# Report from the ET Directorate

### Freise, Ferroni, Martinez, 23.01.2023, ET-0015A-23





# Reminder: objectives, roadmap, deliverables

- Ongoing work is based on the framework of the ESFRI project.
- construction of ET.
- ET by a large vibrant scientific community.
- The necessary documents include:  $\bullet$ 
  - preliminary technical design reports (TDRs) of the infrastructures and detectors
  - an updated and robust costing
  - characterisations of possible sites
  - project execution plan, schedule and funding model

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The first part of the **design and preparation phase** should end with a positive conclusion of the site identification, a first approval (by the BGR eg. ministries of partner countries) for the

We need to provide the **necessary documents** for such a decision to the BGR, demonstrate efficient and professional management of the emerging project and demonstrate support for





## Current status: **a dual structure**: 1) project organisation (towards legal entity) and 2) scientific collaboration

**ET Observatory** 

A project organisation to construct a legal entity to build and operate a research infrastructure.

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**ET Collaboration** 

The collaboration defines the scientific goals and requirements of the detector.







## Current status: **a dual structure**: 1) project organisation (towards legal entity) and 2) scientific collaboration



**Board of governmental representatives** 

Coordinators

Board of Scientific representatives

#### **ET Directorate**

**INFRA-DEV** 

EU project coordination WP1: WP2: WP3:

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**Project office** 

Engineering department

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Our aims are the realisation of a legal entity to build and operate a research infrastructure, the ET Observatory (ETO).

This part of the organisation is new, **in addition to** the ET Collaboration.

Currently, during the preparation phase, we are setting up and operating an interim organisation. The final form of the ET Observatory is one of the outcomes of the preparation phase.

For more details, see also our presentation at the first ET annual meeting: https://apps.et-gw.eu/tds/ql/?c=16464









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Fernando Ferroni (INFN, Italy)

Andreas Freise (Nikhef, NL)

Mario Martinez (IFAE, Spain)

- Since August 2022: Andreas Freise takes over from Jo v.d. Brand.
- Mario Martinez as leader of the Infra-Dev project joins the directorate.

A mandate of the ET Directorate and its roles is being prepared.









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Head of project office: Alessandro Variola (INFN)



WP1. Project Management.

Project Manager

WP2 Technical Management

**Technical coordinator** 

WP3 Safety Management

Safety Manager

WP4 Scope Management

**Technical Coordinator** 

WP5 Schedule Management

Schedule Manager

WP6 Resource and Financial Management

**Resource Manager** 

P7 Quality Management Quality Manager WP8 Risk Management **Risk Manager** uration and Change Manageme Configuration Manager te and Installaton Management e and Installation Manager

ssioning and Operation Manage ommissioning Manager

WP12 Communication Management

Communication Manager









# Example activity of the Project Office: PBS

- 'product'.
- We have created a PBS working group with the goals to
  - provide input for the costing (not including FTE),
  - provide the backbone for the WBS that will define the project schedule, and to
  - provide the backbone for requirements breakdown and hierarchy.
- scheduled with the aim to close the PBS in April 2023.

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• The Project Office initiated the creation of a Product Breakdown Structure (PBS). The PBS is a hierarchical structure similar to the WBS but is primarily composed of the physical elements of the

• Members of group: A.Variola (PO), A.Rocchi (PO), P.Verdier (EIB, PO), P.Werneke (ED), C.Olivetto (PO), G. Gemme (ISB), , D.D'Urso (SCB), S. Hild (SPB), with observers L.Latronico (PO) and H. Lück (EB).

• Status: PBS rules and roles have been established, a template has been agreed, more meetings











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#### Vacuum pipe TDR

See next slides

#### Infrastructure TDRs

See next slides





# Vacuum pipe: INFN-Nikhef-CERN agreement



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Objectives: re-evaluate baseline, propose less-expensive alternative, install pilot sector at CERN, TDR, and coordination effort with ET and CE vacuum community.







# Vacuum pipe: ongoing activities 1

#### WP1

- Preliminary design of corrugated beampipe, including stability analysis.
- Construction drawings of corrugated pre-prototypes (ID 40, L=400 mm).
- Preliminary design of supports for prototypes.

