	G.E.
M.lungo	M.Ferrario	S.C.

Lista di distribuzione:

- Public

- Draft version presented in Jan 2021 at this committee
- Presented to the INFN management board (GE) in February 2021 and "informally" approved.
- Part of TDR funding already allocated for urgent procurement
- Comprehensive document for the TDR Phase

Project Management Plan

INFN
Istituto Nazionale di Fisica Nucleare

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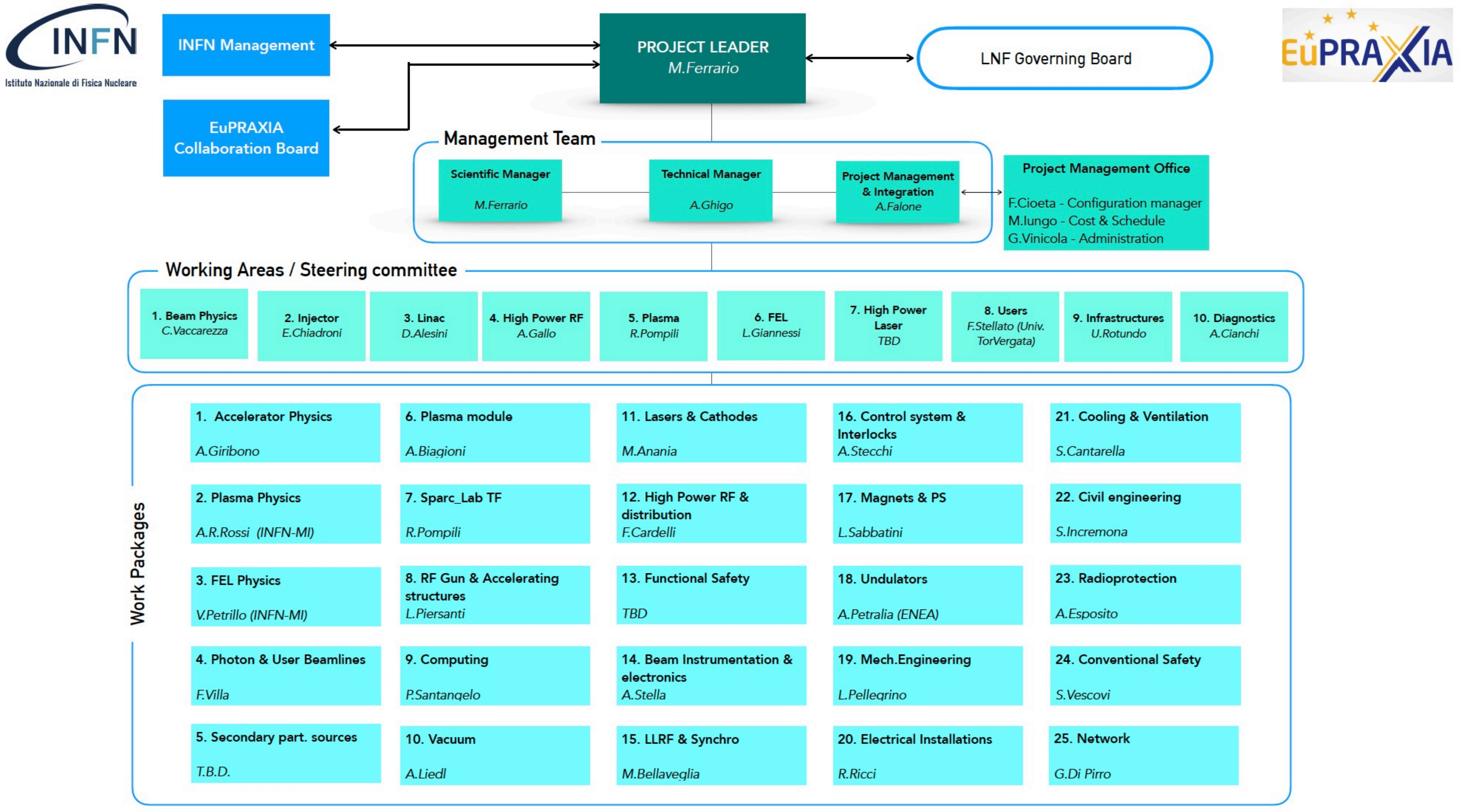
Lista di distribuzione:

- Public

- Organization Breakdown Structure
- Work Breakdown Structure
- R&D Cost
- High level and detailed schedule
- Risk management
- Project Control & Methodology
- Project Communication Plan

Organization Breakdown Structure

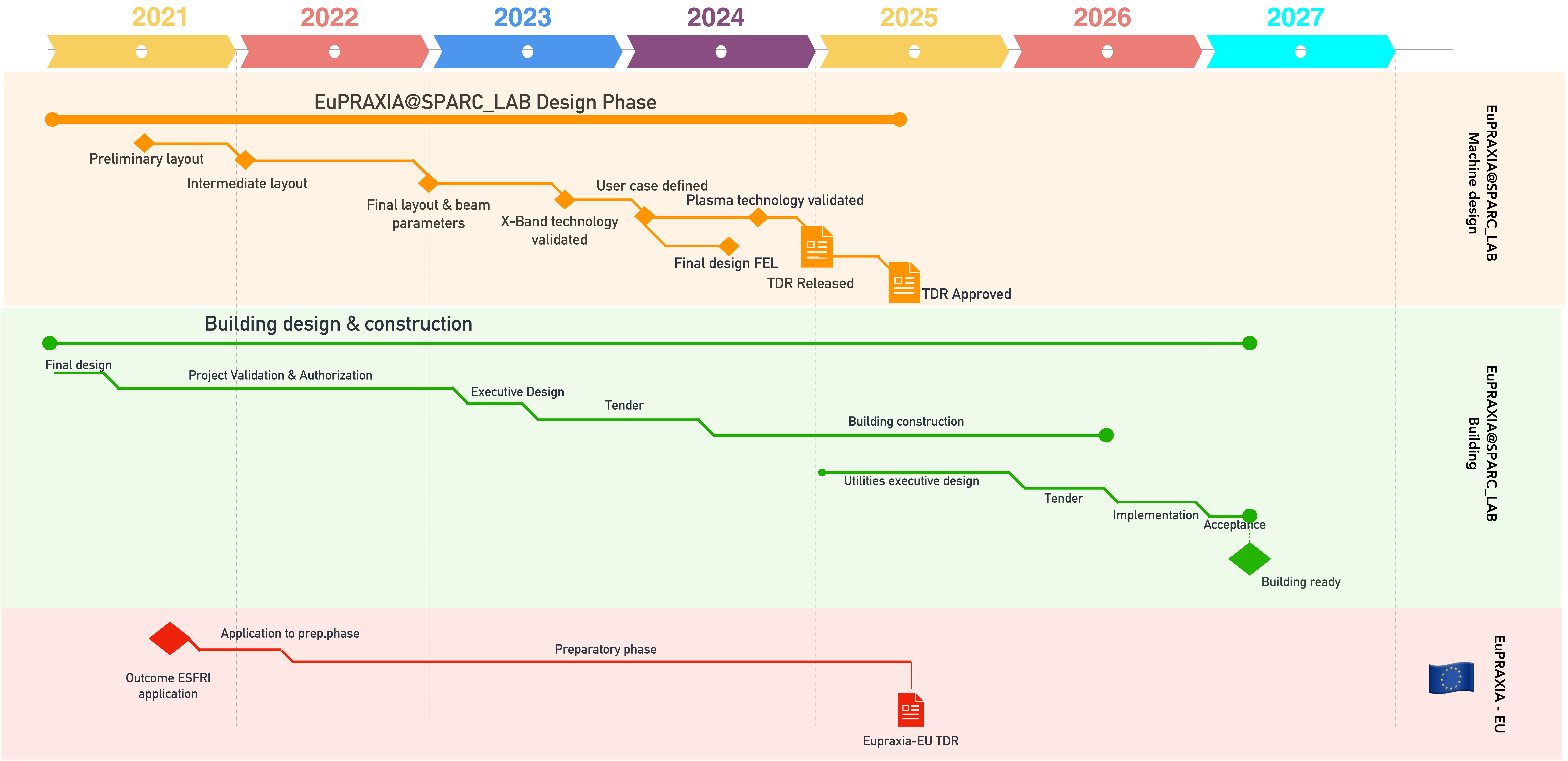


- Few modification w.r.t. last presented version:
  - Additional working area for Diagnostics
  - Some WP responsible have been changed
  - Additional WP: Network, Functional safety.
- For each work packages, expected activities and deliverables are reported in a dedicated document - WBS dictionary (to be updated soon).
- It follows the matrix structure of the internal LNF organigram.
- Aligned w.r.t. the EuPRAXIA consortium expected activities.

