



Horizon Europe: Coordination
and Support Actions



ET-PP
1st review meeting
WP6 Activities

ET-0499A-23

14/12/2023

Grant agreement: N° 101079696

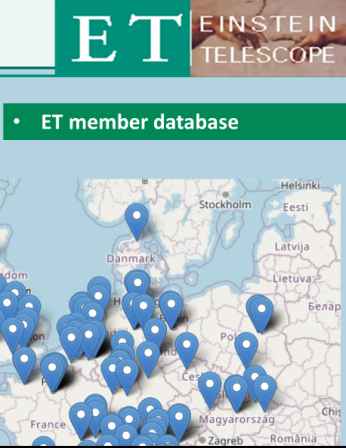
WP 6: Introduction

- Composition of WP6
- Chairs of the WP6:
 - Michele Punturo,
Spokesperson of the Einstein Telescope Collaboration
 - Harald Lück,
Deputy Spokesperson of the Einstein Telescope Collaboration
 - Paolo Chiggiato,
CERN vacuum team leader

Description	From the ET-PP GA
<p>This WP will act as a bridge between ET-PP and the ET collaboration. In fact, the ET collaboration is already well organised in specific boards targeting the objectives of this WP6. The activities indicated in this work package are carried out by a larger community (currently more than 400 scientists) that is only rudimentarily represented by the person-months indicated in the WP6 table. There are many more institutions and universities (more than 80 in December 2021) involved in this activity than indicated in the current WP6 table; as it is impossible to list them all, we provide a link to a public list here: https://apps.et-gw.eu/tds/ql/?c=16183. The overall structure of the ET collaboration producing the deliverables is presented in Figure 2. Finally, as indicated by the deliverables, WP6 will provide the Technical Design Report both for the research infrastructure and for the detectors, as developed by the collaboration. Furthermore, the Data Management Plan and the Data Access policy will be defined together with WP2 and WP8.</p> <p>IFAE will contribute with 10 PM reimbursed by its own resources. INFN will contribute with 20 PM reimbursed by its own resources. UW will contribute with 1 PM reimbursed by its own resources. CNRS will contribute with 28 PM reimbursed by its own resources. NIKHEF will contribute with 2,5 PM reimbursed by its own resources. ANTW will contribute with 48 PM reimbursed by its own resources. UNIGE will contribute with 2 PM reimbursed by its own resources.</p>	<p style="text-align: center;">No direct financial support for WP6 in ET-PP</p>

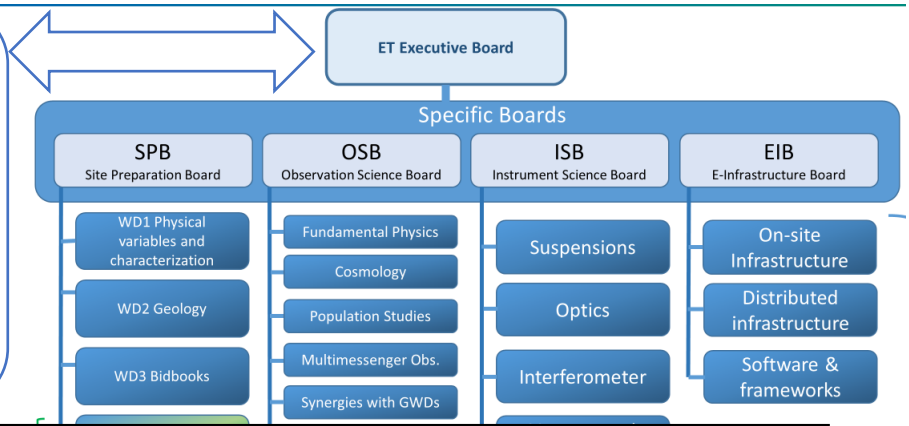
The Einstein Telescope Collaboration

- 85 Research Units (+1 request pending)
- 1568 members (24/11/2023 15:29)
- Total: 226 Institutions in 25 Countries



ET Member's affiliation map

ET-EB chairs are currently 2/3 of the ET-PP WP6 chairs



Nota Bene:
 The activities of WP6 are exclusively funded on large national funds (relevant fraction of 50+M€ in Italy, relevant fraction of the 42+M€ in The Netherlands, few other M€ in other countries)

WP 6: Introduction and objectives

Objectives

From the ET-PP GA

Delivering of the technical design of both the research infrastructure and the hosted detectors of ET. Delivering the science case in a global context. Delivering, in collaboration with WP2 and WP8, the Data Management Plan and the Data Access Policy for ET.

