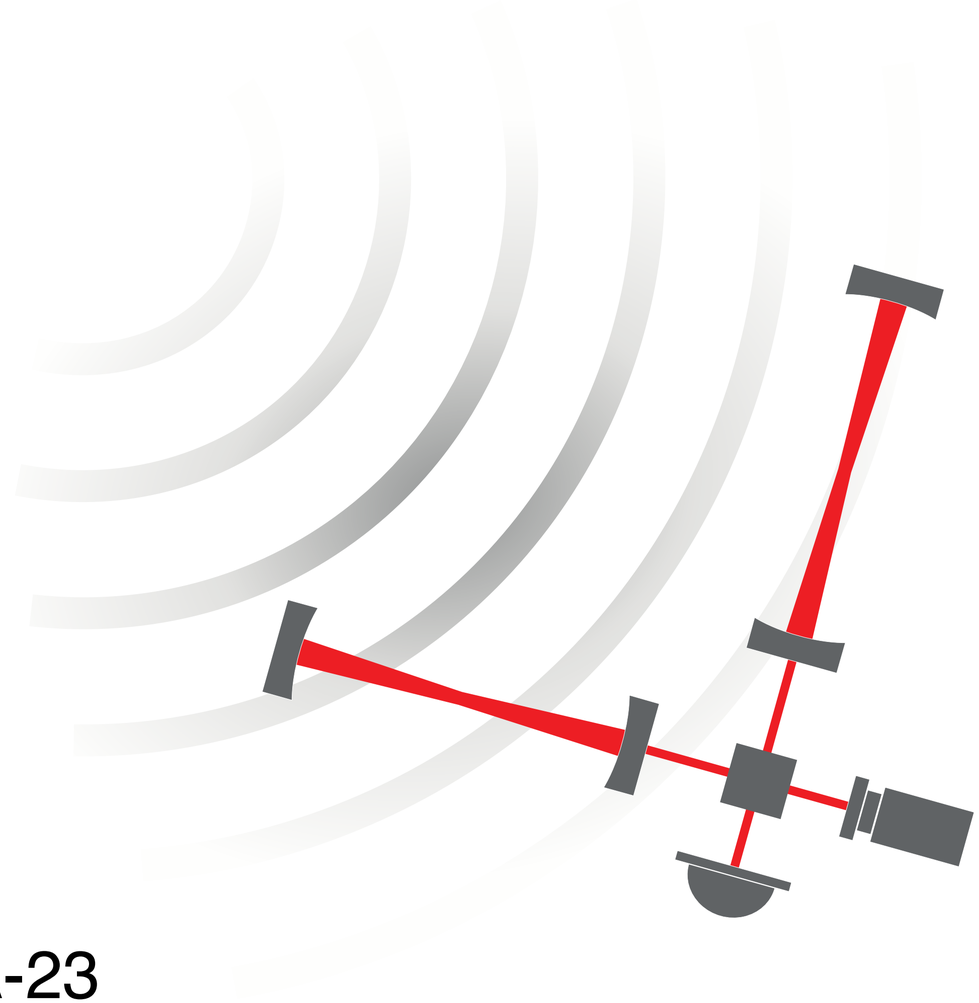
