

ET

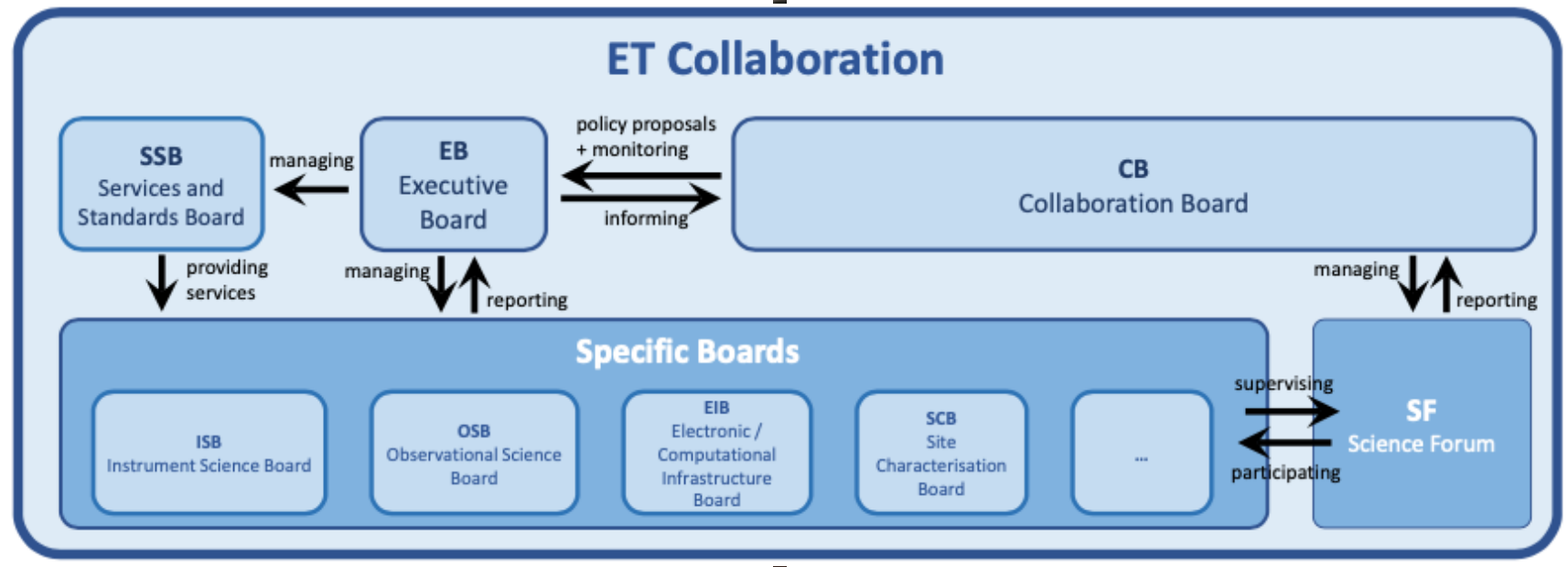
EINSTEIN
TELESCOPE



**Site Preparation Board mandate
approved at PD-SC chairs meeting
April 20th 2022**

ET Collaboration Structure

- Executive Board (EB)
 - Collaboration Board (CB)
 - Science Forum (SF)
- Specific Collaboration Boards
 - Service and Standards Boards and Committees



The SPB must lead the effort on the Einstein Telescope site related activities

- It must coordinate the activities to acquire the required characteristics for each site proposing to host the Einstein Telescope
- Collect, organize and/or produce all the characterizations and documentation needed for a fair comparison of the sites;
- Propose a common framework and common basis for the evaluation of the candidate sites.