#### NEXT:

- **Detailed design** of corrugated beampipe.
- Vibration modal analysis.
- Design of the **supports** for the corrugated and baseline solutions.
- Integration of **baffles**.
- Design of **pumping modules** with integrates NEG pumps.

### **WP2**

- Required H<sub>2</sub> outgassing
  rates achieved in ferritic
  alloys (mild steels and
  ferritic stainless steels)
  - without air bakeout
  - after mild bakeout;
    (80°C<T<150°C).</li>
- Complete metallographic characterisation of the tested alloys.

#### NEXT:

- Study of additional ferritic stainless steels and mild steels, in collaboration with European steelmakers (Aperam, Arvedi, Bohler/ Voestalpine, and Tata steel).
- Manufacturing at CERN of corrugated pre-prototypes made of AISI304, AISI 430 and mild steel.

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#### WP3

- Preliminary study of surface cleaning considering multiple options:
  - O Detergents vs. Solvents.
  - O In situ vs. ex-situ
  - Batch by batch vs.continuous from coil
- Assessment matrix for optimization of sustainability, performance, cost and reliability.

#### NEXT:

- Procedure for cleaning of the corrugated pre-prototype at CERN.
- Industrial partners for cleaning of the pilot sector.
- Design of the ET cleaning machine.

### WP6

Control system and instrumentations for ET beampipe vacuum system: first proposal and cost breakdown, including bakeout system.

#### NEXT:

- Vacuum layout design for the corrugated beampipes prototype.
- Simulation and measurement of integrated NEG pumps.





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# Vacuum pipe: ongoing activities 2

### WP7

 Pilot sector: Two areas of installations are identified, one is in a storage building and the other is in a old transferline tunnel.

#### NEXT:

- Installation feasibility in the two areas in terms of logistic and measurement requirements.
- **Preparation** of the installation area.

#### WP8

- Visits at CNRS-LAPP, IFAE-UAB, ET-Pathfinder, RWTH Aachen, FZ Jülich, LNF-INFN, EGO-Virgo.
- Informal agreement with LAPP and IFAE-UAB (to be formalised soon).
- Preliminary programme of a dedicated workshop at CERN (27-29.03.2023).
- Regular meetings with CE vacuum community.

#### NEXT:

- Final programme of the workshop.
- MoU with IFAE and, possibly, with LAPP.
- Experimental programme with the pilot sector.

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You can learn more at the annual open event 'Beampipes for Gravitational Wave Telescopes 2023' organised by the CERN team, 27.3 - 29.3: <u>https://indico.cern.ch/event/1208957/</u>

In addition, the team plans to have more frequent open Zoom meetings with short presentations about the progress.







## Civil engineering and technical infrastructure



- and technical systems, but can help as consultants.
- to define the required work and to write correct tenders.
- technical work towards the bidbooks for the candidate sites.

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• We are finalising an addition to the agreement with CERN to get support from their team for these topics. Unlike for the vacuum pipe, the CERN team does not have the capacity to write the TDRs on the infrastructure

• Major parts of the design require the involvement of companies. We need to have in-house expertise in order

• This also requires coordination between the international ET Observatory and the national teams doing





# **Collaboration with CERN**

- describes the work for the TDR of the vacuum pipe.
- future.
- is now being formalised.
- safety and document management.

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• We already have a MOU between INFN, Nikhef and CERN. The first appendix

• A new version of the MOU is being prepared which includes IFAE as a fourth partner. We hope that more institutes or national partners will join in the

• A second appendix for the infrastructure related work has been agreed on and

• We are in discussion with teams at CERN on other topics, such as health and





## Upcoming tasks: funding and coordination

- some other countries.
- request for additional funding.
- efficiently and to achieve comparable outputs for different candidate sites.

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• Significant funds have recently become available for the preparatory phase of ET: INFRA-DEV funding for the European project, regional funding related to the site characterisation in Sardegna and the EMR region. We also expect funding for ET in

• However, we believe that not all required work during the ET preparatory phase is fully covered by these funds. We expect that, after a review, we need to prepare a

• Coordination between the various activities will be crucial to use all available funds







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## ... end