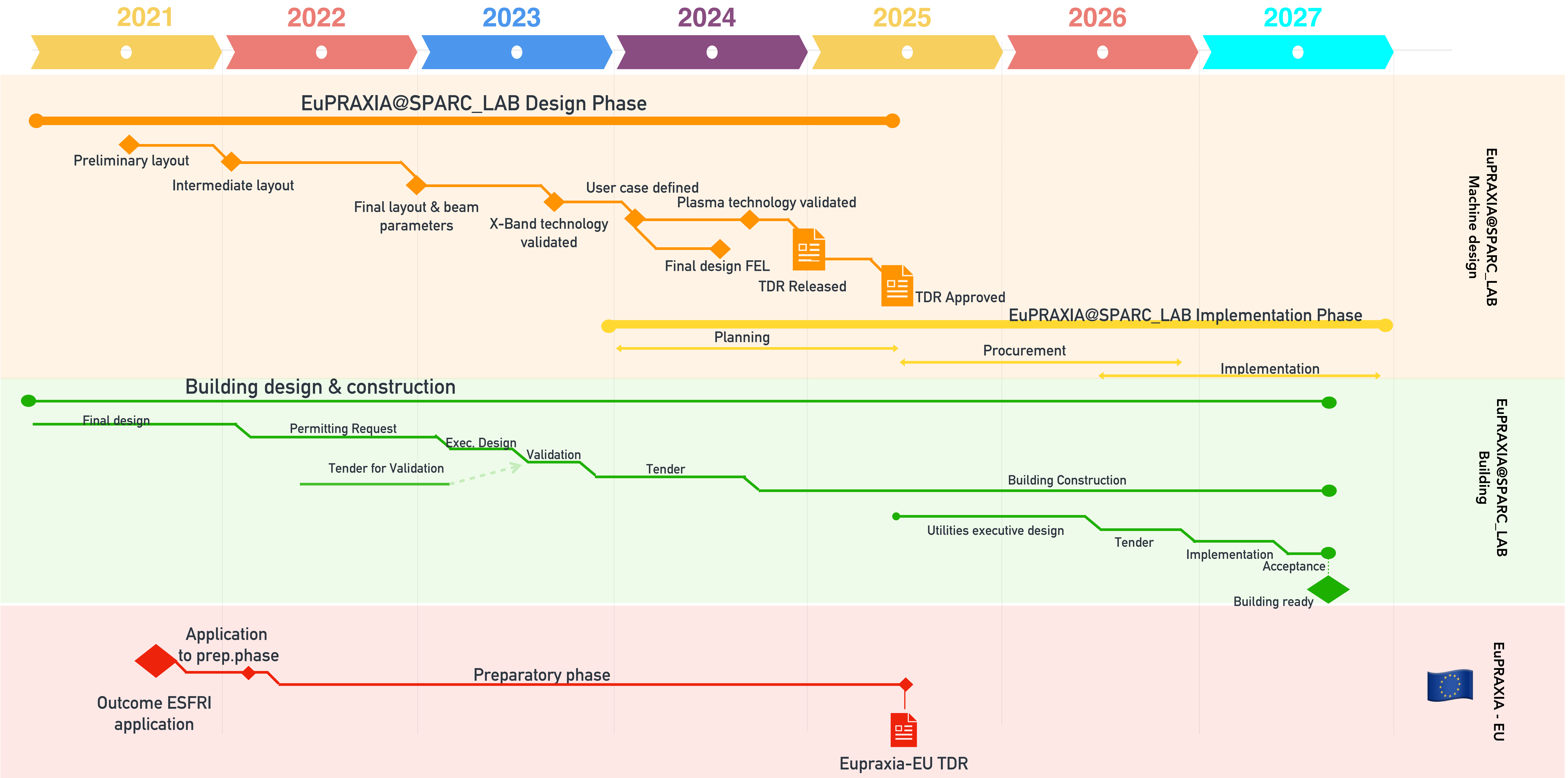

INFN
Istituto Nazionale di Fisica Nucleare
INFN Management
EuPRAXIA Collaboration Board
PROJECT LEADER
M.Ferrario
LNF Governing Board
EuPRAXIA
Management Team
Scientific Manager
M.Ferrario
Technical Manager
A.Ghigo
Project Management & Integration
A.Falone
Project Management Office
F.Cioeta - Configuration manager
M.Iungo - Cost & Schedule
G.Vinicola - Administration
Working Areas / Steering committee
1. Beam Physics
C.Vaccarezza
2. Injector
E.Chiadroni
3. Linac
D.Alesini
4. High Power RF
A.Gallo
5. Plasma
R.Pompili
6. FEL
L.Giannessi
7. High Power Laser
TBD
8. Users
F.Stellato (Univ. TorVergata)
9. Infrastructures
U.Rotundo
10. Diagnostics
A.Cianchi
Work Packages
1. Accelerator Physics
A.Giribono
2. Plasma Physics
A.R.Rossi (INFN-MI)
3. FEL Physics
V.Petrillo (INFN-MI)
4. Photon & User Beamlines
F.Villa
5. Secondary part. sources
T.B.D.
6. Plasma module
A.Biagioni
7. Sparc_Lab TF
R.Pompili
8. RF Gun & Accelerating structures
L.Piersanti
9. Computing
P.Santangelo
10. Vacuum
A.Liedl
11. Lasers & Cathodes
M.Anania
12. High Power RF & distribution
F.Cardelli
13. Functional Safety
TBD
14. Beam Instrumentation & electronics
A.Stella
15. LLRF & Synchro
M.Bellaveglia
16. Control system & Interlocks
A.Stecchi
17. Magnets & PS
L.Sabbatini
18. Undulators
A.Petralia (ENEA)
19. Mech.Engineering
L.Pellegrino
20. Electrical Installations
R.Ricci
21. Cooling & Ventilation
S.Cantarella
22. Civil engineering
S.Incremona
23. Radioprotection
A.Esposito
24. Conventional Safety
S.Vescovi
25. Network
G.Di Pirro

TIME BASELINE

Roadmap towards TDR - Old Baseline



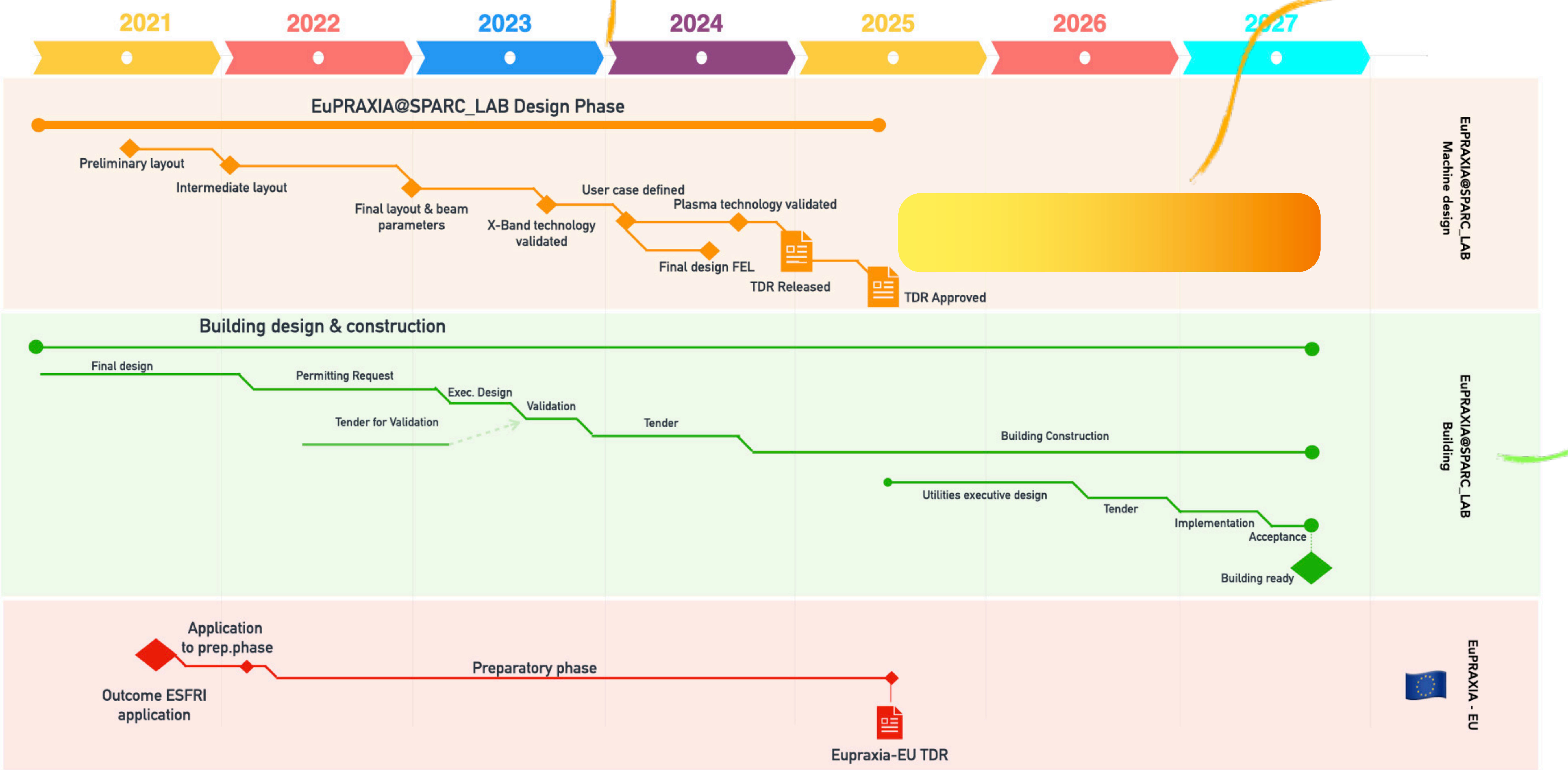
Roadmap towards TDR - new baseline



Roadmap towards TDR - new baseline

- Start Implementation phase planning

- Implementation phase:
  - Procurement
  - Pre-assembly
  - Start of installation



- Contingencies allocated for each activity
- Schedule compression actions under consideration:
  - Consider the possibility of a partial handover to start installation before the end of the construction
  - Preliminary activities to be started well before the indicated data
  - Based on some assumptions to be refined as long as the process will go forward.

- Activities depending on external constraints:
  - Permitting authorities
  - Tender procedure (EU tender required)