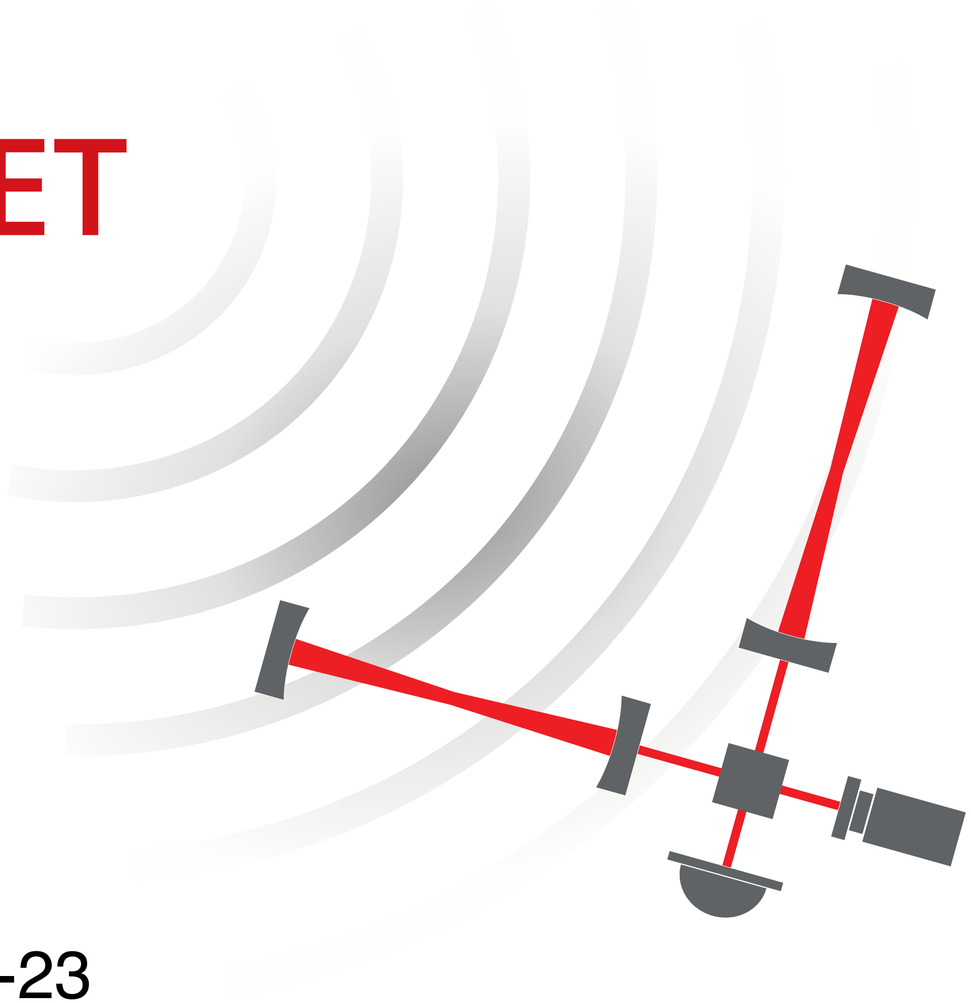
ET Organisation (ETO)



