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TETI Comments to ETO CE Roadmap

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1 List of acronyms

CE – Civil Engineering

ET – Einstein Telescope

ETO – ET Organization

GW – Gravitational Wave

EMR - Euregio Meuse-Rhine

TETI – Team for Einstein Telescope in Italy

2 Applicable documents

[AD1] ETO-Civil Engineering Roadmap for Phase 1, TDS reference ET-0561A-24, EDMS [link](#)

At the time of the release of this document, we refer to the ETO document release from November 6.

[AD2] EMR [Note](#) with comments to [AD1]

3 Purpose

This note is distributed to provide TETI comments to [AD1] and [AD2].

More are expected as [AD1] evolves, and this note shall be updated accordingly.

4 Scope

This is a collection of comments on the methods proposed for organizing the ETO roadmap for CE studies and specific open points in the list of documents outlined in [AD1].

5 Comments

5.1 General comments

These are comments on the general architecture of [AD1].

- the CE roadmap and target deliveries (documents and dates) should be compliant with a general ETO roadmap (methodology and timeline); in the absence of such a general framework whatever specific in [AD1] (documents

and due dates) can be considered as a best effort commitment; for example, what is the impact of the recently appointed Design Task Force to the proposed timeline ?

- Even if the current INFN contract with RockSoil, which supports activities on the field and engineering studies, expires by the end of 2025, future fundings are available and additional contracts are possible. TETI will therefore disclose its products in compliance with the general ETO schedule and the proposal submission process, as soon as established. This comment applies to sections 3.2, 3.3, 3.4, 3.5, 3.6
- Are the documents, eg the TDR in 3.1.6, expected to be released for both triangular and L configurations ?

5.2 Specific comments

These are comments to specific documents and their specifications

- Introduction: the following sentence is unclear, please clarify: *report is writing in the preliminary TDR which is originally expected to be by the end of 2026.*
- 3.1.3 - Validation review procedures: while this is responsibility of ETO and ETC, this has a large impact on the work of the local teams; moreover it extends beyond the science case to other critical aspects (eg cost, risk, safety, performance of the infrastructure); it would help much to know what are the main guidelines that ETO and ETC are working on to establish validation procedures
- 3.1.4 - Cost standards and validation methodology: does this fall under ETO CE responsibility? Is this confirmed after CERN decision not to cover this item? What is the expected contribution from the local teams?
- 3.1.1, 3.1.4, 3.1.7, 3.1.8, 3.7*: the target deliveries at Q4/2024 are not up to date, are there proposed alternative dates?
- 3.1.6: is this document independent of the site selection ?
- 3.1.7: the local teams are elaborating estimates for completing these tasks and it would be reasonable to consider such evaluations when elaborating the reference timeline, or, at least, release a reference timeline with conservative margins to include uncertainties from the local teams estimates. Also, what is the exact meaning of the *Timeline alignment* prerequisite / input:

- 3.1.9 - how does this timeline change after considering the Design Task Force work?
- 3.2: the list of all deliverables is in line with what TETI plans to deliver
- 3.2.1 - Surface surveying: it might help to specify the topic by adding the words: topography above the tunnels and caverns
- 3.2.2 and 3.2.3 - please specify the meaning of the word *potential* in this context
- 3.3.2: replace underground structure with underground infrastructure; replace Emergency with safety as a more general concept
- 3.4.1 cost estimates: indeed, the LT will conduct these, but a fair comparison should be made possible by defining items to be covered and standard reference costs where applicable
- 3.4.3 - Schedule for civil work permitting: if this is a general plan for permits for the site characterization campaigns or for actual construction? In the former case it can easily follow the current example of permits used for local sites campaigns; on the other hand, for the actual ET infrastructure construction, the framework for permits may depend on the interim governance chosen for ET
- 3.5.1 Land development strategy accomplishing local urban planning and land use/zoning: requirements are necessary for a fair comparison
- 3.5.3 - Cultural heritage preservation: indeed, the TETI feasibility study will cover this as well as impact on archeological sites, which are relevant in Sardinia
- 3.5.4 - Noise assessment and mitigation – this topic might be better suited for the Technical Infrastructure list of deliverables (section 3.3); moreover, the assessment of noise levels should be the responsibility of ETO and not of the LTs.
- 3.6.1 - Strategy on safety and security during construction: for the current phase such studies will be developed at the feasibility level, to be later fully developed with an executive project
- 3.6.2 - a prerequisite/input seems to be mandatory to generate this study
- 3.7.2 - Electrical engineering deliverables: TETI plans to present a feasibility study for these topics, which will also cover interface and mechanical interface aspects related to the civil infrastructures in Sardinia.

- 3.7.3: please confirm that the expressions *Document safety requirements and solutions* is intended as a request to provide evidence of specific, local requirements that LTs will use as a reference
- 3.7.4: an MoU does not seem generally provide prerequisites
- 3.7.5: please specify with more details the intent of this deliverable

5.3 Comments to EMR note

We received [AD2] shortly after [AD1] and can therefore provide comments on it as well as on [AD1].

In general, we agree with the issues raised by EMR on:

- **master planning;**
- **Dependencies;**

For the **Safety and security issues**, we agree with the ETO assumption that this is to be defined by the local teams in compliance with the local regulations, which will depend on the site and on the chosen legal entity. On the other hand, EMR correctly raises the issue that a basic set of common, site-independent requirements should be made available by ETO as a reference.

For the **layout issues**, TETI does not limit its scope to the triangular configuration, but all feasibility studies will be conducted both for the triangle and the 2L configurations, in line with the expected configurations delivered by the ETO Design Task Force.

Regarding the **level of detail** issue, TETI agrees that a definition of the specific requirements on the general technical documentation is needed before committing to deliver and before participating in the bidding. On the other hand, INFN contracted RockSoil to provide preliminary, but complete, engineering studies. TETI considers that the level of detail which it has requested to Rocksoil cannot be decreased, without weakening the relevance/significance of the study itself.

6 Conclusions

We thank the ETO-CE group for sharing the preliminary roadmap and giving us a chance to comment early in the process.

TETI is in line with the EMR request to have ETO define and provide requirements for defining the content and format of the requested technical documentation.



TETI will comply with the ETO-CE technical requests (content and format) and with the ETO timeline when this is formalized and distributed. Current expectations for TETI deliverables cannot be considered a commitment.

7 Annex

Not applicable