Building planning baseline

ID		Modalità attività	WBS	Task Name	Durata	Inizio	Fine	Predecessori	Successori
1			1	First Modulator Technical Data Sheet Approved	0 giorni	gio 15/06/23	gio 15/06/23		33II
2			2	FUM Approval	0 giorni	mar 30/01/24	mar 30/01/24		24
3			3	Machine Components' First Installation	0 giorni	mer 15/10/25	mer 15/10/25		36
4			**4**	**EUPRAXIA@SparcLAB BUILDING**	**1892 giorni**	**mer 17/06/20**	**gio 16/09/27**		
5			4.1	Final Draft Issue	9,2 mes	mer 17/06/20	lun 01/03/21		6
6			4.2	INFN FD Review	20 giorni	ven 01/10/21	gio 28/10/21	5	7
7			4.3	Final Draft Amendment	15 giorni	ven 29/10/21	gio 18/11/21	6	8
8			4.4	Final Draft Administrative Check (internal INFN)	2 mes	ven 19/11/21	gio 13/01/22	7	9
9			4.5	Final Draft INFN Validation	2 sett.	ven 14/01/22	gio 27/01/22	8	10;11FI+120 giorn
10			4.6	Building Permitting Request	12 mes	ven 28/01/22	gio 29/12/22	9	12
11			4.7	Tender Issue for Detailed Engineering Design Administrative Check	8 mes	ven 15/07/22	gio 23/02/23	9FI+120 giorni	15
12			4.8	Detailed Engineering Design (DED) Issue	6 mes	ven 30/12/22	gio 15/06/23	10	13
13			4.9	INFN DED Review	1 mes	ven 16/06/23	gio 13/07/23	12	14
14			4.10	DED Amendment	1 mes	ven 14/07/23	gio 10/08/23	13	15
15			4.11	DED Administrative Check (appointed professional)	3 mes	ven 11/08/23	gio 02/11/23	14;11	16
16			4.12	DED INFN Validation	2 sett.	ven 03/11/23	gio 16/11/23	15	17
17			4.13	Tender for Building Construction Issue	12 mes	ven 17/11/23	gio 17/10/24	16	18
18			4.14	Building Construction	36 mes	ven 18/10/24	gio 22/07/27	17	19
19			4.15	Building Commissioning and Handover	2 mes	ven 23/07/27	gio 16/09/27	18	
20			**5**	**HI-TECH COOLING & HVAC**	**1546 giorni**	**lun 01/06/20**	**lun 04/05/26**		
21			5.1	Requirements Collection	18 mes	lun 01/06/20	ven 15/10/21		22
22			5.2	Feasibility Study [HI Stability Cooling R&D]	12 mes	lun 18/10/21	ven 16/09/22	21	23
23			5.3	INFN Front End Engineering Design (FEED)	10 mes	lun 19/09/22	ven 23/06/23	22	24
24			5.4	Tender Issue for Design Finalization	6 mes	mar 30/01/24	lun 15/07/24	23;2	25;26II
25			5.5	FD & DED Issue	6 mes	mar 16/07/24	lun 30/12/24	24	27
26			5.6	Tender Issue for Design Administrative Check	5 mes	mar 30/01/24	lun 17/06/24	24II	27
27			5.7	DED Administrative Check (appointed professional)	1 mes	mar 31/12/24	lun 27/01/25	26;25	28
28			5.8	DED INFN Validation	2 sett.	mar 28/01/25	lun 10/02/25	27	29
29			5.9	Tender for Construction Issue	8 mes	mar 11/02/25	lun 22/09/25	28	30
30			5.10	Construction	6 mes	mar 23/09/25	lun 09/03/26	29	31
31			5.11	Commissioning and Start-up	2 mes	mar 10/03/26	lun 04/05/26	30	
32			**6**	**HI-TECH ELECTRICAL INSTALLATIONS [HARMONIC REJECTION FILTERS]**	**800 giorni**	**gio 15/06/23**	**mer 08/07/26**		
33			6.1	Feasibility Study [R&D]	6 mes	gio 15/06/23	mer 29/11/23	1II	34
34			6.2	INFN DED Issue	10 mes	gio 30/11/23	mer 04/09/24	33	35
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36			6.4	Supply and Installation + Machine Components' Hookup	6 mes	gio 27/11/25	mer 13/05/26	35FI+8 mes;3	37
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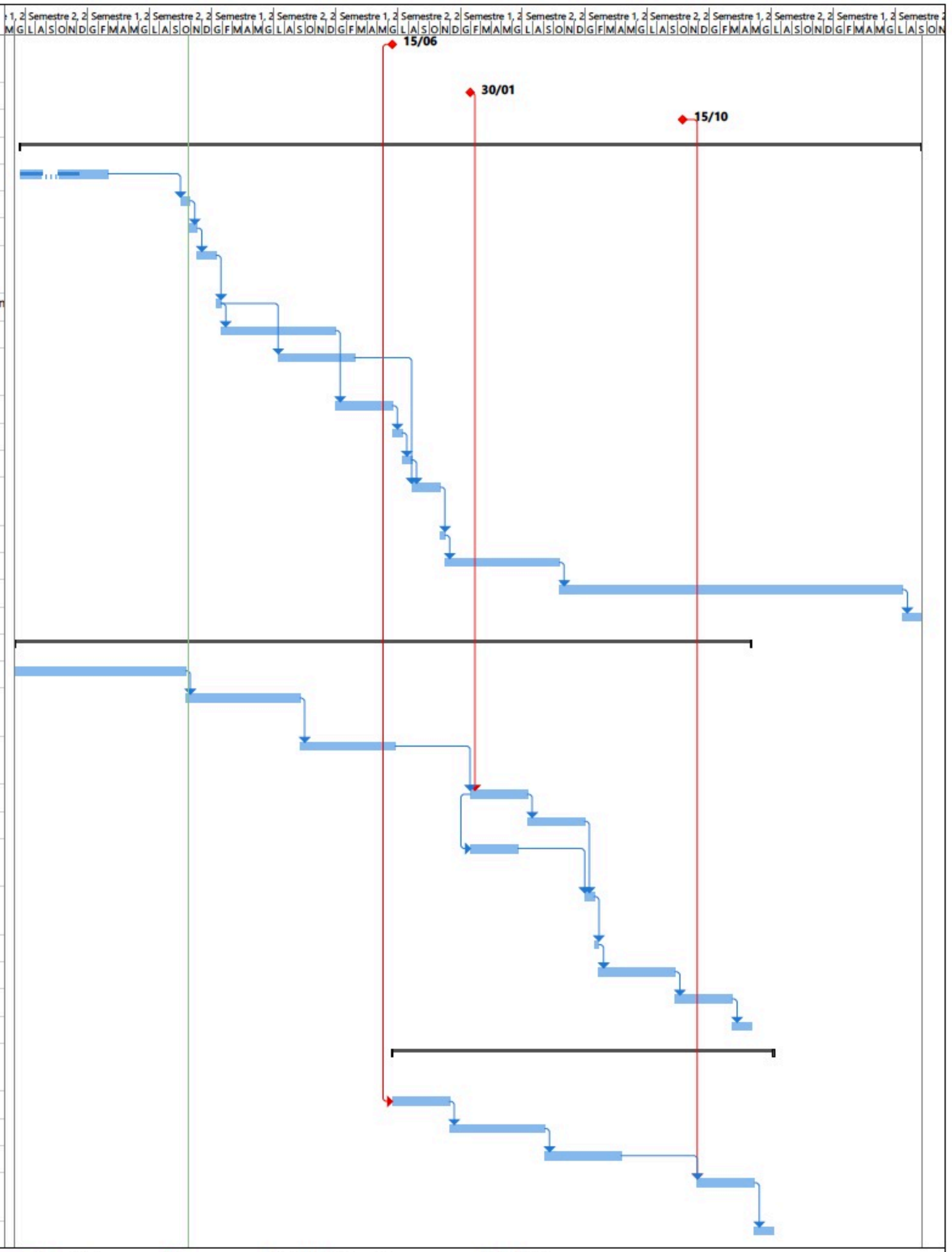
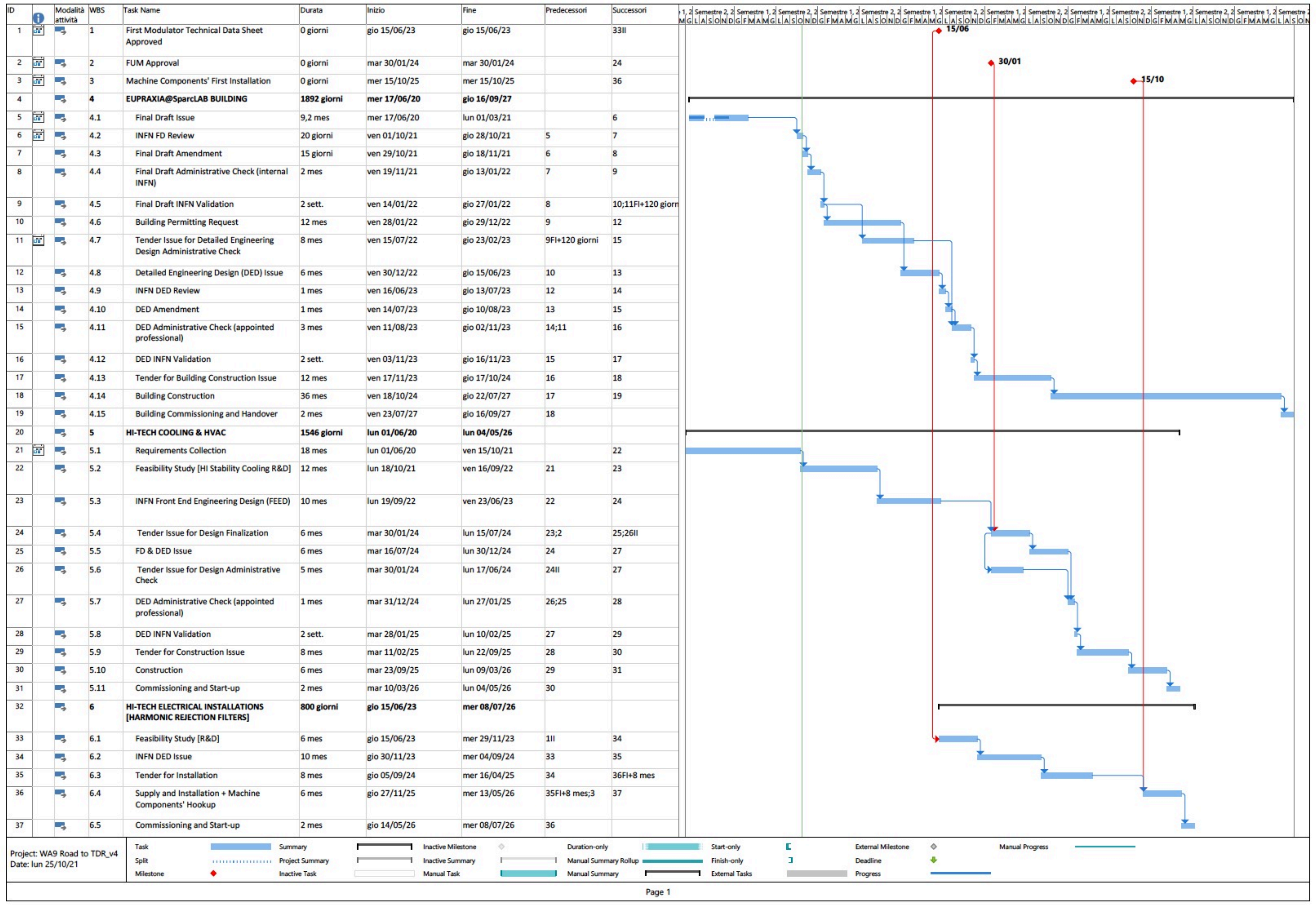


Project: WA9 Road to TDR_v4
Date: lun 25/10/21

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

Page 1

Building planning baseline



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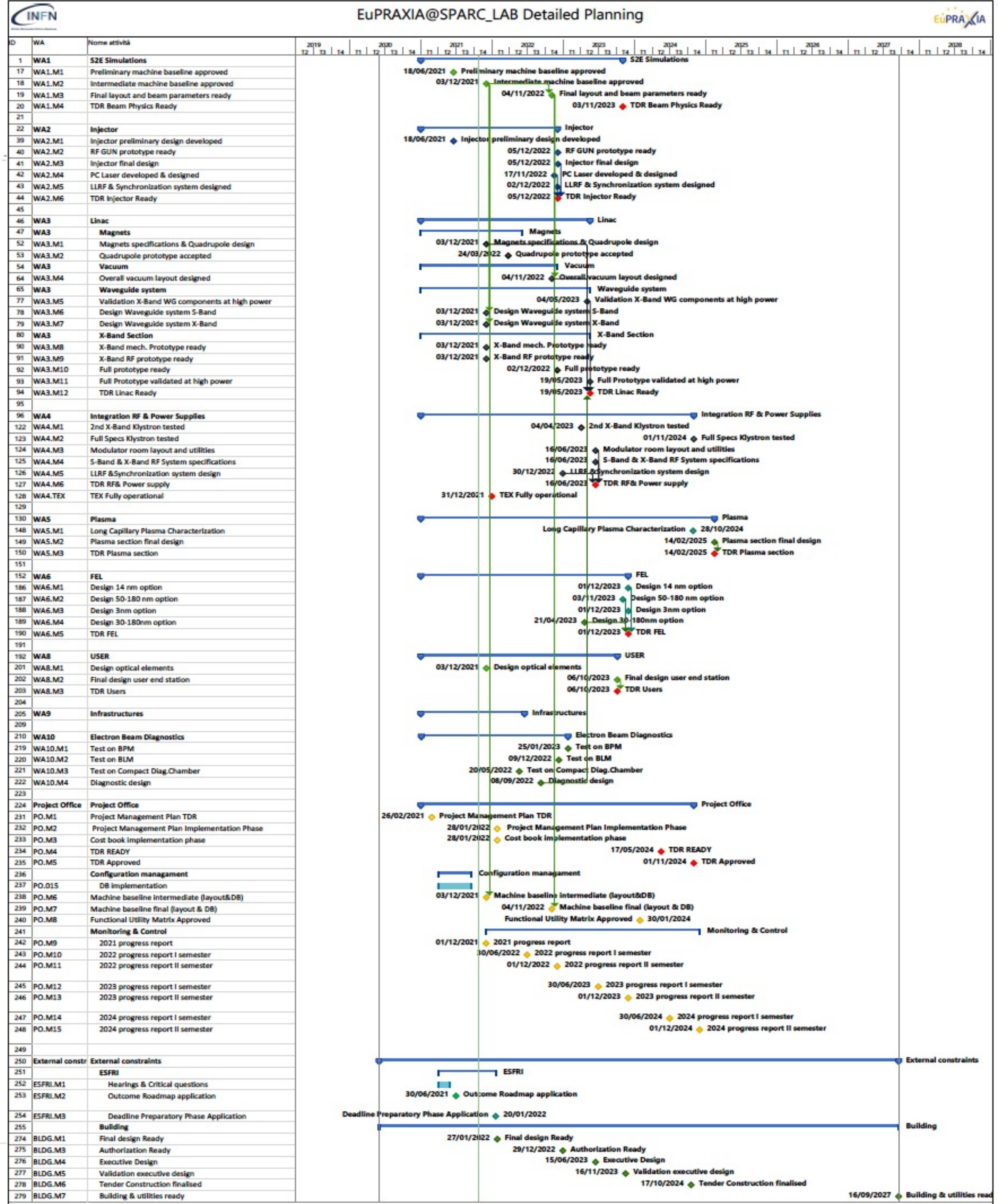
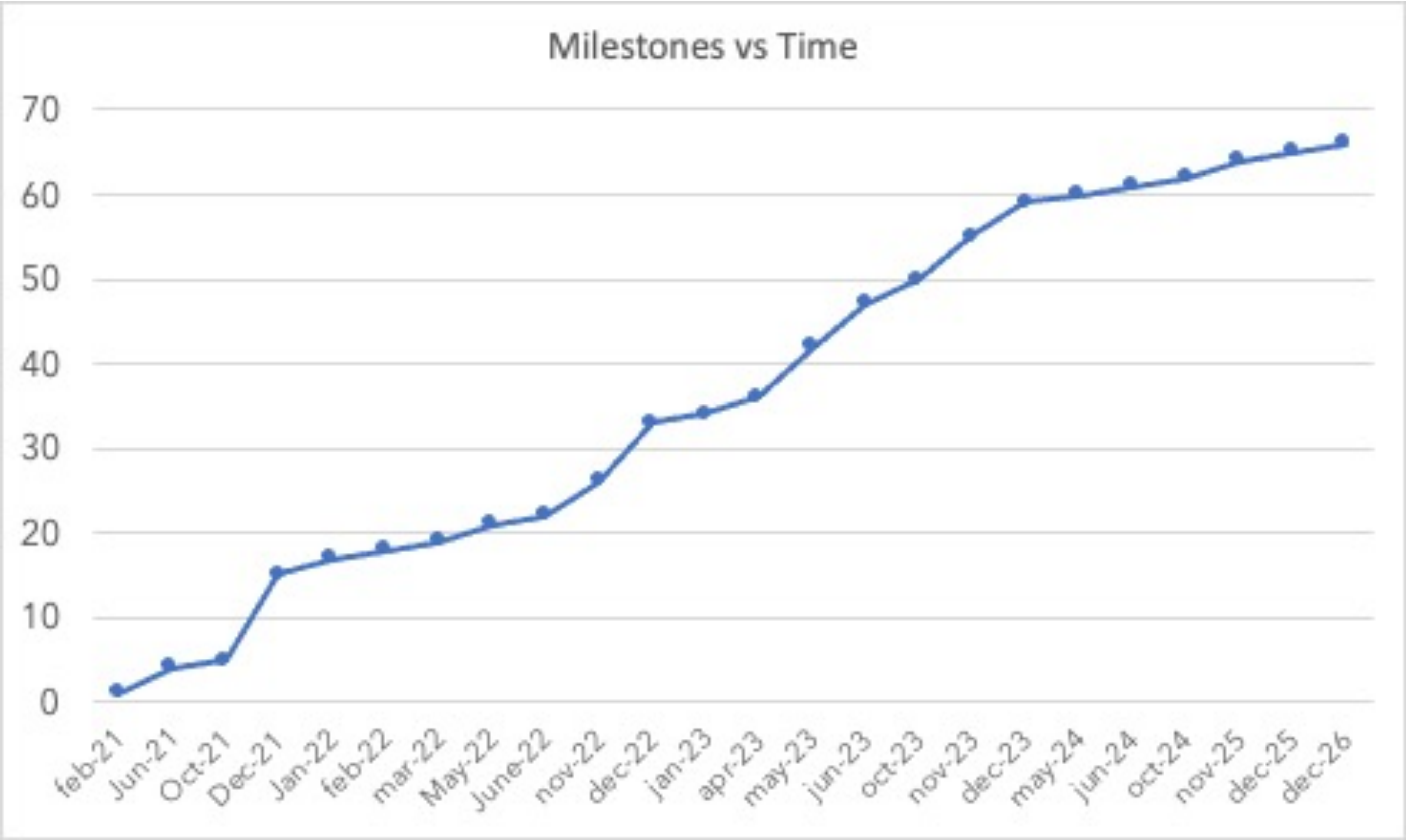
- Critical Internal dependencies:
  - RF System requirements
  - Functional Utility Matrix

- Critical External dependencies:
  - Permitting process: 12months with some contingencies. Preliminary works already started.
  - DED Verification Process: To be outsourced, only 1 Verification tender in order to compress the schedule.
  - Administrative time for EU Building tender.



