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**Italy-Bologna: Astronomical and optical instruments
2022/S 107-296095**

Prior information notice

This notice is for prior information only

Supplies

Legal Basis:

Directive 2014/24/EU

Section I: Contracting authority

I.1) Name and addresses

Official name: INAF OAS

Postal address: via Gobetti 93/3

Town: Bologna

NUTS code: IT Italia

Postal code: 40129

Country: Italy

Contact person: PAOLO CILIEGI

E-mail: paolo.ciliegi@inaf.it

Internet address(es):

Main address: <https://www.oas.inaf.it/en/>

Address of the buyer profile: <http://www.maory.oabo.inaf.it/>

I.3) Communication

The procurement documents are available for unrestricted and full direct access, free of charge, at: <http://www.maory.oabo.inaf.it/index.php/infodm/>

Additional information can be obtained from the abovementioned address

I.4) Type of the contracting authority

Other type: Research Institute

I.5) Main activity

Other activity: Research

Section II: Object

II.1) Scope of the procurement

II.1.1) Title:

Preliminary Information Note for MAORY Deformable Mirrors' procurement

II.1.2) Main CPV code

38630000 Astronomical and optical instruments

II.1.3) Type of contract

Supplies

II.1.4) Short description:

ELT (Extremely Large Telescope) is the world's largest telescope (39m diameter) under construction by ESO (<https://elt.eso.org/>) at Cerro Armazones in Chile. ELT is considered worldwide to be one of the highest priorities

in ground based astronomy. MAORY (<http://www.maory.oabo.inaf.it/>), as a first generation ELT instrument, will help compensate for the distortion of light caused by turbulence in the Earth's atmosphere. MAORY is a Multi-Conjugate Adaptive Optics (MCAO) module that will allow spatially uniform adaptive optics compensation over a large field of view (about 1 arcmin²) with high sky coverage. The call will cover the procurement of the two deformable mirrors needed by MAORY and it will cover the final design phase for both DM1 and DM2) plus the manufacturing phase (for DM1 and possibly for DM2, depending by funds availability) which include the assembly, integration and verification at the company premises and the delivery at the integration hall in Bologna (Italy)

II.1.5) **Estimated total value**

II.1.6) **Information about lots**

This contract is divided into lots: no

II.2) **Description**

II.2.3) **Place of performance**

NUTS code: ITH55 Bologna

Main site or place of performance:

The two deformable mirrors must be delivered to the Integration Hall in Bologna at the INAF OAS Institute (Via Gobetti 93/3, Bologna, Italy).

II.2.4) **Description of the procurement:**

1. The call will cover the procurement of the two deformable mirrors needed by MAORY and it will cover the final design phase for both DM1 and DM2 plus the manufacturing phase (for DM1 and possibly for DM2, depending by funds availability at the end of final design phase) which include the assembly, integration and verification at the company premises and the delivery and commissioning at the integration hall in Europe (Bologna, Italy). The transition between the final design phase and the manufacturing phase will be subjected to internal and

external constraints (technical verification and acceptance of the Final Design by MAORY Consortium and ESO and funds availability).

2. Assuming as T0 the date of the Kick Off Meeting with the selected contractor, the Final Design Phase shall end within 12 months from T0 while the delivery of DM1 and DM2 (if the manufacturing is approved) the two deformable mirrors at the Bologna Integration Hall shall take place within 44 (forty four) months from T0.

3. All the ESO standards for ELT instrumentation will be applied to the projects

Optics:

4. The clear aperture of the first deformable mirrors will be about 900 mm, with a convex shape and a curvature radius around 15m. The clear aperture of the second deformable mirrors will be about 1200 mm, with a concave shape and a curvature radius around 15m.

5. The mirrors shall be coated with high reflectivity in visible and near infrared wavelengths (550-2500nm) (baseline Aluminum, goal Silver Protected)

6. The optical elements must allow for a periodical recoating

Mechanics:

7. The mass of each DM should be in the order of 1000 Kg (namely 650 Kg for the smallest and 1000 Kg for the largest) control electronics in external cabinets excluded, positioner included.