Site Characterization: physical variables

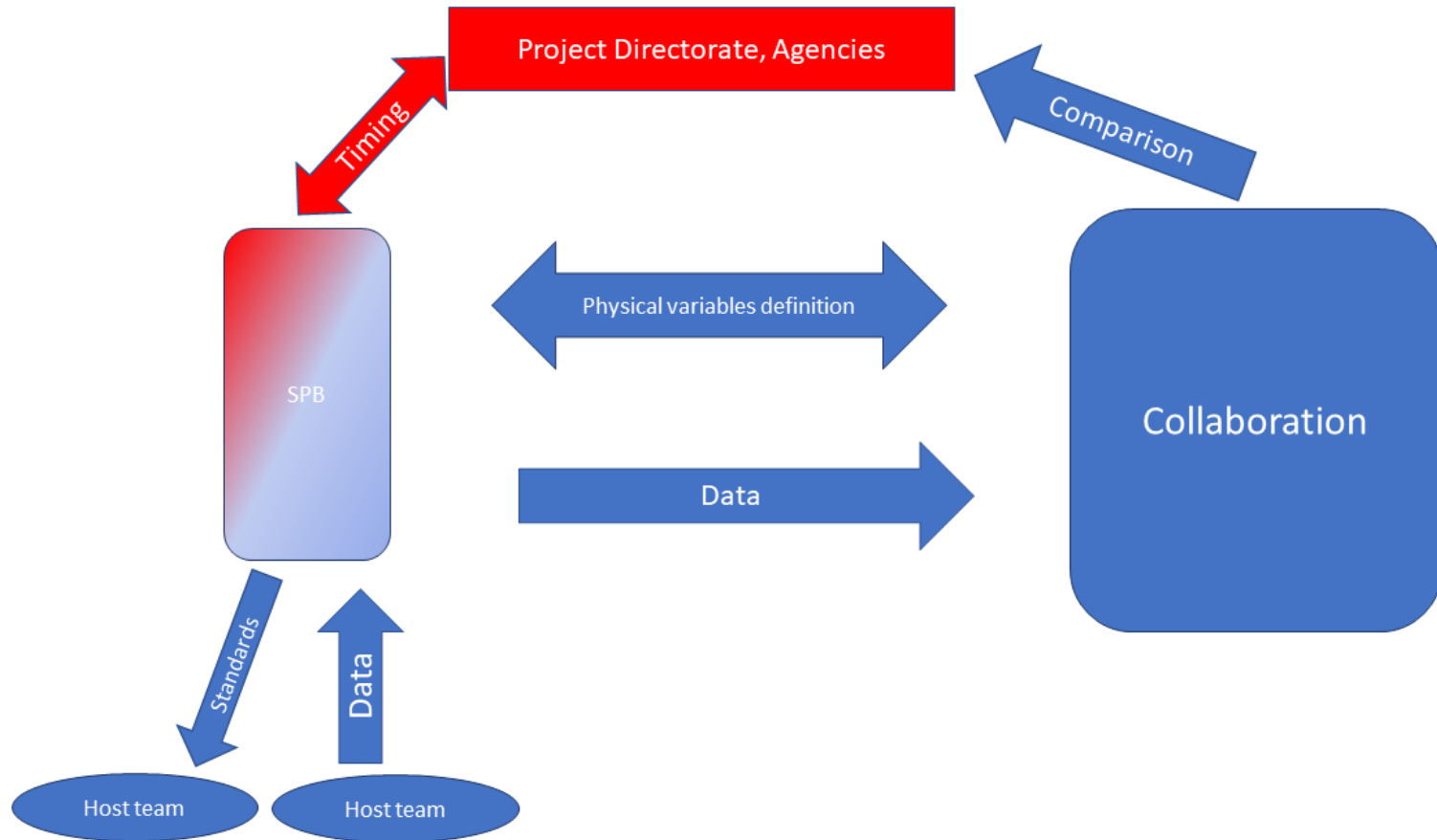
- Define surface and downhole measurements to be performed for accurate noise characterization and site description in terms of geophysical, geological and geotechnical information.
- Environmental studies including seismic surveys. Coordination of measurements to be performed (long-term, short-term, passive and active measurements). Geophysical and technical investigation. Coordination of measurements to be performed.
- Definition of unique data formats for sensor data acquisition. Set up of (or identify) a database to collect and to share the various data acquired at each site with all ET collaborators. Definition of software tools and recipes to be used for data analysis

- Definition of best practice and common indication for measurements
 - Surface and borehole measurements
 - Instrumentation, number and detector sensitivity
 - Minimal duration of data taking
 - Recommended setup
- Exchange of experience from the two sites
- Data sharing (seismic and environmental measurements, geological and geotechnical data)
- Common recipes, prescriptions and tools for data access and data analysis
- Windmills
- ...