- The detailed planning considers all the most critical activities organized per Working Area.
- Building and ESFRI activities are also considered since they act as external constraints and it is important to make sure that TDR activities are synchronized with the building development and construction and EU initiative (Preparatory phase).
  - Simplified and compressed version + full detailed planning
  - BUILDING is on the critical path.
  - Several intermediate deliverables/milestones to help monitoring & control

Intermediate milestones



- High Level milestones as presented in the high level planning have been broken down to several intermediate deliverables/milestones to help monitoring & control

- Upcoming milestones discussed at every WA Meeting.

- Several class of intermediate milestones:
    - Protoype (hardware)
    - Design
    - Report

- Dependencies are also considered

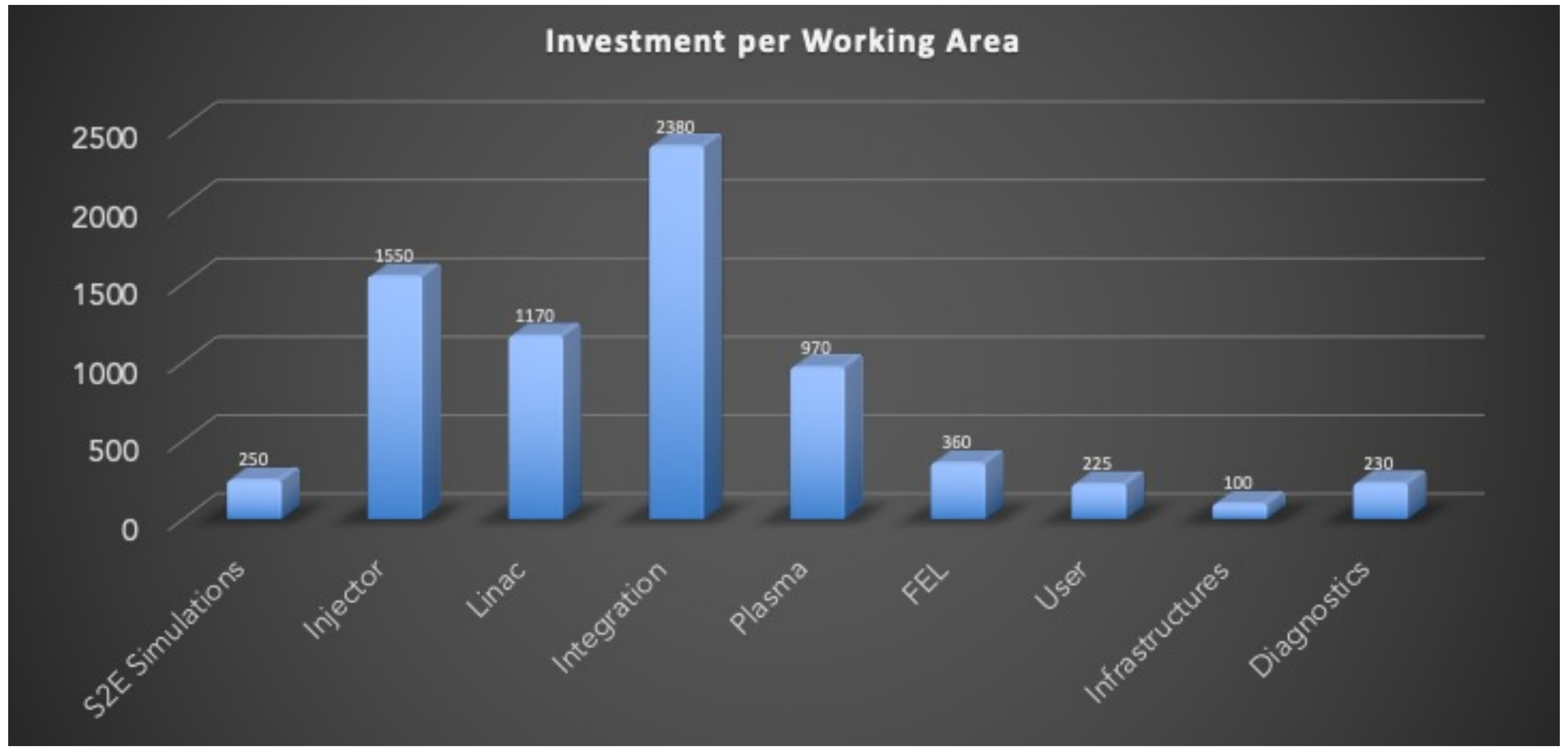
Short term outlook - upcoming milestones

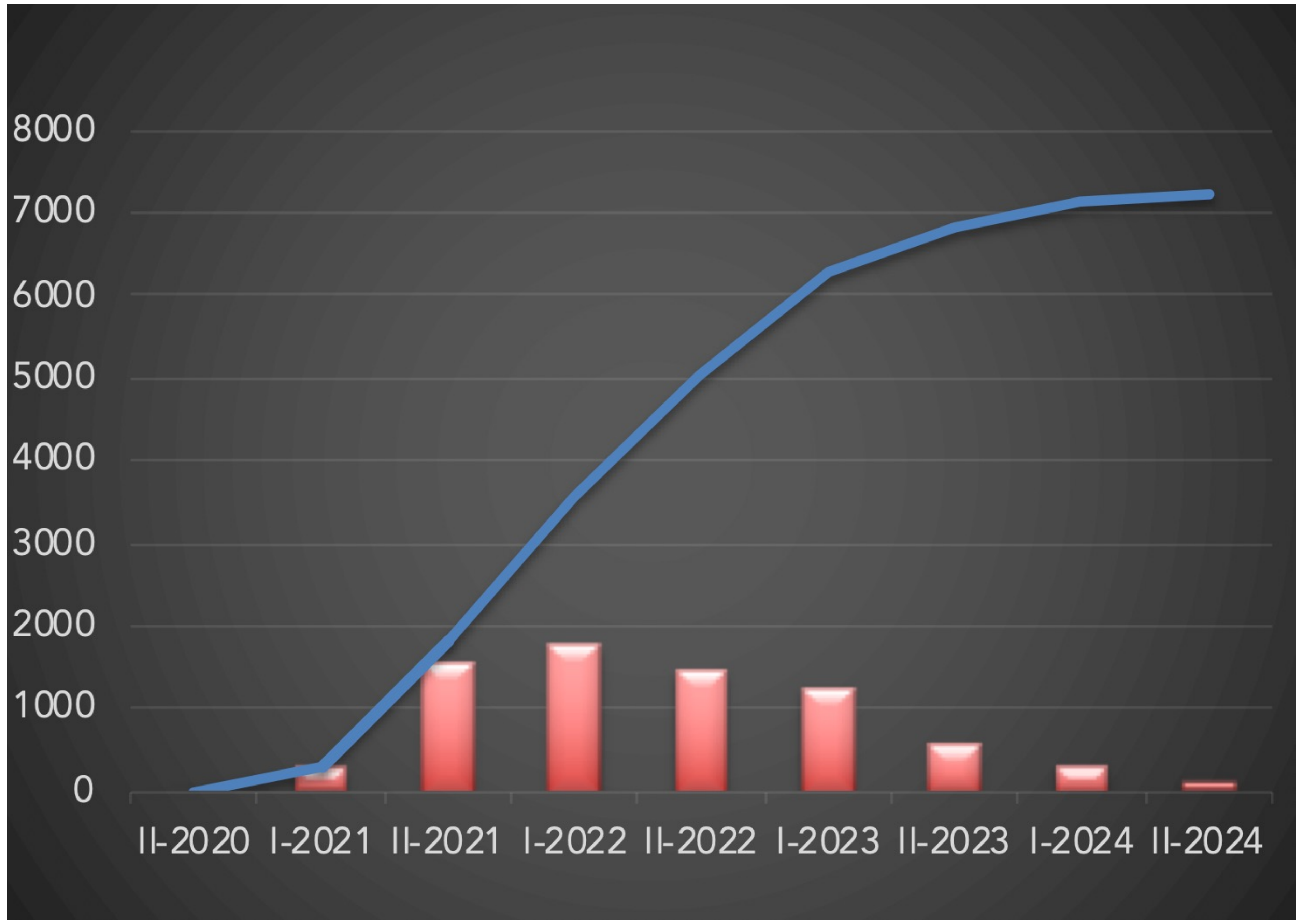
Intermediate Milestone	Expected date	Status	Risk
Project Management Plan ready	Feb21	☑ **Accomplished**	n.a.
Preliminary layout	Jun -21	☑ **Accomplished**	n.a.
Injector preliminary layout	Jun -21	☑ **Accomplished**	n.a.
Building final design	Jun -21	☑ **Accomplished**	n.a.
Outcome ESFRI Application	Oct-21	☑ **Accomplished**	n.a.
2021 Progress Report	Dec-21	On time	None
Intermediate machine baseline	Dec-21	Ongoing	Risk of delay HIGH due to lack of manpower
Magnets Specifications	Dec-21	Ongoing	Risk of delay HIGH due to lack of manpower
S-Band Waveguide design	Dec-21	On time	None
X-Band Waveguide design	Dec-21	On going	Depending on the final RF Station choice. It might be delayed
X-Band mech prototype	Dec-21	On time	To be validated
X-Band RF Prototype	Dec-21	On time	To be validated
Funcitonal layout and configuration framework	Dec-21	☑ **Accomplished**	n.a.
TEX Fully operational	Dec-21	On time	None

COST BASELINE

Cost-Baseline

Working Area	Amount (k€)
WA1- Beam Physics	250
WA2 - Injector	1550
WA3 - Linac	1170
WA4 - Integration	2380
WA5 - Plasma	970
WA6 - FEL	360
WA8 - Users	225
WA9 - Infrastructures	100
WA.10 - Diagnostics	230
Subtotal	7235
Contingencies	360
TOTAL	7595





- Cost Baseline for TDR already presented at the last meeting. Few modification in the meanwhile.
- Presented to the INFN management board (GE) which informally approved but waiting for your final feedback.
- Some funds already allocated to cover some urgent procurement.

