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Abstract

The document describes the qualification and selection procedure for the E-TEST Vibration Isolation tender.

Document Status

Revision	Date	Comment	Reviewed by	Approved by
0	14/09/2022	Document initiated		
1	19/09/2022	Details on Nikhef added		
2	27/09/2022	Awarding criteria detailed		
3	02/10/2022	Knock-out table updated		
4	08/11/2022	Final drawings added		

Revision History

Revision	Date	Description
0	14/09/2022	Document initiated

1 Documentation and Acronyms

1.1 Abbreviations/Acronyms

Abbreviation	Description
E-TEST	Project about site study and technology development for the Einstein Telescope
EMR	Euregio Meuse-Rhine
CSL	Centre Spatial de Liege
ET-LF	Einstein Telescope low frequency interferometer
UHV	Ultra-high vacuum
AP	Active vibration isolation platform
IP	Inverted pendulum
GAS	Geometric Anti-Spring
VIS	Vibration isolation system
MAR	Marionette: cryogenic payload steering suspension stage

2 Introduction to the E-TEST project

The E-TEST project, funded by INTERREG Euregio Meuse-Rhine (EMR), has two main objectives:

1) to carry out a detailed geological and seismological study of the Meuse-Rhine cross-border region to support its candidacy to host the Einstein Telescope,

2) to tackle challenging engineering and technological aspects of the Einstein Telescope design concerning vibration isolation, cryogenics and optics.

In the framework of E-TEST a technology demonstrator, coined Prototype, will be built and put in operation at the Centre Spatial de Liege (CSL). In the Prototype (see CAD view of the setup in Fig.1), a 100-kg mass monocrystalline silicon mirror, cooled down to 25K by radiation heat exchange, will be suspended from a multistage vibration isolation system, reproducing the configuration of the Einstein Telescope Low Frequency (ET-LF) interferometers.

A more detailed description of the E-TEST project can be found in https://www.etest-emr.eu/

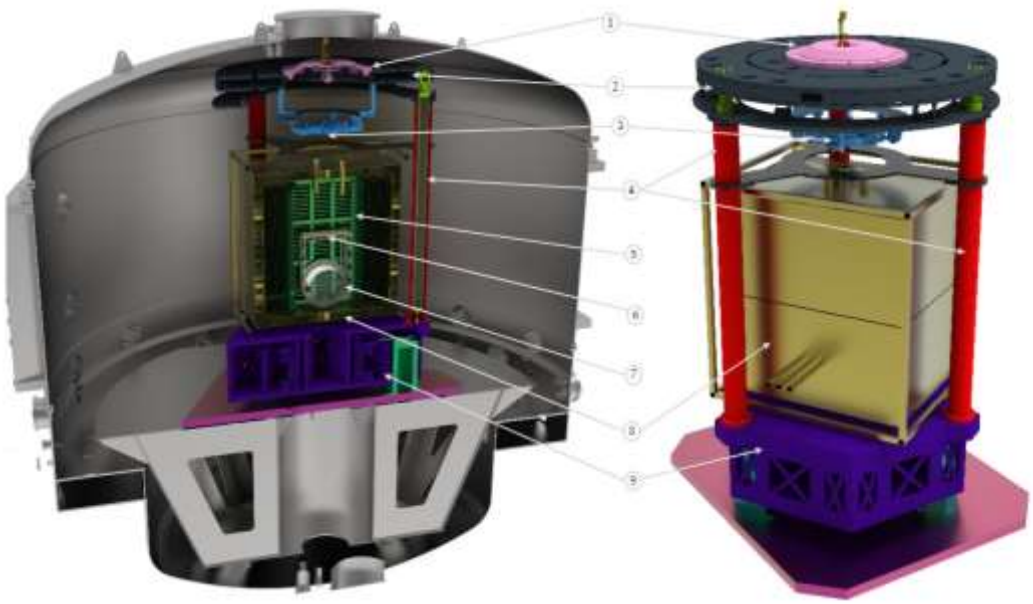

Figure 1 *Artist impression of the E-TEST technology demonstrator. A 100-kg mass silicon mirror (7) is housed inside a cryostat consisting of an 80K outer thermal tent (8), cooled by liquid nitrogen, and a 20K inner heat shield (5) cooled by gaseous helium. The mirror is connected by means of thin rods made of monocrystalline silicon to a heat exchanger (6), together with which it forms the cryogenic payload. The payload is suspended from a multistage vibration isolator operating at room temperature and consisting of: a room-temperature steering stage, coined marionette, (3), a passive attenuator with an inverted pendulum (IP) (2,4) and a geometric anti-spring (GAS) vertical filter (1), a six degrees of freedom active isolation stage (9).*

3 Content of the tender

The tender is intended for the procurement of the parts needed for assembling the mechanics of the **vibration isolation system** (VIS) and of the **cryogenic platform** (CP) of the E-TEST prototype facility.