Expected Output

- Definition of a set of physical variable to be acquired
- Definition of set of standard in their acquisition, and the data collected according that standards

Information Flux

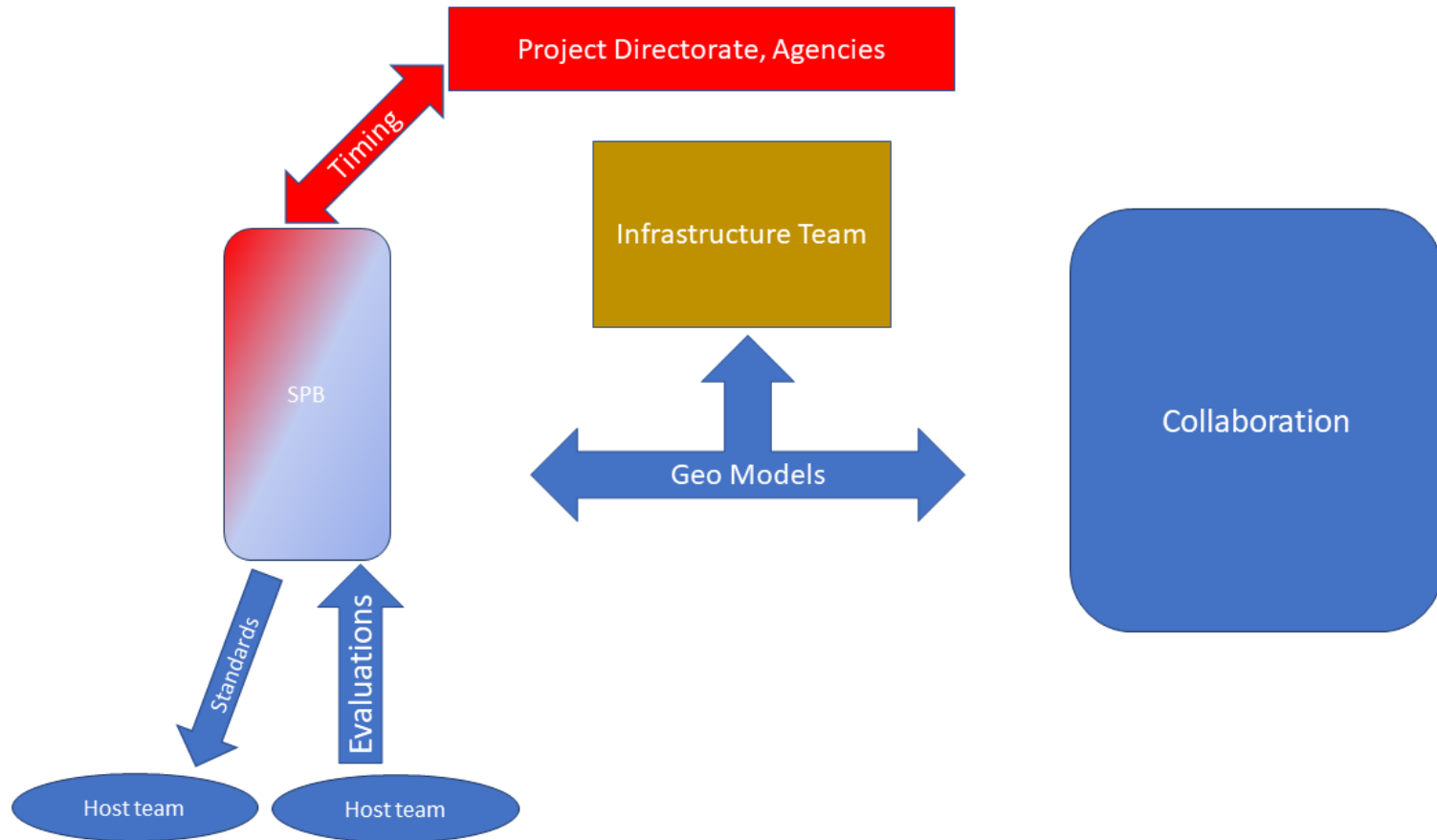


- Definition of a minimal set of geological, geophysical and geotechnical investigations
 - ❑ Sub-surface geological structure and notably rock quality and stability;
 - ❑ Hydrology;
 - ❑ Inventory of (major) fault zones.
 - ❑ ...

Expected Output

- 3D map of the sub-surface of the volume enclosed by ET
- Reports – using a common or at least comparable format– to be used for site comparison.

Information Flux



Site Char.: costs and timing

- Plan, cost and timing estimation for waste disposal, land-acquisition, logistics, surface infrastructures (buildings, services, ...)
- NN compensation and all action needed to mitigate site “effects” on ET

Expected Output:

- comparable set of site-specific cost and timing evaluations, based on a common framework

- Identification of all the legal aspects to be faced in all the ET realization phases (construction and operation)
 - ❑ legal, planological , (local) community, etc. issues

Expected Output:

- A list of required legal documents, needed for the realization of the ET infrastructure
- A report describing the consolidated strategy to preserve the site quality. A standardization of the timeline computation