Freise, Ferroni, Martinez, 11.05.2023, ET-0185A-23

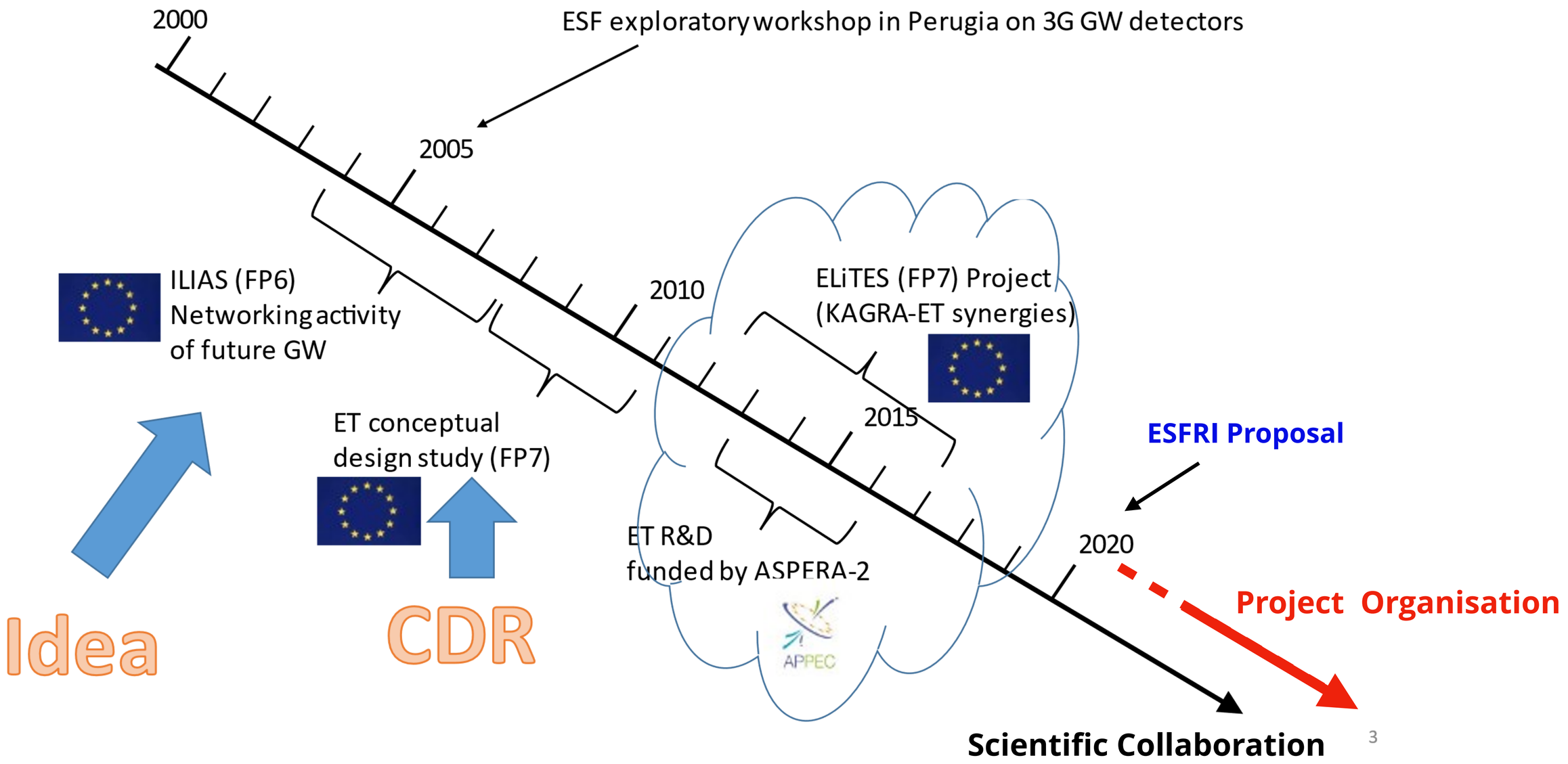
ET Organisation (ETO)

… an organisation for ET



Freise, Ferroni, Martinez, 11.05.2023, ET-0185A-23

Historic timeline of the Einstein Telescope



Why an organisation to support ET?

- The background:
  - ET has a strong and organically grown scientific collaboration, and now also a strong brand. This is why we have been successful in obtaining signifiant support.
  - There are well-known frameworks for realising large infrastructures. We are expected to follow established routes (without repeating mistakes).
  - Obtaining approval for a project at this scale requires a strong central entity and a coordinated engagement with governments.
- **ETO is our vehicle to provide ET with essential new parts** that will be key for an eventual approval:
  - A formalised process to engage with national governments (BGR, BSR)
  - A professional project management infrastructure for the realisation of the infrastructure and in support of the detectors (CERN, ESA, CTAO, …)
  - A budget plan and scheduled based on formal project management and engineering processes.

Active on three fronts

- **ET Collaboration (international)**
  - Define **scientific vision and detector requirements**. For example: science case for ET, which are the key characteristics of a good ET site.
  - **Research and development the technology** required for ET. For example, silicon mirrors, cryogenic suspension systems, …
- **ETO (international project organisation)**
  - Provide **project management** and all **engineering work**.
  - Decide on **governance**, type of legal entity and financial frameworks, …
  - **Engineering work and technical design** of the research infrastructure.
- **Local teams**
  - **Site characterisation** with seismic and geological studies.
  - Deliver design and implementation plans that are **unique to the region**.
  - Develop **economic case** and deliver socio-economic impact plan.