- The objectives of WP6 defined in the ET-PP GA are corresponding to the realisation of the key scientific documents of the ET project:
 - The Science Case
 - The detector and the research infrastructure Technical Design Report (TDR) (with different levels of detail)
 - The pipe vacuum system Technical Design Report
 - The Data Management Plan & Data Access Policy for ET

WP 6: Introduction and objectives (vacuum pipe)

The ET beampipe is a 120 km long, 1 m diameter ultrahigh vacuum chamber connecting the extremities of the interferometers. The cost of the beampipe is second only to that of the civil engineering.

The objective of WP6 (ET-beampipe) is:

- To design and test **technical solutions** that fulfil the ET requirements and are **less expensive** than the baseline (i.e., the present technology used for Virgo and LIGO). The required **technical infrastructure** will be evaluated and optimized accordingly.
- To manufacture, assemble and test a pilot sector.
- To write the technical design report, including cost estimations.

During the first year, the primary focus was on pursuing the first objective, leading to experimental studies of materials and detailed design. The participants include CERN staff members (contributing an amount equivalent to 2 FTE), two fellows, and a doctoral student.

The WP6 (ET-beampipe) is led by Ana Teresa Perez Fontenla and Paolo Chiggiato.

WP 6: Tasks

- Considering the particular nature of WP6, acting as a bridge toward the complex system of activities in the ET Collaboration, no explicit tasks were defined in the GA
- But the set of deliverables declared in the GA clearly defines the task structure “projected” by the Collaboration in WP6:
 - Production of the ET Refined Science Case
 - This task ends with the deliverable 6.1 (M18).
 - It is produced by the ET Collaboration Observational Board

OSB



WP 6: Tasks (Vacuum pipe)

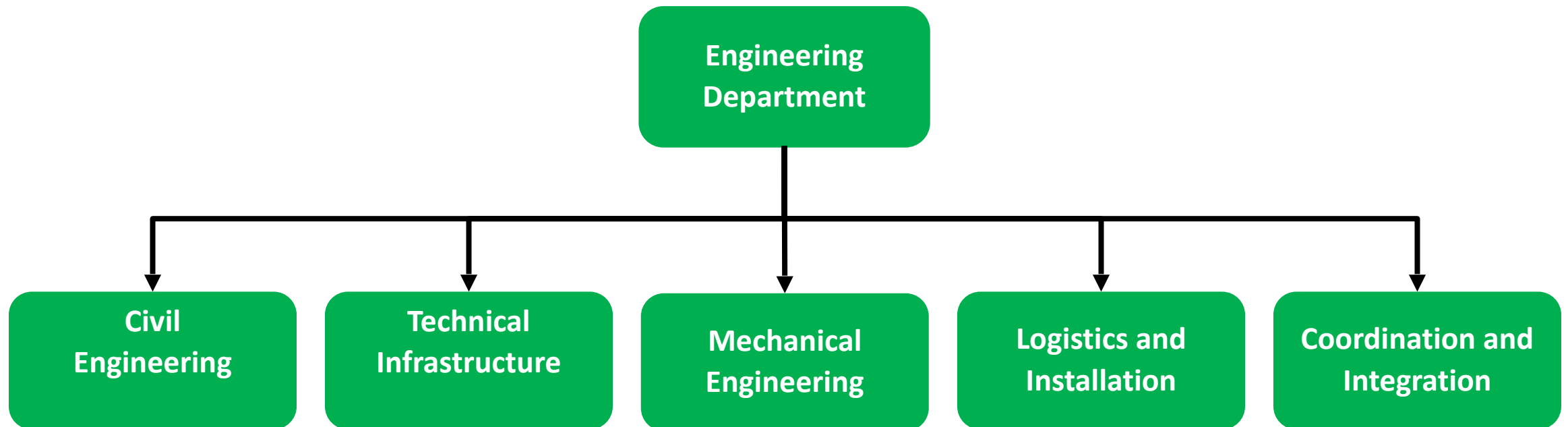
The tasks outlined for WP6 (ET-beampipe) are 8:

- Designing and engineering the vacuum chamber
- Selecting materials and manufacturing technology
- Determining post-manufacturing treatments
- Managing handling and logistics
- Outlining installation procedures and interfacing with other systems
- Choosing vacuum pumps and valves
- Installing and testing a pilot sector
- Coordinating various work packages and collaborating with contributors