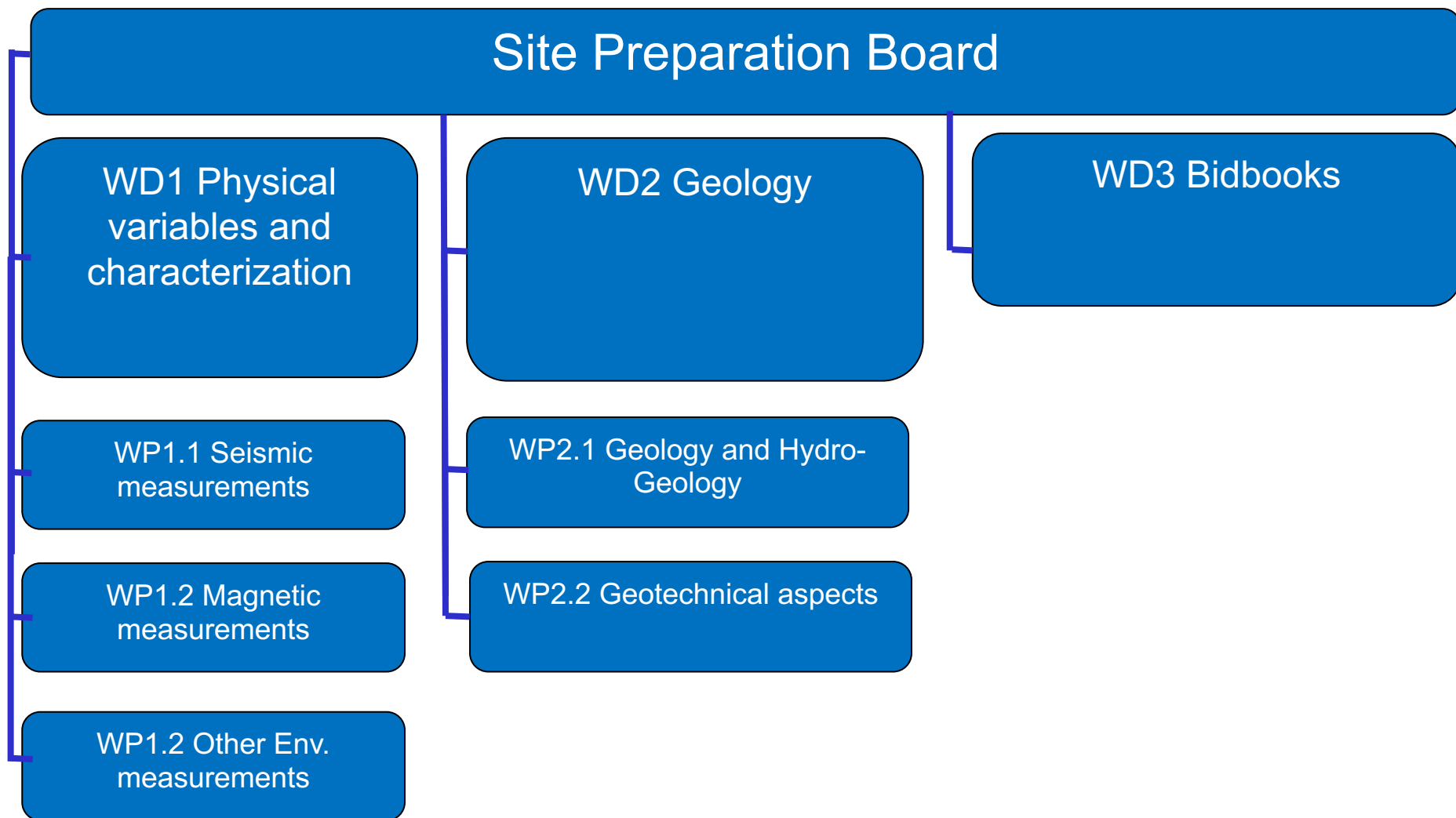
➤ Estimation of socio-economic impact

Expected Output:

- A set of standards in the computation of the socio-economic-environmental impact
- common multipliers in the computation of the economic impact, or multipliers based on shared criteria
 - definition of a set of common categories to define the social impact
 - definition of a set of common categories to define the environmental impact

The SPB defines the standard format of the ET bidbook and its content

- needed legal documentation
- procedures to realize the ET infrastructure
- timing and cost according with the infrastructure team, the collaboration and the Host Teams
- financial plan
- site related risk assessment
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WP4 - Site Preparation - is responsible for collecting and processing, from each potential site, all the required information necessary for site qualification. This includes site specific characteristics that might impact the ET scientific performance, socio-economic impacts, legal implications, and civil engineering costs. The information will be treated in a coherent and transparent manner, with the aim of facilitating a site selection process in a timescale consistent with ET anticipated schedule. M. Campinelli (INFN) and F. Linde (NIKHEF) act as co-coordinators of WP4 in this proposal.

Participating institutions: INFN, Nikhef, UW (Warsaw) & Wigner RCP (Budapest) ***(and anyone else is of course more than welcome!)***

Available funding: 200 k€ for professional consulting expenses related to civil engineering costs and socio-economic impacts.

WP4 Gantt chart. Starting date assumed to be 1-Sept-2022.

WP4. Site Preparation

Start of ET-PP

M4.1 Document detailing the site-specific characteristics

M4.2 Common methodology to estimate impact of site characteristics on ET sensitivity