Two international pillars of ET:
1) project management and 2) scientific collaboration

ETO (ET Organisation)

- **Board of governmental representatives**
- **Board of Scientific representatives**
- **Coordinators**
- **ET Directorate**
- **Project office**
- **Engineering department**
- Administrative office
- **ET-PP**

ET Collaboration

- **Collaboration board**
- **Executive board**
- **Specific boards**
  - **ISB**
  - **OSB**
  - **EIB**
  - **SCB**
  - **SSB**
  - **...**

From the mandate of the directors

- The ET ESFRI Project Coordinators [...] are in charge and responsible for the creation of the ET Research Infrastructure. Their authority is recognised by the BGR in their Terms of References.
- The ET Coordinators nominate two ET Directors: [...] Fernando Ferroni (INFN) and Andreas Freise (NIKHEF) [...]. Mario Martinez (IFAE) is responsible for the INFRA-DEV project. He operates under the responsibility of the two ET Directors and is a member of the ET Directorate.
- This mandate covers the '**Design and Preparation Phase I'***. The main deliverables during this phase are reports addressed to the BGR, suggesting them to give a first approval for:
  - the construction of the ET Research Infrastructure and its location(s)
  - a budget and a schedule which both cover the procurement process, the installation, the commissioning, the operation and finally the dismantling,
  - for the establishment of a legal entity for the Implementation Phase.

  The final report as delivered by the Directors should include a comparison of two scenarios, namely the baseline consisting of one triangle versus an alternative option based on two L-shaped infrastructures, in scientific potential, risk analysis and costs.

*** Phase I end with the site decision and the principal approval for construction of ET.**

ETO: project management and engineering support

ETO (ET Organisation)

- **Board of governmental representatives**
- **Board of Scientific representatives**
- **Coordinators**
- **ET Directorate**
- **Project office**
- **Engineering department**
- Administrative offices
- **ET-PP**

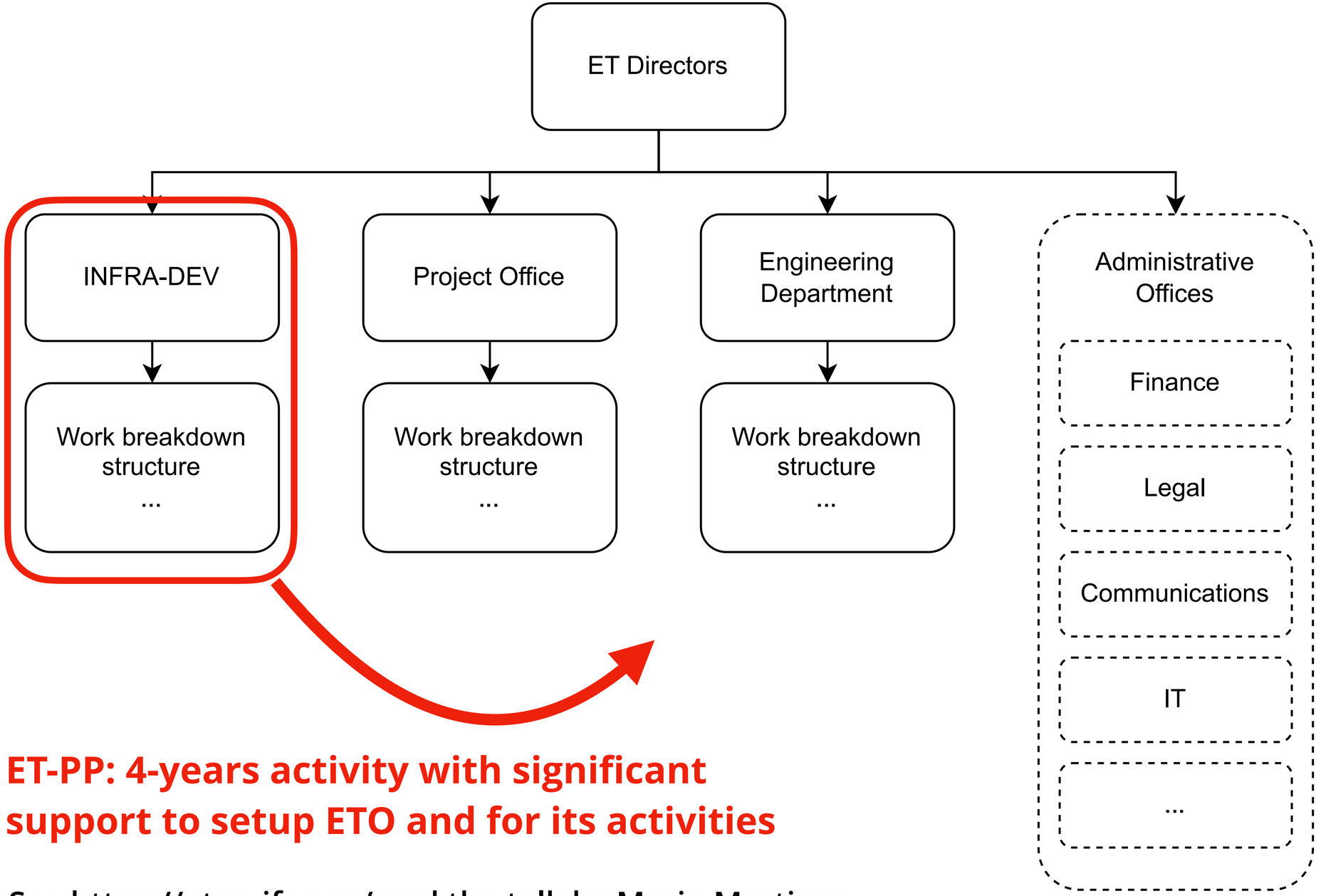
Antonio Zoccoli,
President of INFN,
Italy