The VIS consists of four sub-systems (an impression of the assemblies is shown in Fig.2): a six-degrees of freedom active isolation stage, so-called **active platform** (AP), an ultra-low natural frequency **inverted pendulum** (IP) horizontal isolator, a **geometric anti-spring filter** (GAS) for additional vertical attenuation and a pendulum stage (**marionette**) for steering the cryogenic payload in the angular degrees of freedom. The CP provides the mechanical interface between the mirror and the 20K radiation heat exchanger and serves as test-bed for the advanced and cryogenic environment compatible inertial sensors developed within the project.

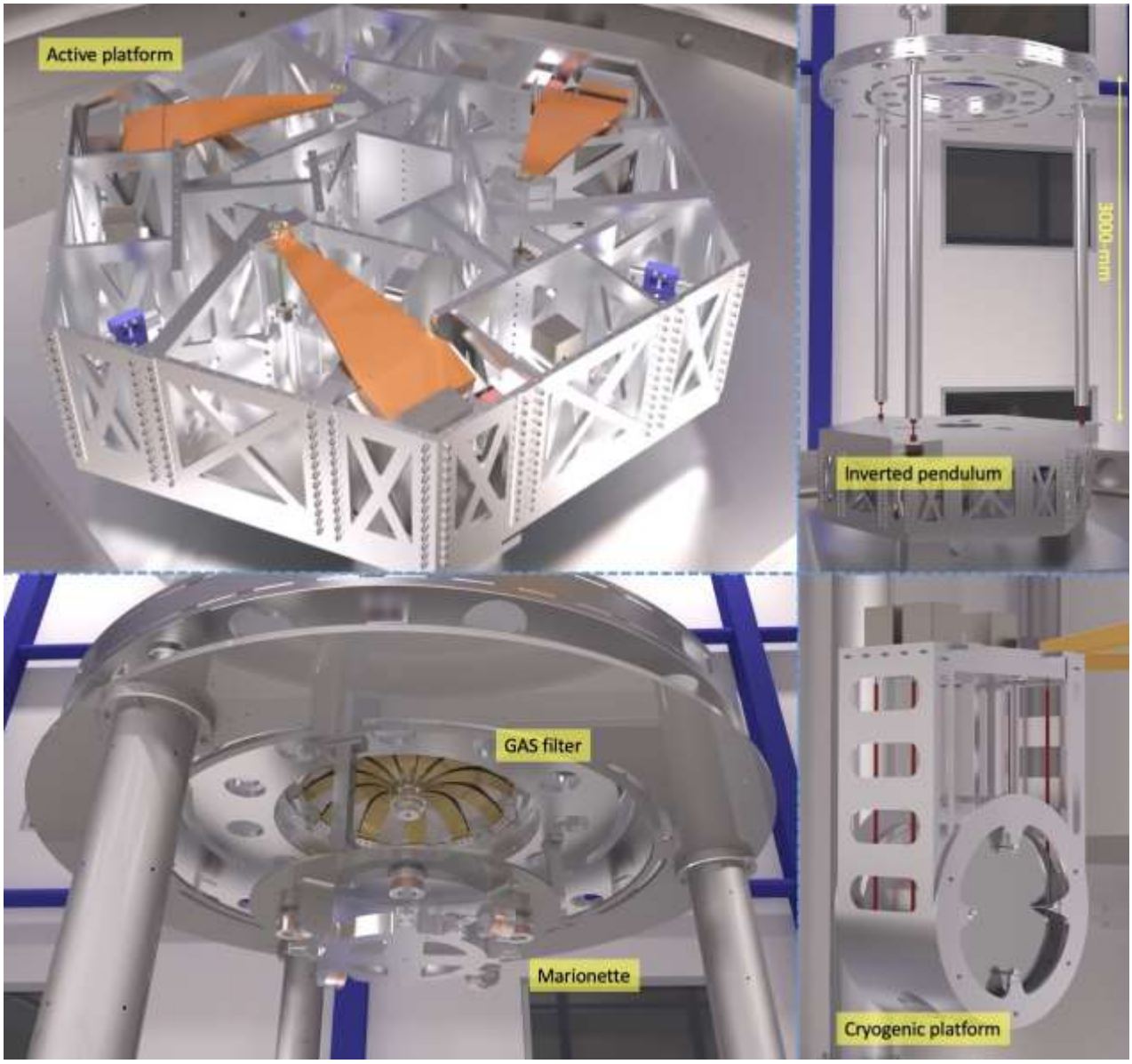

Figure 2 *CAD views of the VIS sub-systems.*

4 Tender - general conditions

This tender is issued on behalf of Nikhef (National Institute for Subatomic Physics), an institute of the NWO-I Foundation ('Stichting Nederlandse Wetenschappelijk Onderzoek Instituten').