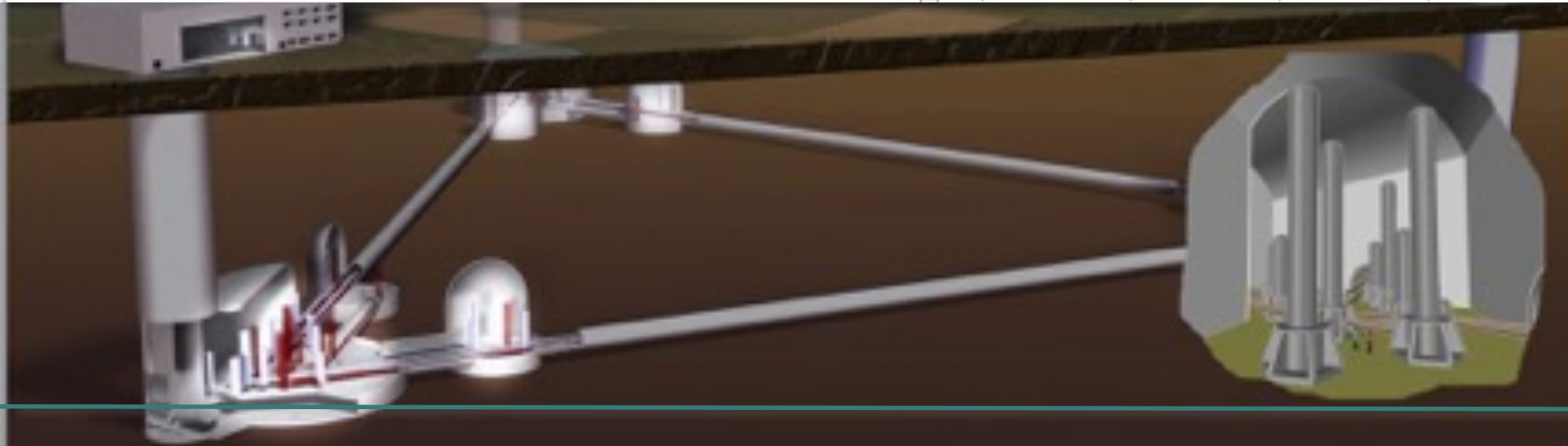
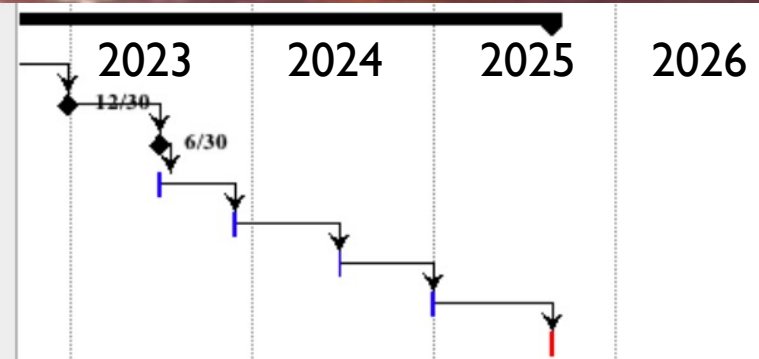
D4.1 Scan of legal procedures

D4.2 Updated socio-economic impact studies

D4.3 Complete quantification of all the aspects impacting the Einstein Telescope perform

D4.4 3D geology, hydrology, etc. model

D4.5 Robust and complete cost and schedule estimates of the excavations



Milestone name – Date (in months)/Lead Institution

- **M4.1 – M3/UW** : *Document detailing the site-specific characteristics that impact ET sensitivity and its duty cycle => **REPORT***
- **M4.2 – M10/UW** : *Common methodology to estimate impact of site characteristics on ET sensitivity and operation and, if required, a scheme to compensate it => **REPORT***

My take:

Both Milestones should be formulated in close collaboration with the ISB and OSB and we should start the discussions with these boards soon.

Deliverable name – Date (in months)/Lead Institution

- **D4.1 – M10/Nikhef:** *Scan of legal procedures, permitting and land acquisitions i.e. the steps to be taken prior to starting excavations*
- **D4.2 – M15/INFN:** *Updated socio-economic impact studies. Scan of accessibility, quality of life etc.*
- **D4.3 – M28/UW:** *Complete quantification of all the aspects impacting the ET performance for each site*
- **D4.4 – M30/INFN:** *Report on 3D geology, hydrology, etc. model with localisation of the ET infrastructure*
- **D4.5 – M42/Nikhef:** *Updated cost and schedule estimates of the excavations. Including, if necessary: instrumentation for Newtonian Noise cancellation; costs of debris removal; costs of land acquisition, permitting, etc.*