Stan Bentvelsen,
Director of Nikhef ,
Netherlands

Fernando Ferroni
(INFN, Italy)

Andreas Freise
(Nikhef, NL)

Mario Martinez
(IFAE, Spain)



ET-PP: 4-years activity with significant support to setup ETO and for its activities

See https://etpp.ifae.es/ and the talk by Mario Martinez

https://apps.et-gw.eu/tds/ql/?c=16590

ETO activities this week

- Thematic workshop: ETO: From the PBS to a preliminary design of the ET civil infrastructure, Maria Marsella, Tuesday 16:30
- Thematic workshop: ETO: Configuration kick-off and optical/functional layout, Alessandro Variola, Alessio Rocchi, Patrick Werneke, Wednesday 17:00
- ETO: Einstein Telescope Organization, Andreas Freise, Thursday, 10:20
- ETO: ET-PP (INFRADEV), Mario Martinez, Thursday 10:40
- **ETO: Engineering Dept, Patrick Werneke, Friday 11:20**
- **ETO: Vacuum Pipe project, Carlo Scarcia (CERN), Friday 18:00**

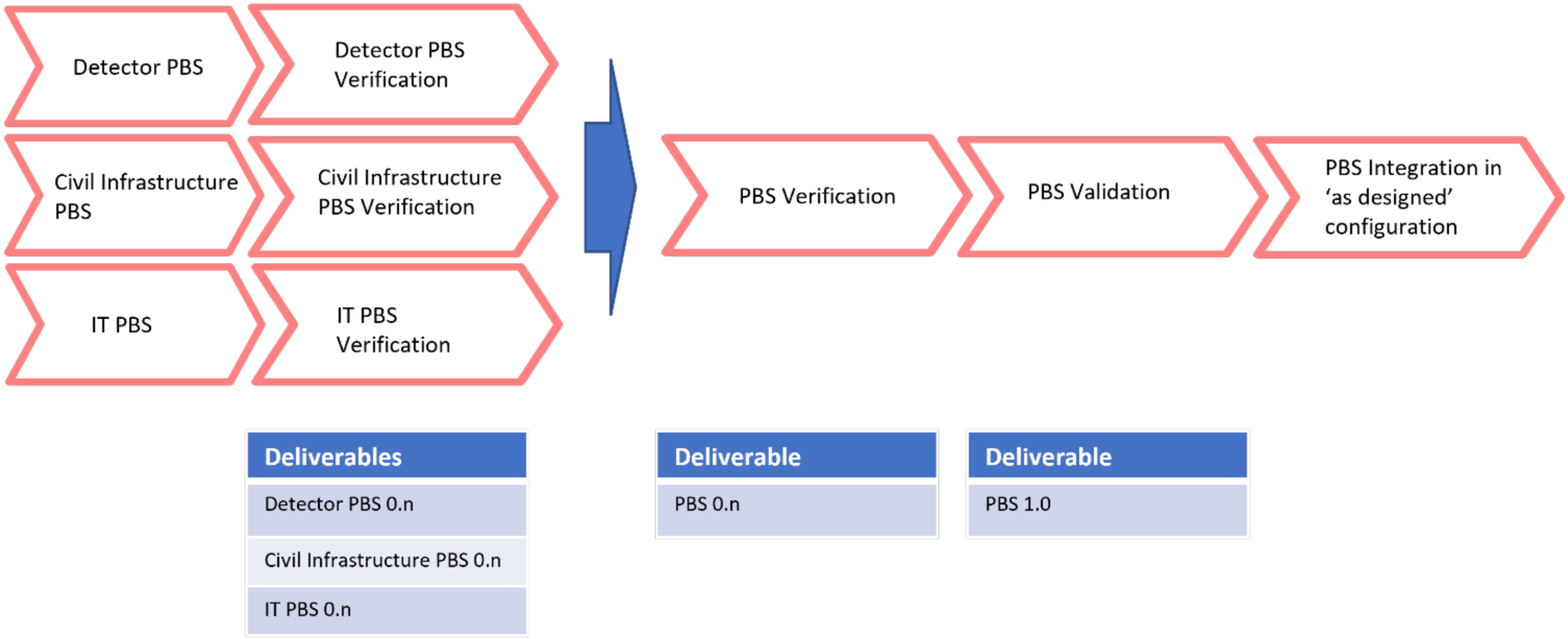
Formal project management: PBS

- Following the initiative from the project office, an ad-hoc working group was appointed
- Made of both PO and Collaboration members (Mandate/Composition - ET-0026A-23), the WG met (mostly) in presence four times in different locations with monthly cadence. All presentations and meetings executive summaries available in the ET Wiki: https://wiki.et-gw.eu/Main/PBSWorkingGroup/WebHome
- The Product Breakdown Structure (PBS) is a first step in a formal project management process:
  - PBS will define the structure of the Requirements Breakdown Hierarchy (not considering crosscutting systems or others)
  - PBS shall represent the backbone of the WBS (Work Breakdown Structure)
  - PBS is triggering the OBS (Organization Breakdown Structure) via the definition of the WBS
  - PBS shall produce the Hardware Project Object costing

PBS in practise

- PBS structured in three parts:
  - Detector (HF and LF interferometers);
  - Civil Infrastructure (Surface and Underground) + requests from ISB WPs;
  - E-Infrastructure;

- Final report (ET-0170A-23) released describing:
  - Goals
  - Strategy
  - Rules
  - PBS Management Plan
  - Roles
  - Traceability
  - Nomenclature



Working with CERN

- We actively seek collaborations with technical teams at CERN. Those teams can provide extremely valuable expertise for urgent topics, such as vacuum pipe systems and the construction of underground infrastructures.

- By working with CERN we are established links and building ET-related knowledge within the technical teams at CERN and we are establishing ET as a active topic within the CERN systems, opening the doors for future opportunities.

- An generic MOU between ET partners and CERN, as a framework for future collaboration, was negotiated in 2019 and signed January 2020 between CERN, INFN and Nikhef. Recently IFAE has joined as a fourth partner. **We strive for other national partners to join in the future.** Based on this MOU we are starting specific collaborative activities (see next slides).