Cost-Baseline, shopping cart

Working Area	Item	Expected cost (k€)	Comment
WA.1 - Beam Physics	Computing cluster for 3D Full simulations	250	Already procured
WA.2 - Injector	Upgrade PC Laser	725	To be performed @ SPARC_LAB
	Upgrade LLRF	100	To be performed @ SPARC_LAB
	Upgrade Synch System	100	To be performed @ SPARC_LAB
	Upgrade Timing System	50	To be performed @ SPARC_LAB
	RF Gun prototype	25	First under testing @ SPARC_LAB
	S-Band Modulator	550	To be defined
WA.3 - LINAC	Heat treatment chamber	70	
	Vacuum Components	60	
	Local heater	10	
	X-Band mech prototype	60	Already procured
	X-Band RF prototype	80	
	RF - in vacuum component	50	
	WG Circular mode converter	80	
	High Power Waveguide component	150	
	X-Band full prototype	200	
	BOC Prototype (x2)	200	
	Magnetic measurement lab upgrade	130	
	Compact integrated quad prototype	80	

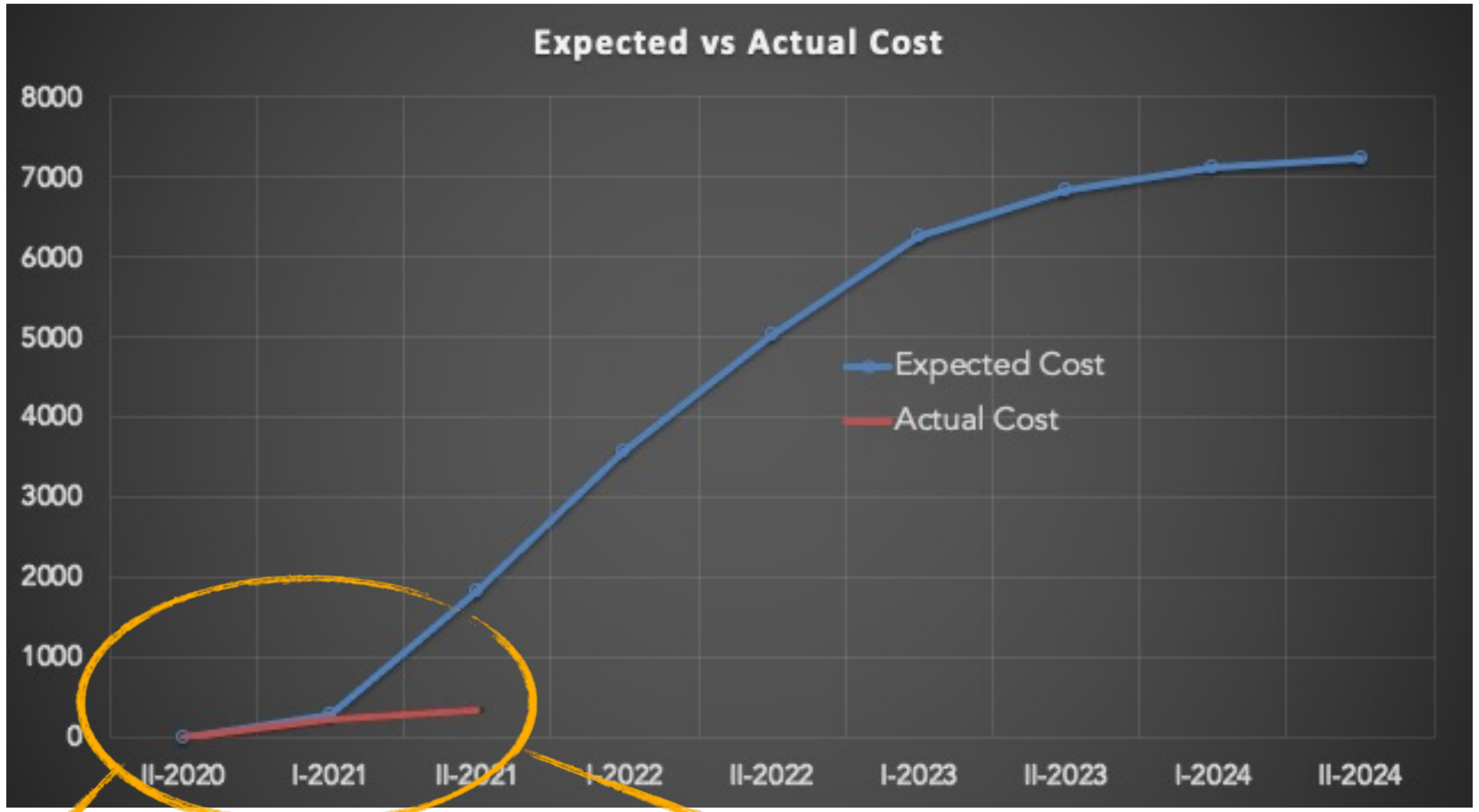
Cost-Baseline, shopping cart

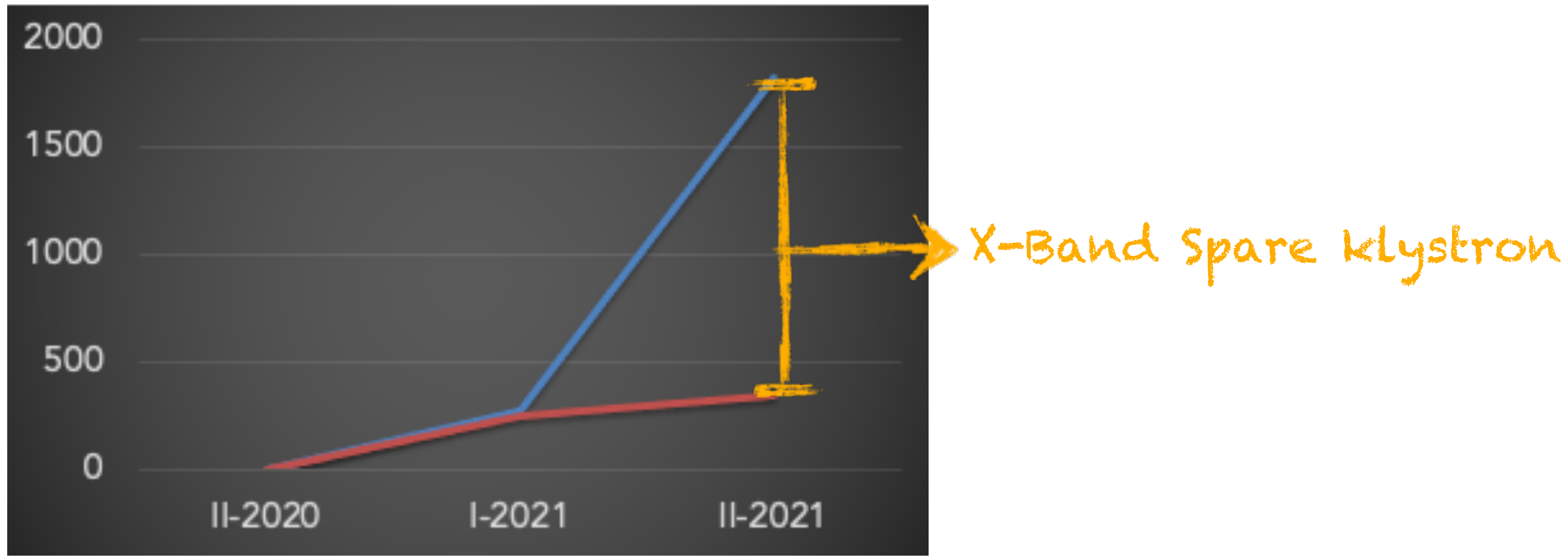
Working Area	Item	Expected cost (k€)	Comment
WA.4 - Integration	Klystron spare for TEX	1300	Under discussion
	X-Band Solid state amplifier	100	
	Warranty extension	35	Already procured
	TEX Setup	195	Already procured
	2nd Klystron full specs	750	
WA.5 - Plasma	Vacuum Chamber & Support	150	To be performed @SPARC_LAB
	Capillary & Supports	100	To be performed @SPARC_LAB
	Plasma diagnostics	240	To be performed @SPARC_LAB
	Discharge laser trigger	60	To be performed @SPARC_LAB
	Gas injection system	60	To be performed @SPARC_LAB
	Pumping system	120	To be performed @SPARC_LAB
	Motorized actuators	100	To be performed @SPARC_LAB
	Electrovalve	40	To be performed @SPARC_LAB
	Discharge pulser and HV generator	100	To be performed @SPARC_LAB

Cost-Baseline, shopping cart

Working Area	Item	Expected cost (k€)	Comment
WA.4 - Integration	Klystron spare for TEX	1300	Under discussion
	X-Band Solid state amplifier	100	
WA.6 - FEL	Prototype Apple X	100	
	Intraondulator diag prototype	100	
WA.8 - User	Optical elements prototype	225	
WA.9 - Infrastructure	Radioprotection studies	50	
	High stability cooling skid	50	
WA.10 - Diagnostics	High precision charge measurement	80	
	Beam loss monitor prototype	30	
	Stripline BPM prototype	60	Already procured
	Compact diagnostic chamber prototype	60	

Cost-Baseline, status





- Some items already procured thanks to a pre-allocation of money of the GE due to urgent reasons.
- Under budget at the moment → Bad Sign!
- Essentially due to delays in the negotiation of the spare X-Band Klystron (most expensive item to be purchased). See. A.Gallo's talk.
- Excessive cost of CPI klystron opened the way to different scenarios (negotiations with CPI/CERN and involvement of Canon).
- This is a critical choice for the development of the machine. A small delay to get to a wise choice can be considered acceptable and in any case we plan to finalize the decision soon and hence allocate the money in a short term.

Risk Management

Risk management, methodology

LEVEL	DESCRIPTION	PROBABILITY
5	Very High	80% - 100% or ever month
4	High	60% - 79% or every year
3	Moderate	40% - 59% or an event every 2-5 years
2	Low	20% - 39% or an event every 5 – 10 years
1	Very Low	0% - 19% or an event every > 10 years

LEVEL	DESCRIPTION	IMPACT
5	Very High	Failure in the scope or time or cost of the project.
4	High	Extra-cost of the project that must be allocated through dedicated management (GE) actions. Completion delayed >1year Machine performances significantly reduced
3	Moderate	Cost increasing but affordable within contingency or with modest extra funding Completion delayed > 6 months Machine performances lightly reduced but within the scientific goals
2	Low	Moderate increase of the cost affordable with allocated contingencies. Completion delayed < 6 months Marginal impact on the machine performances
1	Very Low	Some marginal cost increasing Few intermediate milestones delayed (not in the critical path) NO impact on the machine performances

- Risks defined as: R=PxI. Likelihood x Impact.
- Risk matrix and thresholds:
  - LOW - R< 6 , No actions required
  - MODERATE - 6<R<10, Some contingencies might be required
  - HIGH - 10<R<15, Contingencies MUST be allocated & mitigation actions might be required
  - CRITICAL - R>15, Mitigation actions required

TDR- Management Risks

EVENT	P	I	LEVEL	TYPE OF RISK	DESCRIPTION	MITIGATION ACTIONS
Extra cost	3	4	HIGH	COST	Extra cost for prototyping and experimental activities	Close follow up of procurement and authorization process before launch the procurement. Periodical reviews to assess extra cost and potential compensation.
Time delay	3	4	HIGH	TIME	Time delays	Contingencies allocated. TDR completion is currently NOT in the critical path which is dominated by the building.
Manpower	4	3	HIGH	TIME & COST	Shortage of manpower	A comprehensive plan to cover required professional profile will be discussed at management level.
Financial resources availability	2	2	LOW	COST	Financial resources	Funds allocated are sufficient for the TDR and Implementation. Additional funding are expected through different funding agencies (ESFRI preparatory phase, regional funding, other European calls).