8. The system presents mechanical constraints: the mechanical envelope must be such that: the frontal area is limited by the optical clear aperture + 20% and the depth (direction along the optical axis) is between 0.5 and 1m (namely 0.5m for the smallest and 1m for the largest), positioner included (different depth for the different DMs).

Electronics:

9. Each DM can be equipped with an extra coarse positioner which will allow decentering and tip/tilt and focus correction with a precision of some tens of microradians for rotations and ten micrometers for translations. The stroke requested will be <1 degrees for rotations and several millimeters (up to some tens) for translations.

10. The average power consumption for each unit should be around 2KW (control electronics in external cabinet included)

Thermal:

11. The cooling lines will be fed by water and glycol

12. The skin temperatures of the entire unit must be kept regulated to be <+1 C degree from the surrounding environment

Performances:

13. Each DM should be able to update its shape with a response time of the order of 2 milliseconds

14. Each DM must provide at least 700 Degrees Of Freedom for the figure correction

15. Each DM should be able to provide its prescribed optical shape with a misfigure of max 1 arcsec slope at mean inter-actuator distance.

16. Each DM should be able to correct the provided simulated commanded shape with a residual error of <40nm RMS wavefront (file with temporal sequence available at <http://www.maory.oabo.inaf.it/index.php/procurements/>)

17. Position feedback: the actual displacement of the mirror in the actuation points should be made available at full update rate.

Conclusions and Timeline

No response nor expression of interest is expected to this Preliminary Information Note from interested companies.

The publication of the Call for Tender is expected early Q3 2022.

The Kick Off is expected within Q4 2022

II.2.14) **Additional information**

Additional information can be requested within 30 days from the publication of this Note by email to procurement.maory@inaf.it. The questions (in an anonymous form) and the relative answer will be publicly available at the web site <http://www.maory.oabo.inaf.it/index.php/procurements> with due advance with respect to the publication of the Call for Tender.

- II.3) **Estimated date of publication of contract notice:**
15/09/2022

Section IV: Procedure

IV.1) **Description**

IV.1.8) **Information about the Government Procurement Agreement (GPA)**

The procurement is covered by the Government Procurement Agreement: yes

Section VI: Complementary information

VI.3) **Additional information:**

Wavefront sensing for MAORY is performed by six Laser Guide Stars (LGS) and three Natural Guide Stars (NGS), for the measurement of high and low-order wavefront perturbations respectively. The wavefront error compensation is performed by two adaptive post focal Deformable Mirrors (DMs) located inside MAORY (the core of the instrument), which work together with the telescope's adaptive and tip-tilt mirrors M4 and M5 respectively. Currently the MAORY project is funded for the purchase of only one deformable mirror (DM1). The second deformable mirror (DM2) will be purchased only if extra funds will be available. However, in order to allow a future possible upgrade path, MAORY has to be designed for two deformable mirrors from the beginning, with the second deformable mirror being possibly replaced by a rigid mirror.

MAORY is being designed and built by a consortium of partners in Italy, France and Ireland, together with ESO. INAF, as the leading institute, is responsible for all the major procurements.

The project has completed the Preliminary Design Phase and is entering the Final Design Phase. The final design and the manufacturing of some components will be assigned to external companies. In particular the MAORY Consortium would like to inform all the industries concerned that within a few months an international public call for tender will be published concerning the final design and the manufacturing of the two deformable mirrors for MAORY.

The call for tender for the two deformable mirrors will be placed in the framework of the general technical specifications described in Section II.2.4 (Description of the procurement) of this prior information notice. A detailed Statement of Work with a detailed description of all the technical specifications will be published with the public call for tender.

- VI.5) **Date of dispatch of this notice:**
01/06/2022