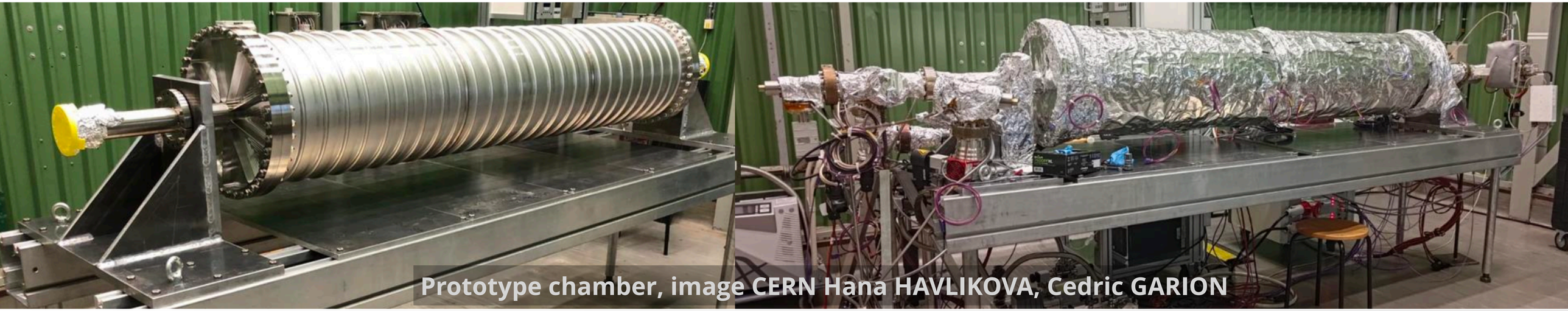
- The Einstein Telescope is now a ‘recognised experiment’ at CERN (since this month), following an application process from the ET Collaboration. This will allow easier access to CERN itself and to CERN tools.

CERN vacuum pipe activity

- The first annex to the general MOU describes the vacuum pipe project which started in May 2022 and will run for 3 years, with the **Technical Design Report** for the vacuum pipe as a deliverable.

- Progress is impressive and the work is reported regularly, see for example meeting on 21.04.2023, https://indico.cern.ch/event/1278417/

- Please stay for the talk by Carlo Scarcia, Friday 18:00.



Prototype chamber, image CERN Hana HAVLIKOVA, Cedric GARION

CERN, next steps

- **Civil engineering**: an extension to the MOU has been agreed on and is now being formalised: CERN will provide consultancy and technical support towards the creation of the TDR for the civil engineering and technical infrastructure. That project will start in 2023 and run for 3 years.

- **Health and safety**: technical designs at CERN are usually done by a large interdisciplinary team, including for example the safety group. we had a first exploratory meeting with CERN's Occupational Health & Safety and Environmental Protection Unit (HSE) on 04.04.2023. To be continued.

- **Engineering support**: we are organising a first meeting with Katy Foraz, the Head of the Engineering Department at CERN, and her Group Leaders to explore other opportunities for collaboration.

- **Document management**: project management requires specific tools, we are investigating the use of the CERN tool EDMS. Hosting and support could be add/by CERN or from another partner.

Change comes with challenges

- The establishment of a entities such as ETO transfers ownership and control, this comes with risks. In particular, artificial competition between the ‘project’ and the ‘collaboration’ is a know issue that has caused significant delays elsewhere.

- ETO in the future will become a large entity with hundreds of people. At the moment we start from scratch, with no direct funding, but limited support via ET-PP and in-kind person power from key partners. The bootstrapping and evolution is a difficult process.

- We rely on your help to make ETO work well. ‘You’ includes everyone with a task related to ET but most importantly people in leading positions in the ET collaboration, ET-PP, national teams or your own institutions. We will seek new in-kind contributions and collaborations. Let’s talk!

... end