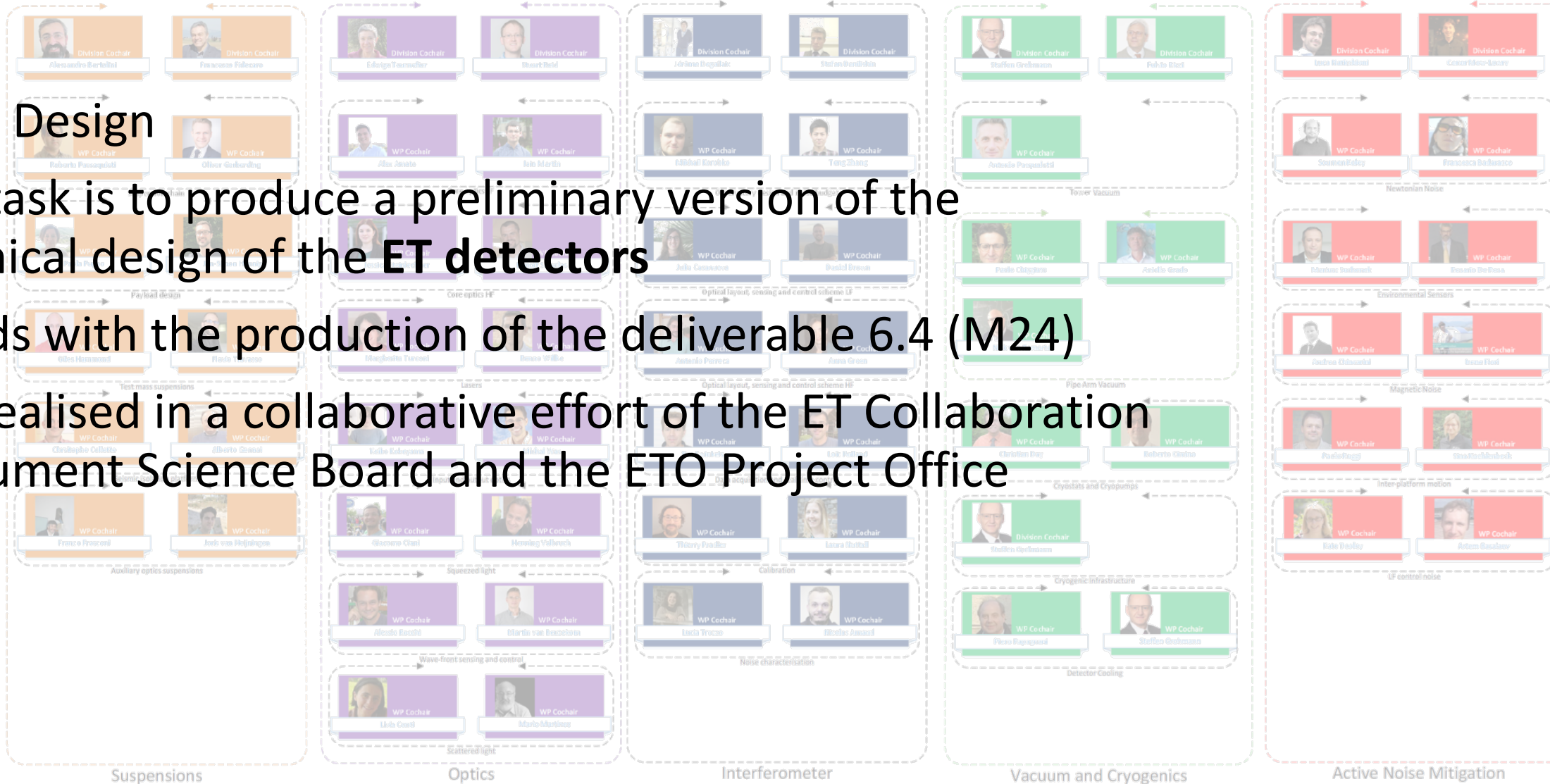
During the initial year, the first three tasks were elaborated in more detail.