The content of the Tender Response must comply with the following conditions:

- The Tender response and all further communications must be in the English language.
- The General Government Purchase Conditions 2018 are applicable i.e. ARIV_2018 conditions as published here: https://www.nwo-i.nl/wp-content/uploads/2019/11/ARIV_2018-mei2018_0-2.pdf;
- The Tender response must be irrevocable for at least 60 days after the closing date of this procurement procedure.
- All amounts must be stated in euros excluding VAT.
- Nikhef reserves the right to check the accuracy of all data and to contact the persons designated with regard to competence requirements. If that information is found to be missing, Nikhef may decide to request it, provided that competition is not thereby damaged. Nikhef is in no way obliged to do this.
- The submission of a Tender response signifies that the Tenderer agrees to the proposed procedure and the provisions of this Descriptive Document (including Annexes).

Other conditions:

- Nikhef reserves the right at all times not to award the contract (in full or in part) and to discontinue the procurement procedure.
- The Dutch Public Procurement Act (Dutch Official Journal 2012, 542), is applicable to this tender.

5 Tender - specific conditions

The E-TEST Prototype setup requires the mechanics to be compatible with an Ultra-high vacuum (UHV) environment. Therefore, the production procedure requires experience with processing and handling clean materials. Proven experience in manufacturing of components for scientific equipment is preferable, but not mandatory. More details about the cleanliness requirements are presented in the Technical Specifications document (Annex I).

Therefore Nikhef requires information from the tenderer regarding previous supplies or products that prove the company's expertise in production of UHV compatible parts, specifically the application and the presence of UHV quality welds of aluminium alloys and stainless steel.

Nikhef reserves the right to visit the production facility of the selected company during the tender verification period (before final awarding). If the production facility is found inadequate for the purpose of this tender the award of the tender will be cancelled.

Nikhef requires the delivery to take place ultimately 180 calendar days after the date of Final Awarding.

6 Documents to be submitted

Tenderer should submit the following documents:

A. Explicit confirmation on all Requirements (Req. 1 – Req. 16) as listed in the Technical Specifications (format: Annex III-A);
B. Price for the complete supply, excluding VAT (format: Annex III-B);
C. A Technical Qualification document, maximum two A4, describing at least one and at most two supplies or products, delivered by bidder in the past five years (2016 – 2021), reflecting the bidder's competence in the expertise required for this tender, in particular UHV quality welds of aluminium alloys and stainless steel. The bidder is encouraged to attach to the document any Certification, Quality Awards, etc. that support the quality of the company in this respect (format: Annex III-C);
D. Delivery time - the number of calendar days, starting 90 calendar days after Final Awarding (format: Annex III-D), to which the bidder commits to have completed delivery of the supply. This figure cannot be higher than 90 days so that in total the required 180 calendar days for the delivery time is respected.

7 Tender: awarding criteria

Bidders must comply with all requirements set forth in the Technical Specifications. A signed form (Annex III-A) needs to be submitted.

Bids will be evaluated as follows:

Price – a maximum of 80 points will be awarded based on the formula:

$$\boldsymbol{points = 80 \times \frac{HB - B}{HB}}$$

where B and HB are respectively the bid and the highest submitted bid.

Quality – a maximum of 20 points will be awarded as follows:

- A maximum of 10 points for 'Technical Qualification' as submitted in Annex C, for proven experience in manufacturing components for scientific equipment in an UHV environment:
  - 0 points will be awarded if no convincing earlier supplies or products are described;
  - 10 points will be awarded if two convincing supplies or products are described, with in addition any other documents that support the company's quality in this respect.

- A maximum of 10 points for 'Delivery Schedule' as submitted in Annex D:

$$\boldsymbol{points} = \mathbf{10} \times \frac{\mathbf{90} - \boldsymbol{D}}{\mathbf{90}}$$

where D is the number of calendar days, starting 90 calendar days after Final Awarding, to which the bidder commits to have completed delivery of the supply.

Please note, that the delivery schedule as submitted will be contractually binding. If during execution of the contract, bidder is not able to meet his submitted delivery schedule, the final contract price will be reduced. This reduction will be 1,25% times the difference in the score obtained on criterion 'Delivery Schedule' *as submitted* and the score on this criterion based on the *actual* delivery time (all in calendar days).

Example:
- submitted delivery time: 45 days; score: 5 points
- actual delivery time: 90 days; score: 0 points
- price reduction: 1,25% * (5 – 0) = 7,25%

8 Planning

The planning for this tender is as follows (no rights can be derived):

11 November 2022	Publication on Tenderned.
Until 5 December 2022, 12:00	Questions on the tender can be posted on Tenderned.
9 December 2022, 17:00	Answers on questions will be provided.
9 January 2023, 12:00	**Offers should be received.**
16 January 2023	Provisional awarding
6 February 2023	Final awarding

9 Annexes

I. E-TEST Vibration Isolation: Technical specifications
II. drawings and STP files
III. Bidding documentation (Word-file):
   A. Compliance with requirements.
   B. Format Price;
   C. Format Technical Qualification;
   D. Format Delivery Time