TDR - Technical Risks

EVENT	P	I	LEVEL	TYPE OF RISK	DESCRIPTION	MITIGATION ACTIONS
X-Band Acc-Section	3	3	MODERATE	Time & Cost	X-Band Acc.section technology is new.	Collaboration with CERN. Prototyping for technology assessment and validation
Manpower	4	3	HIGH	TIME	Resources under-allocated	A masterplan for additional recruitment should be done at LAB level.
X_Band performances	2	4	MODERATE	Scope	The performances of the 100Hz High power X-Band klystron are still to be proven	Involvement of other companies with different technological scenarios are under consideration
Plasma development	3	4	HIGH	Scope	Performances of the PWFA Scheme	R&D and international collaboration

Building - Management Risks

EVENT	P	I	LEVEL	TYPE OF RISK	DESCRIPTION	MITIGATION ACTIONS
Verification delay	3	3	Moderate	TIME	Design verification steps might be time consuming	Make only 1 tender only for the executive design. Out of the critical path.
Authorization delays	3	3	MODERATE	TIME	Time delays due to the authorization process which is still unkown	Reasonable contingencies. Some preliminary activities already started.
Tender	4	3	HIGH	TIME	Time needed to issue a multimillion tender might become longer than expected	To be carefully monitored. Prepare tender in advance and implement reasonable contingencies.
Construction cost	3	2	MODERATE	COST	Extra cost during construction	Contingencies are usually considered in the tender.
Construction delays	4	4	CRITICAL	TIME	Time delays due to building construction.	1. Compress verification and tender phase as much as possible. 2. Consider the possibility to have some areas available before the completion of the building. 3. Contingencies already allocated

Resource management

Current resources allocation [FTE]

	Accelerator Division										
	Diag.	Magnets	Mech Eng	Linac	RF	Controls	Vacuum	Laser	STAFF	Secret.	TOT
Staff	3	1,5	2	2	2	2	3	2	7	1	25,5
Technician	2	1	2	3	2	1	3	1	0	0	15

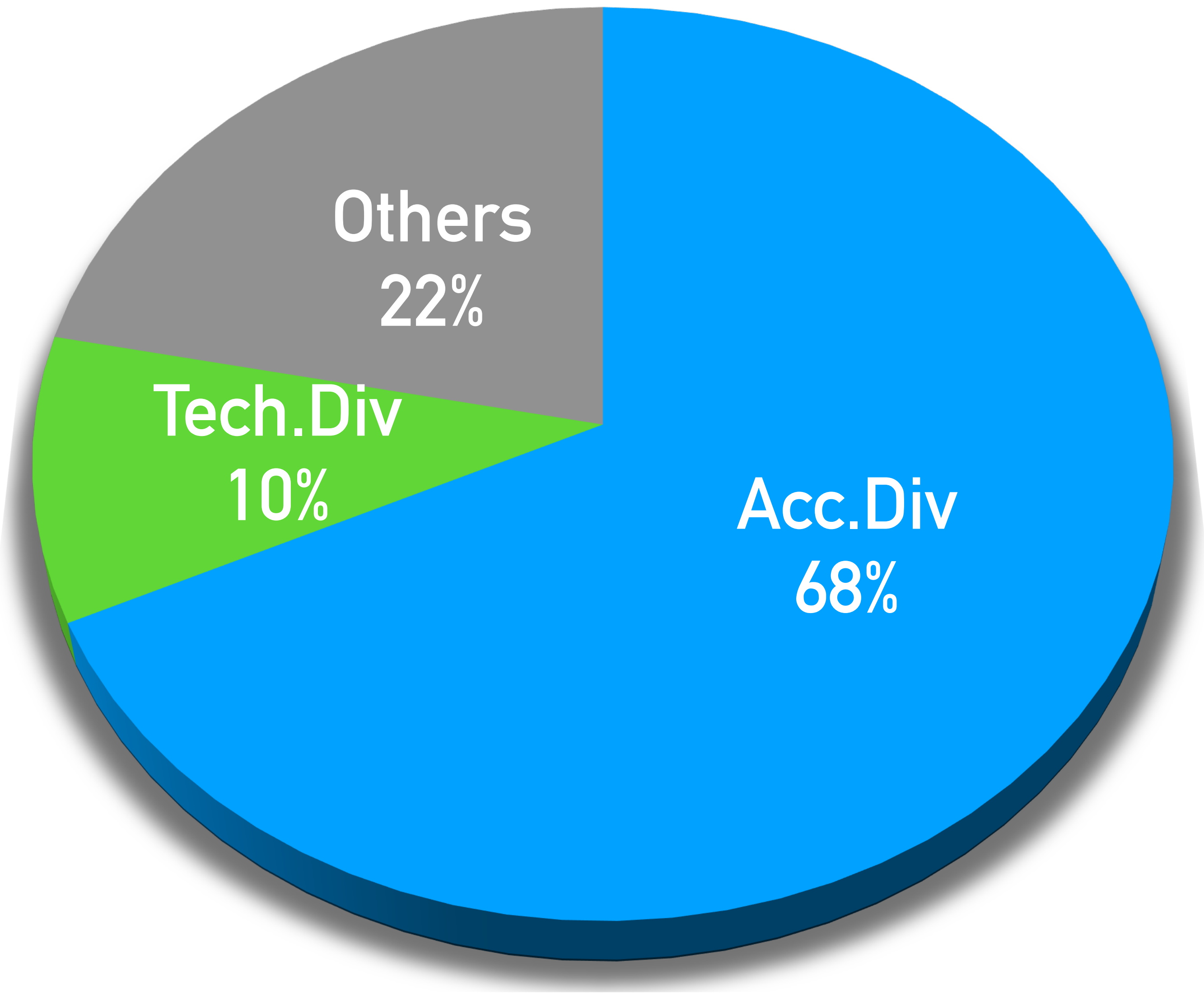
	Technical Division						
	Civ.eng.	HVAC	Electrical	Gen.Serv	Warehouse	Mech.	TOT
Staff	1	1	1				3
Technician	0	1	1	0,5	0,25	0,25	3

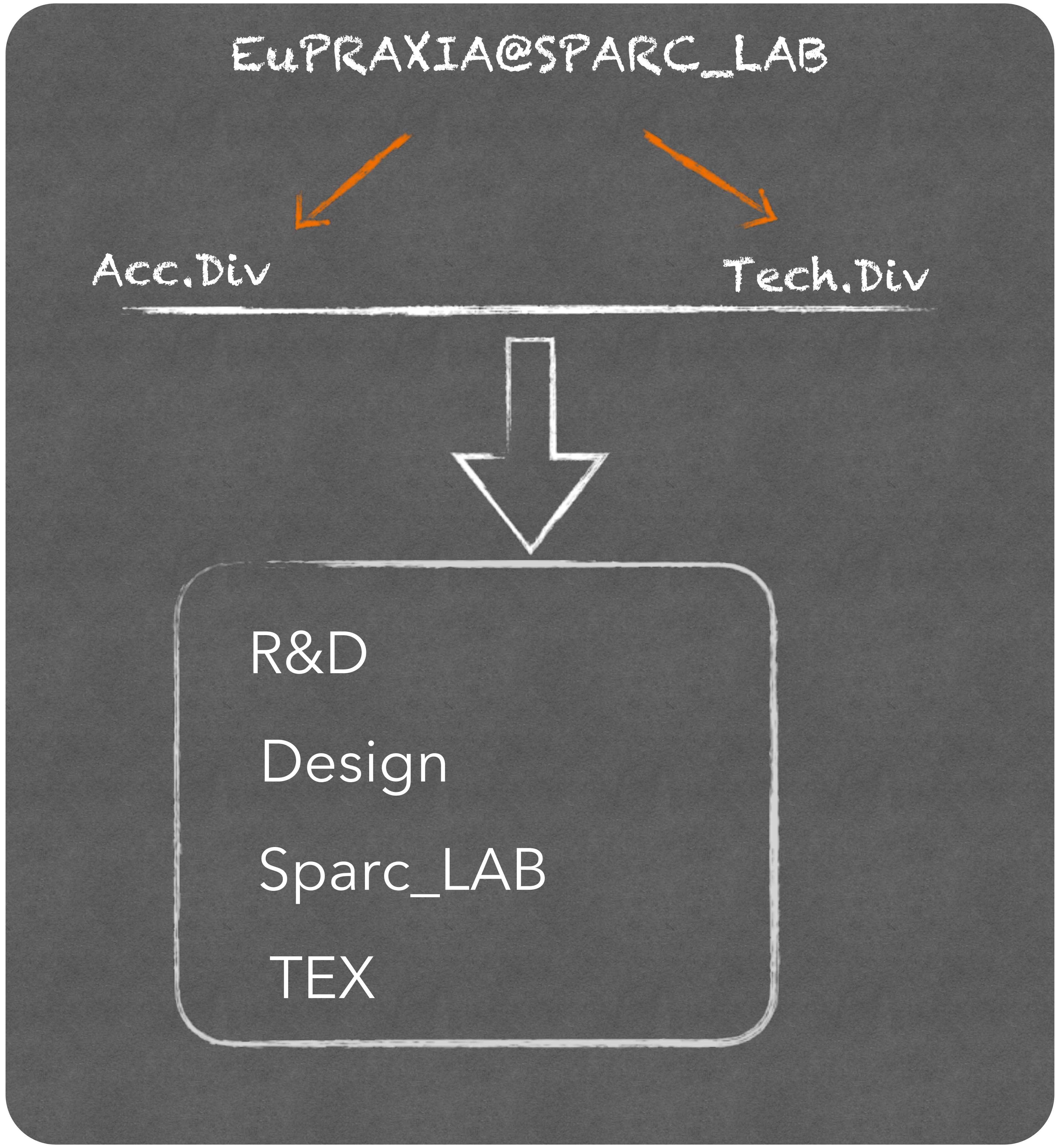
	Others
AdR / Post-Doc	6
INFN-MI	2
UniRoma1	1
UniRoma2	2
ENEA	2
TOT	13

First estimation to evaluate the current FTEs allocated to the project.

Current resources allocation [FTE]

60 FTE currently allocated





- 30% of total resources available for the Acc.Div
- 5% of the total resources available for the Tech.Div
- DOES NOT INCLUDE Building design activities

Estimation required additional manpower

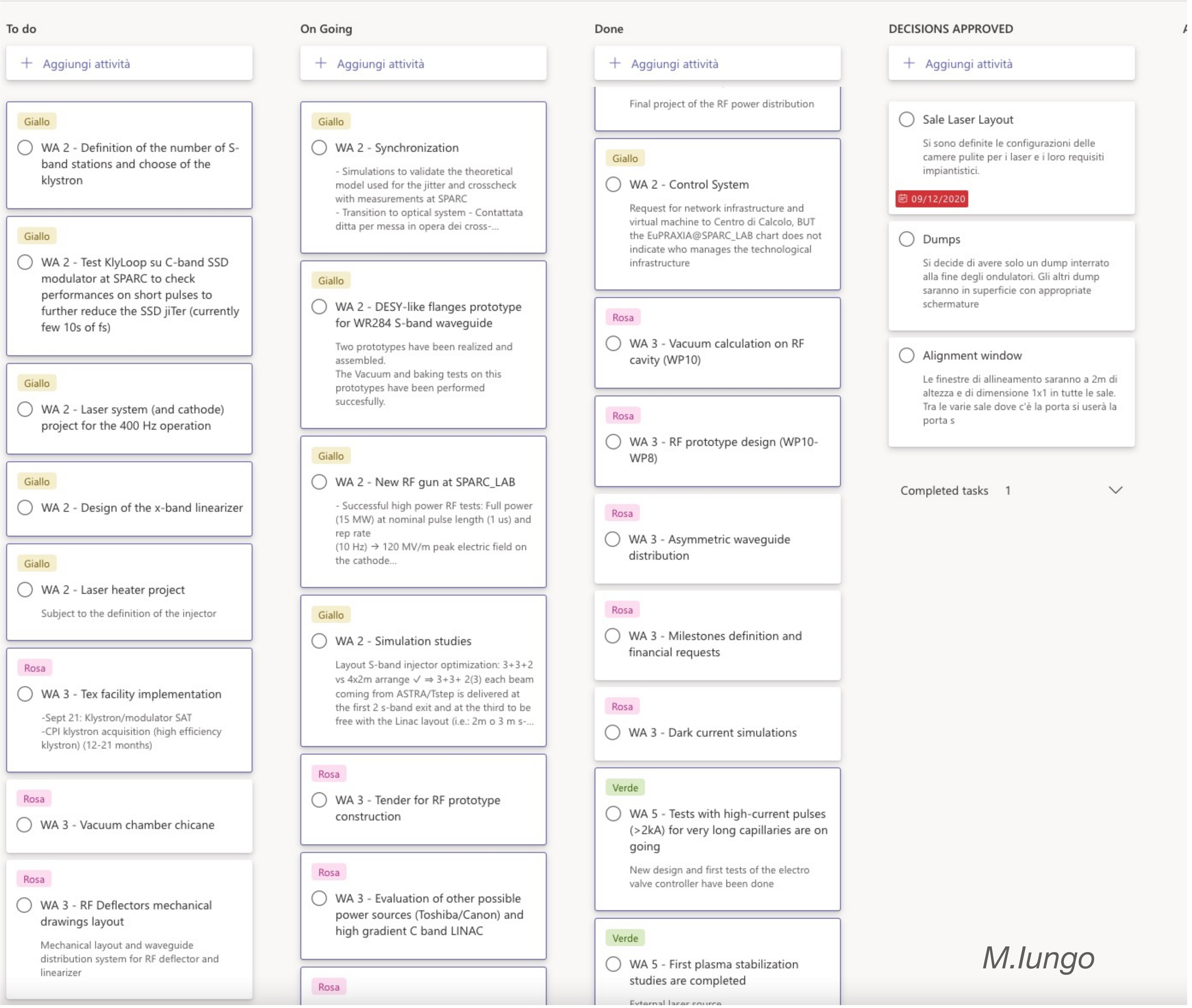
WP	Description	Staff *	Post-Doc	Technician	Comment
1	Beam Physics		2		
2	Plasma Physics	1	1		
3	FEL Physics		1		INFN-MI
6	Plasma Module		1		
8	RF-Gun & Acc.Structures				
10	Vacuum		1	2	
11	Laser & Cathodes	1	1		
14	Diagnostics	1	1		
15	LLRF & Synchronization	1			
16	Controls	2		2	
17	Magnets & PS		1		
18	Undulators		2		1 @ ENEA
19	Mech Engineer	1			
20	Electrical Installation			2	
21	Cooling & Ventilation			1	
22	Civil Engineering			1	
23	Radioprotection	1			
24	Conventional Safety	1			
25	Network	1			
PO	Project Office	1	2		
	TOTAL	**11**	**13**	**8**	
	TOT. FTE	**32**			