WP 6: Tasks

- Research Infrastructure Design
 - The task is to produce the technical design of ET's **civil and technical infrastructures**
 - It is an iterative process producing 2 deliverables D6.3 (M24) and D6.5 (M40) (the RI TDRs with different levels of maturity)
 - The achievement of its targets is pursued by the ET-Organization (ETO) and supported by an advisory agreement with CERN



WP 6: Tasks



• Detector Design

- This task is to produce a preliminary version of the technical design of the **ET detectors**
- It ends with the production of the deliverable 6.4 (M24)
- It is realised in a collaborative effort of the ET Collaboration Instrument Science Board and the ETO Project Office

- Data Management Plan (DMP) and Data Access Policy (DAP)
- This complex task aims to define the ET policy for data access and the consequent DMP (D6.6, M46)
- Several actors have to play in synergy to achieve the expected result
 - The scientists have to optimize the data access policy to maximize the science return of ET
 - Agencies have to optimize the usage of public resources
 - Technical bodies (EIB and WP8) have to design an efficient DMP for ET
- Considering the global nature of the GW science, the international scenario plays a crucial role in the definition of the DMP and DAP

WP 6: Deliverables and milestones

Milestones:

8	ET Collaboration in place	WP6	2-INFN	ET Symposium	11
14	On site infrastructure, computing and data model	WP6, WP8	4-CNRS	Workshop (+D8.2)	36
15	Low latency and offline workflows and computing model	WP6, WP8	2-INFN	Workshop (+D8.2)	40
16	Data management, access, policy and implementation	WP2, WP6, WP8	1-IFAE	Workshop (+D8.3)	46



WP8 driven
WP8 driven



15–17 Nov 2022 NEWS
EGO
Furone/Rome timezone



8–12 May 2023 NEWS
T Hotel Cagliari
Europe/Rome timezone



2nd Einstein Telescope Annual meeting
ET Einstein Telescope
November 14-17 2023
IJCLab Orsay France
Auditorium P. Lehmann
IJCLab, CNRS, Université Paris-Saclay, Université Paris Cité

WP 6: Deliverables and milestones

Deliverables:

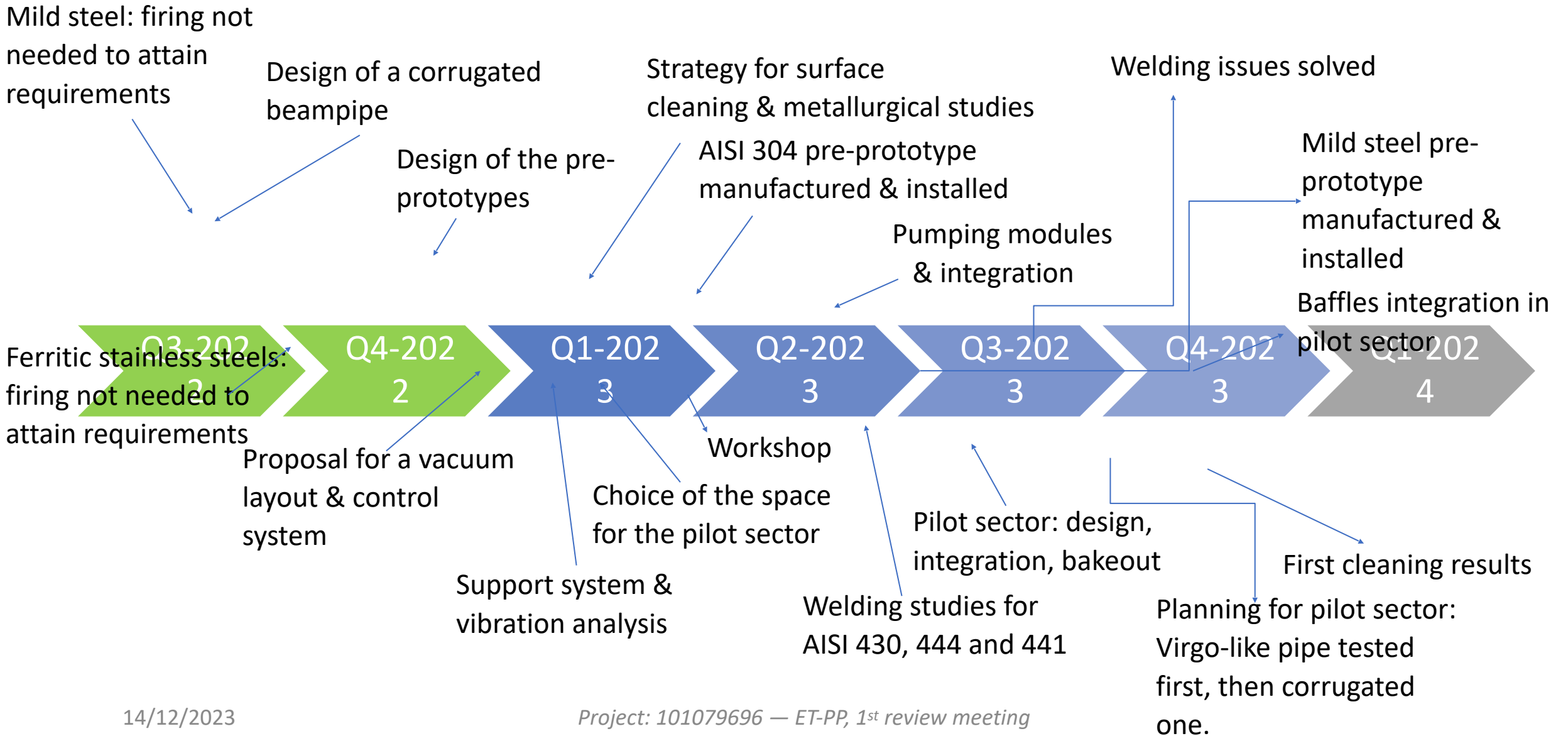
D6.1	Refined Science Case	WP6	12 - UNIGE	R — Document, report	PU - Public	18
D6.2	Vacuum pipe Design	WP6	7 - UAntwerpen	R — Document, report	PU - Public	24
D6.3	Preliminary RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	24
D6.4	Preliminary DET TDR	WP6	5 - NIKHEF	R — Document, report	PU - Public	24
D6.5	RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	40
D6.6	DMP and Data Access Policy	WP6	9 - DESY	R — Document, report	PU - Public	46



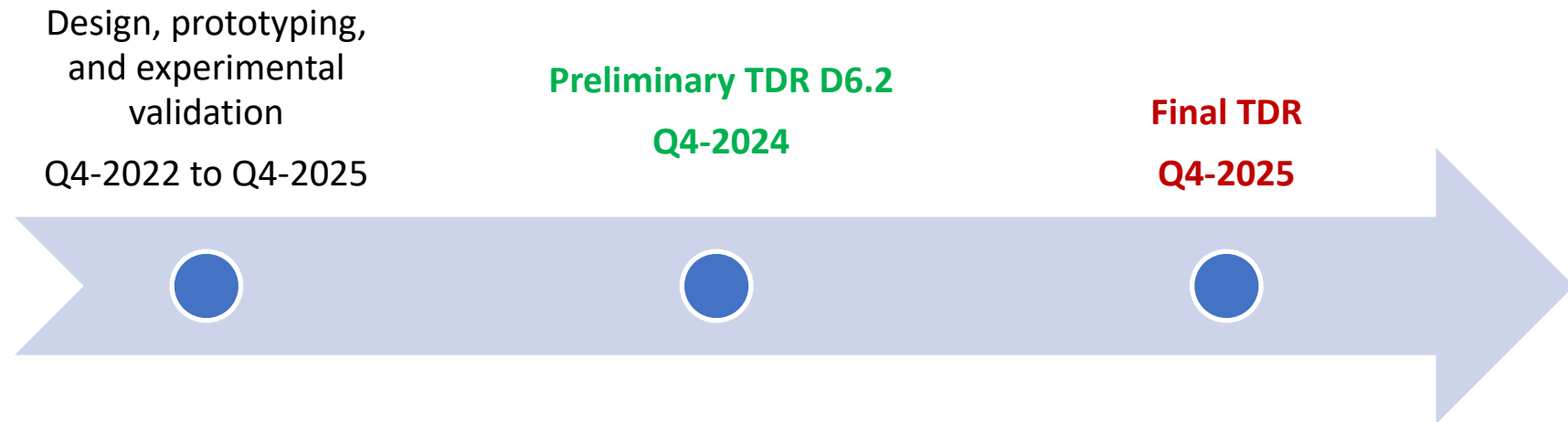
- D6.1 Refined Science Case

- The refined Science Case in the ET Collaboration jargon is named «Blue Book» and it is part of the «natural» activities of the OSB in ET
- **Its production is in progress**
- A first implementation of the Blue Book is the paper (already published) «[Science with the Einstein Telescope: a comparison of different designs](#)» Marica Branchesi et al JCAP07(2023)068, [DOI 10.1088/1475-7516/2023/07/068](#), arXiv:2303.15923 [gr-qc]
- No risks identified, no deviations expected

WP 6 (ET-beampipe): Deliverables and milestones



WP 6 (ET-beampipe): Deliverables and milestones



WP 6: Deliverables and milestones

Deliverables:

D6.1	Refined Science Case	WP6	12 - UNIGE	R — Document, report	PU - Public	18
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D6.5	RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	40
D6.6	DMP and Data Access Policy	WP6	9 - DESY	R — Document, report	PU - Public	46



- D6.3 Preliminary RI TDR

- ETO realised the RI Product Breakdown Structure that is the first step toward the preliminary TDR
- Risk#3 “Delays in producing the RI” exists and is mitigated through a series of contracts with private companies engaged by the National Host Teams

WP 6: Deliverables and milestones

Deliverables:

D6.1	Refined Science Case	WP6	12 - UNIGE	R — Document, report	PU - Public	18
D6.2	Vacuum pipe Design	WP6	7 - UAntwerpen	R — Document, report	PU - Public	24
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D6.5	RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	40
D6.6	DMP and Data Access Policy	WP6	9 - DESY	R — Document, report	PU - Public	46



- D6.4 Preliminary DET TDR

- We have completed the first step toward the TDR: the PBS
- We are working with the PO to build on the PBS all the procedures to get from the **PBS to the TDR**
 - The **first step** is the so-called **parameter tables**
- It is the first iteration toward the TDR (“preliminary”)
- Risk#4, “Delays in producing the RI TDR” did not yet materialise, but we are investigating a staged approach for the ET implementation

WP 6: Deliverables and milestones

Deliverables:

D6.1	Refined Science Case	WP6	12 - UNIGE	R — Document, report	PU - Public	18	😊
D6.2	Vacuum pipe Design	WP6	7 - UAntwerpen	R — Document, report	PU - Public	24	😊
D6.3	Preliminary RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	24	😐
D6.4	Preliminary DET TDR	WP6	5 - NIKHEF	R — Document, report	PU - Public	24	😐
D6.5	RI TDR	WP6	2 - INFN	R — Document, report	PU - Public	40	😐
D6.6	DMP and Data Access Policy	WP6	9 - DESY	R — Document, report	PU - Public	46	😐

- D6.5 RI TDR
 - Sequential to D6.3:
 - Its destiny depends on the status of D6.3

WP 6: Deliverables and milestones

Deliverables:

D6.1	Refined Science Case	WP6	12 - UNIGE	R — Document, report	PU - Public	18	
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- D6.6 DMP and DAP
 - Activity still to be started

WP 6: Contribution from each partner

INSTITUTION		PM as per Annex I	PM in the period
1 IFAE	CONTRIBUTIVES	10	2,5
	REQUESTED EC	0	0
1.1 BSC	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
2 INFN	CONTRIBUTIVES	20	6
	REQUESTED EC	0	0
3 UW	CONTRIBUTIVES	1	0
	REQUESTED EC	0	0
4 CNRS	CONTRIBUTIVES	28	5,5
	REQUESTED EC	0	0
5 NIKHEF	CONTRIBUTIVES	2,5	0
	REQUESTED EC	0	0
6 UCL	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
7 UAntwerpen	CONTRIBUTIVES	48	0,8
	REQUESTED EC	0	0
8 EGO	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
9 DESY	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
10 Wigner RCP	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
11 MUL	CONTRIBUTIVES	0	0
	REQUESTED EC	0	0
12 UNIGE	CONTRIBUTIVES	2	0
13 UKRI	CONTRIBUTIVES	0	0
14 UCAR	CONTRIBUTIVES	0	0
15 UGLA	CONTRIBUTIVES	0	0
Total Person Months	CONTRIBUTIVES	111,5	14,8
Total Person Months	REQUESTED EC	0	0
		111,5	14,8

% PMs used = 12,5

WP 6: Outlook and perspectives

- The major objective of WP6 is to **advance and complete the PBS2TDR process**, passing through
 1. the implementation of the **parameter tables in the PBS**
 2. The creation of a **relational database** that organises all this info
 3. The drafting of the **TDR documents**
- Crucial for the successful completion of these steps are:
 1. the **update of ET timing** through the definition of a shared, coherent and realistic-but-aggressive ET roadmap
 - Geometrical options to be analyzed and decided
 2. **Reviewing the internal organization** considering the redistribution of responsibilities between ETO and the ET collaboration

WP 6 (ET-beampipe): Outlook and perspectives

The primary objectives for the upcoming year include:

- Procuring material coils, supports, and beampipes required for the pilot sector, which involves conducting price inquiries and conducting a market survey.
- Installing the pilot sector.
- Writing and delivering the preliminary version of the Technical Design Report (TDR).



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