This would bring up to 90FTE allocated

- This does not take into account PhD students (around 10).
- Estimated cost/year = 1M€
- These FTEs could come from different sources:
  - Already present in the Lab but working on other topics
  - Turnover
  - New hiring
  - In-kind contribution
- Request to be submitted at the INFN-Management.
- Strategy to be decided at Management level

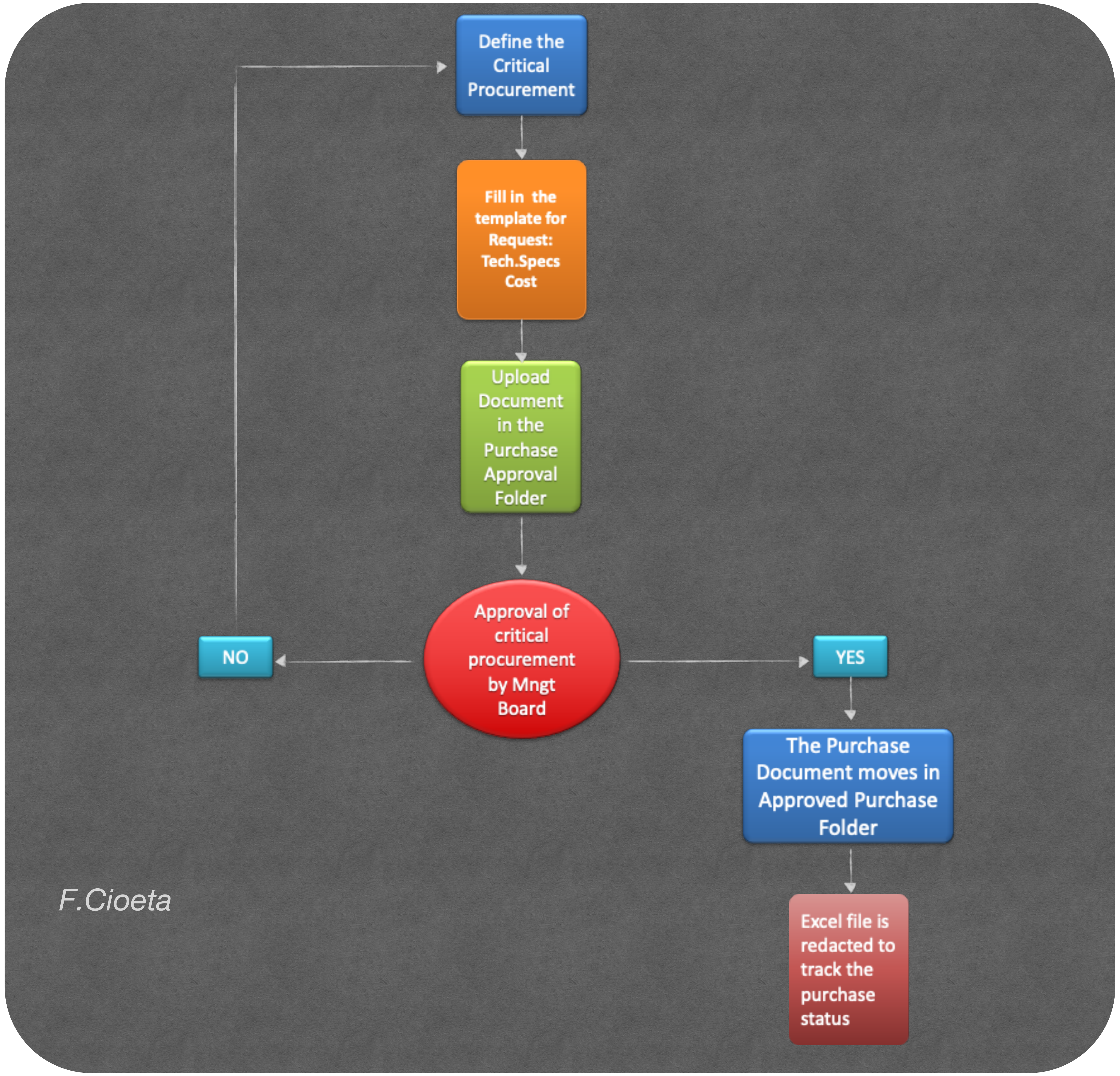
Project Office Activities

PM and Integration activities



- Follow up of the activities through dedicated follow up meetings as specified in the PMP:
  - WA Summary and general communications
  - Template for reporting the status
  - Kanban for open actions (to do, ongoing, done, decisions approved)
  - Upcoming milestones discussed and monitored.

PM and Integration activities

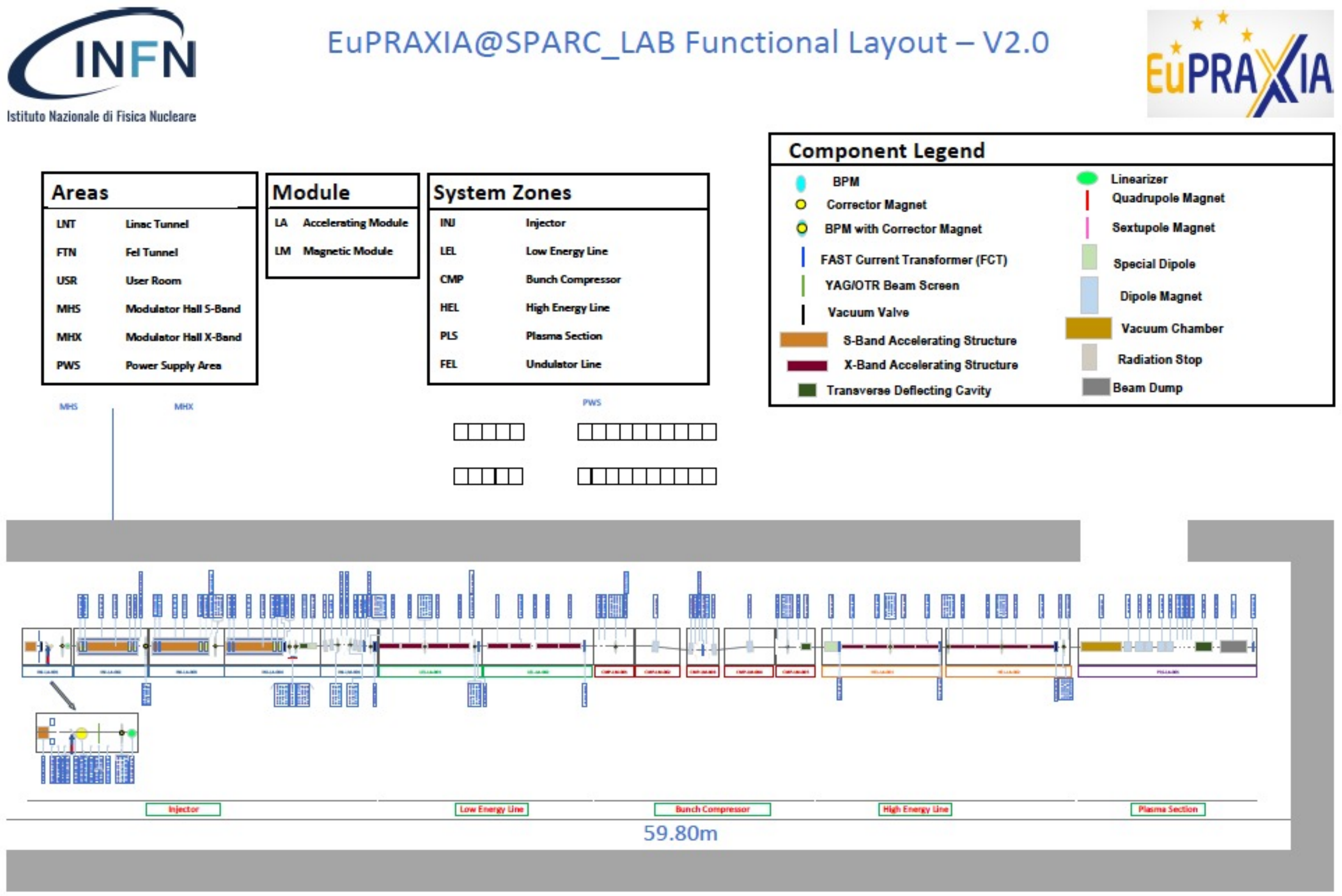


- Implementation of a DMS and authorization process for critical procurement (in order to minimize the risk of extra-cost and implement proper quality assurance processes)

- Internal cost tracking (in addition to the LNF usual procurement portal).

- Reference documents made public
  - Project Management Plan
  - Schedule
  - Intermediate milestone list
  - Cost breakdown
  - OBS
  - WBS
  - Naming Convention

System engineering



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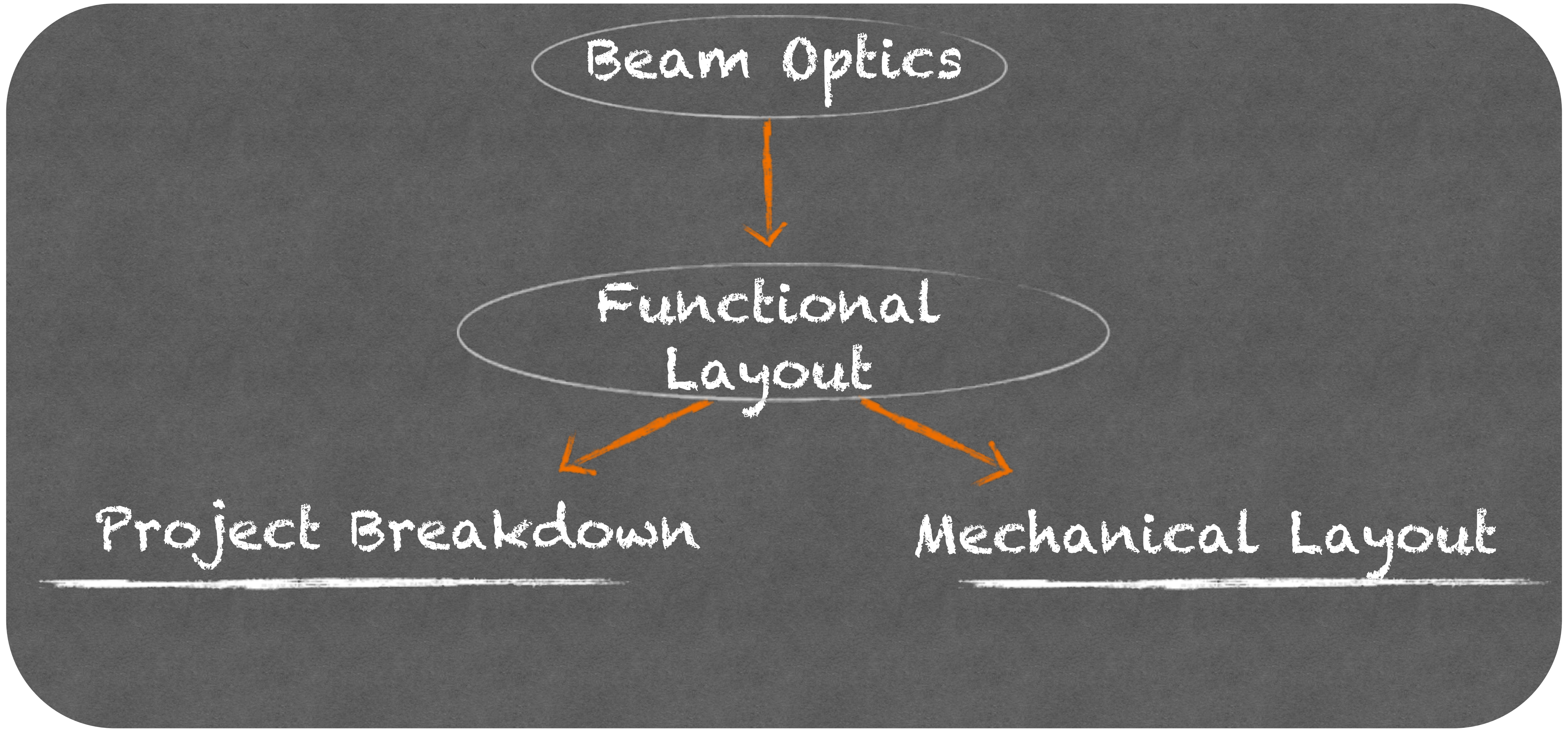


- Production of a functional layout as main input for the Project Breakdown Structure
- Baseline for machine configuration database
- Functional layout for the RF distribution is already ongoing

System engineering -Functional Layout★

Areas	
LNT	Linac Tunnel
FTN	Fel Tunnel
USR	User Room
MHS	Modulator Hall S-Band
MHX	Modulator Hall X-Band
PWS	Power Supply Area

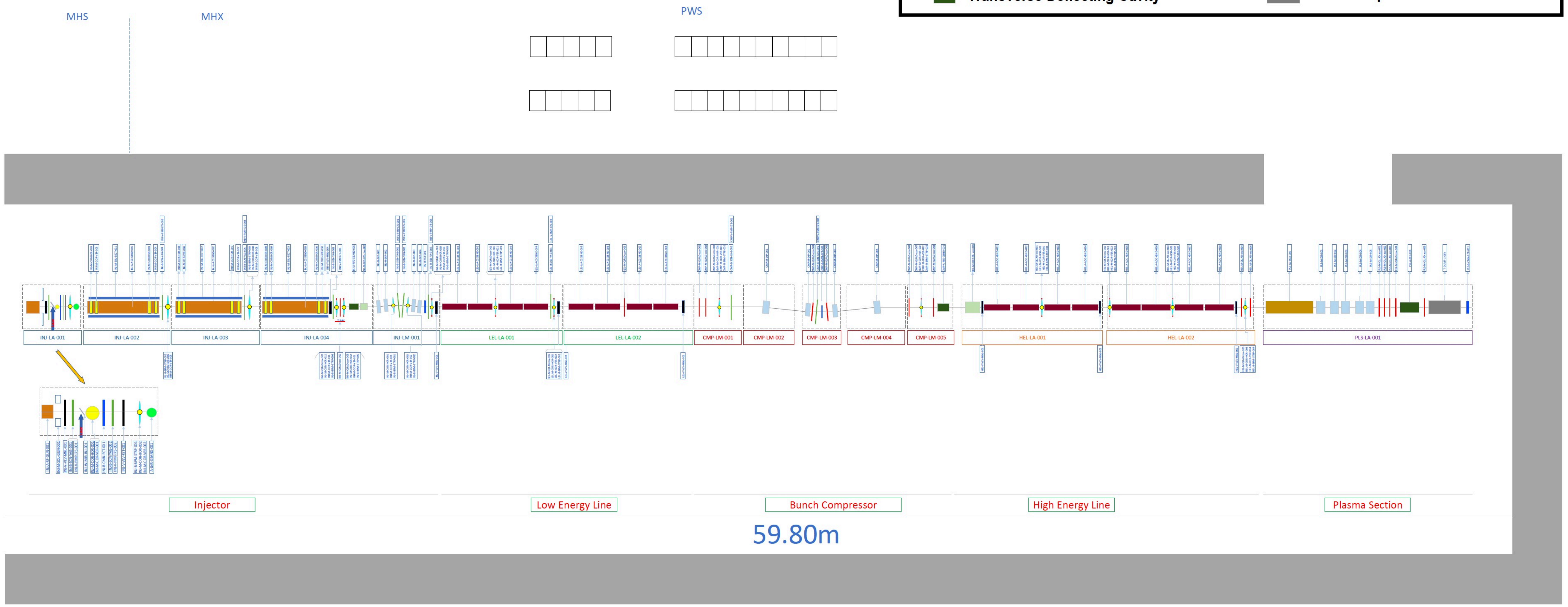
Module	
LA	Accelerating Module
LM	Magnetic Module

System Zones	
INJ	Injector
LEL	Low Energy Line
CMP	Bunch Compressor
HEL	High Energy Line
PLS	Plasma Section
FEL	Undulator Line

Component Legend

- BPM
- Corrector Magnet
- BPM with Corrector Magnet
- FAST Current Transformer (FCT)
- YAG/OTR Beam Screen
- Vacuum Valve
- S-Band Accelerating Structure
- X-Band Accelerating Structure
- Transverse Deflecting Cavity
- Linearizer
- Quadrupole Magnet
- Sextupole Magnet
- Special Dipole
- Dipole Magnet
- Vacuum Chamber
- Radiation Stop
- Beam Dump

★ See A.Ghigo's Talk



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System engineering -Functional Layout★

★ See A.Ghigo's Talk

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System engineering

PBS-Machine | WG/RF

ID	WBS Code	Area / Zona	Sistema	Famiglia	Tipo	Numero Sec	PBS-Code	Descrizione	Z-Coordinat	Modulo
1	WP-08	INJ	A	RF	GUN	0010	INJ-A-RF-GUN-0010	RF Gun	0	INJ-LA-0010
2		INJ	V	PMP	I20	0010	INJ-V-PMP-I20-0010	Ion Pump 20 l/s	0	INJ-LA-0010
3		INJ	V	PMP	I20	0020	INJ-V-PMP-I20-0020	Ion Pump 20 l/s	0	INJ-LA-0010
4		INJ	V	GAU	PIR	0010	INJ-V-GAU-PIR-0010	Pirani Gauge	0	INJ-LA-0010
5		INJ	V	PMP	NXT	0010	INJ-V-PMP-NXT-0010	Next Torr	0	INJ-LA-0010
6		INJ	V	PMP	NXT	0020	INJ-V-PMP-NXT-0020	Next Torr	0	INJ-LA-0010
7		INJ	M	SOL	GUN	0010	INJ-M-SOL-GUN-0010	Gun Solenoid	0	INJ-LA-0010
8		INJ	V	VLV	MAN	0010	INJ-V-VLV-MAN-0010	Manual Valve	0	INJ-LA-0010
9		INJ	B	SCN	YAG	0010	INJ-B-SCN-YAG-0010	Yag Screen	0	INJ-LA-0010
10		INJ	W	MIR	PC	0010	INJ-W-MIR-PC-0010	Mirror Laser Photocathod	0	INJ-LA-0010
11		INJ	V	PMP	I75	0010	INJ-V-PMP-I75-0010	Ion Pump 75 l/s	0	INJ-LA-0010
12		INJ	M	COR	HOR	0010	INJ-M-COR-HOR-0010	Horizontal Corrector	0	INJ-LA-0010
13		INJ	M	COR	VER	0010	INJ-M-COR-VER-0010	Vertical Corrector	0	INJ-LA-0010
14		INJ	B	CMN	FCT	0010	INJ-B-CMN-FCT-0010	Fast Current Transformer	0	INJ-LA-0010
15		INJ	B	SCN	YAG	0020	INJ-B-SCN-YAG-0020	Yag Screen	0	INJ-LA-0010
16		INJ	V	PMP	I75	0020	INJ-V-PMP-I75-0020	Ion Pump 75 l/s	0	INJ-LA-0010
17		INJ	V	RGA		0010	INJ-V-RGA-0010	Residual Gas Analyzer	0	INJ-LA-0010
18		INJ	V	VLV	FST	0010	INJ-V-VLV-FST-0010	Fast Vacuum Valve	0	INJ-LA-0010
19		INJ	B	BPM	STRP	0010	INJ-B-BPM-STRP-0010	Stripline BPM	0	INJ-LA-0010
20		INJ	A	ACC	SBND	0010	INJ-A-ACC-SBND-0010	1st S-Band TW Section	0	INJ-LA-0020
21		INJ	M	COR	HOR	0020	INJ-M-COR-HOR-0020	Horizontal Corrector	0	INJ-LA-0020
22		INJ	M	COR	VER	0020	INJ-M-COR-VER-0020	Vertical Corrector	0	INJ-LA-0020
23		INJ	M	SOL	SBND	0010	INJ-M-SOL-SBND-0010	Long Solenoid S-Band	0	INJ-LA-0020
24		INJ	M	COR	HOR	0030	INJ-M-COR-HOR-0030	Horizontal Corrector	0	INJ-LA-0020
25		INJ	M	COR	VER	0030	INJ-M-COR-VER-0030	Vertical Corrector	0	INJ-LA-0020
26		INJ	B	SCN	YAG	0030	INJ-B-SCN-YAG-0030	Yag Screen	0	INJ-LA-0030
27		INJ	V	PMP	I75	0030	INJ-V-PMP-I75-0030	Ion pump 75 l/s	0	INJ-LA-0030
28		INJ	A	ACC	SBND	0020	INJ-A-ACC-SBND-0020	2nd S-Band TW Section	0	INJ-LA-0030
29		INJ	M	COR	HOR	0040	INJ-M-COR-HOR-0040	Horizontal Corrector	0	INJ-LA-0030
30		INJ	M	COR	VER	0040	INJ-M-COR-VER-0040	Vertical Corrector	0	INJ-LA-0030
32		INJ	B	CMN	FCT	0020	INJ-B-CMN-FCT-0020	Fast Current Transformer	0	INJ-LA-0030
33		INJ	V	VLV	MAN	0020	INJ-V-VLV-MAN-0020	Manual Valve	0	INJ-LA-0030
34		LEL	A	ACC	XBND	0010	LEL-A-ACC-XBND-0010	X-Band Accelerating Secti	0	LEL-LA-0010
35		LEL	B	BPM	STRP	0010	LEL-B-BPM-STRP-0010	Stripline BPM	0	LEL-LA-0010
36		LEL	M	QUAD	SHRT	0010	LEL-M-QUAD-SHRT-0010	Short Quadrupole	0	LEL-LA-0010
37		LEL	A	ACC	XBND	0020	LEL-A-ACC-XBND-0010	X-Band Accelerating Secti	0	LEL-LA-0010
38		LEL	B	BPM	STRP	0020	LEL-B-BPM-STRP-0020	Stripline BPM	0	LEL-LA-0010
39		LEL	M	QUAD	SHRT	0020	LEL-M-QUAD-SHRT-0020	Short Quadrupole	0	LEL-LA-0010
42		LEL	A	ACC	XBND	0030	LEL-A-ACC-XBND-0030	X-Band Accelerating Secti	0	LEL-LA-0010
43		LEL	B	BPM	STRP	0030	LEL-B-BPM-STRP-0030	Stripline BPM	0	LEL-LA-0010

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- The functional layout is approved by the project leader and by the management board and must be considered as the baseline of the machine development – Iterative process.
- Project Breakdown database - framework is now fixed, to be filled up according with the progress in the design.
- Main tool to freeze the machine configuration and system engineering issues (interfaces, utilities, type of connectors, etc..)
- Naming convention defined in a dedicated document
- It includes also the RF System (RF stations and waveguide network)

Conclusions

- ESFRI 2021 Roadmap inclusion
- Application preparatory phase on-going

- Project Management Plan finalized
- Manpower issues are being addressed at management level
- Cost Baseline for the TDR phase refined and partially already ongoing.
- Re-baselining of the building under discussion with possible mitigation and time compression actions

- PM Activities on-going: monitoring and control of the upcoming milestones, activities and cost&schedule follow up
- Integration activities on-going: functional layout, machine configuration and naming convention