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Technical Specifications (In-Cash Procurement)

Framework Contract for Diagnostics engineering services for design, manufacturing and construction

This framework contract is for the provision of engineering services for laser, microwave, UV and X-Ray diagnostics. The needed engineering services include the supervision of design, fabrication and manufacturing activities for the first plasma diagnostics and second phase diagnostics.

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Technical Summary

Framework Contract for Diagnostics engineering services for design, manufacturing and construction

1 Purpose

This framework contract is for the provision of engineering services for laser, microwave, UV and X-Ray diagnostics. The needed engineering services include the supervision of design, fabrication and manufacturing activities for the first plasma diagnostics and second phase diagnostics.

2 Scope

Diagnostic systems are critical to the successful and safe operation of ITER. They provide the means to observe, monitor and maintain plasma performance over extended periods of time.

They provide accurate measurements of plasma behaviour and performance, including those required for machine protection and control, as well as measurements required for physics studies.

In total, about 60 diagnostic systems will be installed on ITER. Of these, two groups of systems are covered by this scope, both being fundamental to the first phase of ITER: lasers and microwave systems and X-ray and UV systems managed respectively by the LAMS and VUVX groups of the diagnostic and Port plug Division.

The scopes of the LAMS and VUVX groups cover a total of 20 systems, with systems in various stages readiness aimed for a start of operation at first plasma, second plasma or Deuterium-Tritium plasma phase.

The systems in these two groups provide crucial measurements for the protection and control of the machine, such as:

- Impurity monitoring;
- Electron temperature and density profile measurement;
- Presence of disruption precursors;
- Current and energy of Runaway electron;
- Current profile;
- Radiated power.

Diagnostic systems are either procured in kind from the ITER Domestic Agencies (DAs) according to functional specifications, or the ITER Organization has full responsibility from conceptual design to procurement. The objective of this contract is to support the ITER diagnostic teams of LAMS (Laser and microwave systems) and VUVX (Vacuum UV and X-Ray systems) groups in:

- Project management;
- Definition and follow-up of interfaces, integration and requirements;
- Follow-up of the system manufacturing process;
- Follow-up of the system installation and their integration into ITER;

- Production and assembly of prototypes;
- Supply of components and assemblies in small series.

It includes documentation preparation in view of projects lifecycle milestones, and interface tracking in ITER Documentation and Project lifecycle management systems (IDM and PLM).

The contractor's work on diagnostics which are either within the scope of the DAs or ITER Organization will consist, but not exclusively, in:

1. Supervision during design development and procurement phases,
    a. Review of technical documents,
    b. Organisation and follow-up of review and progress meetings with stakeholders;
2. Interfaces development and follow-up;
3. Support for the identification of risk for the diagnostic systems;
4. Preparation and management of acceptance of the systems (factory acceptance, site acceptance);
5. Preparation and management of installation in ITER;
6. Preparation and management of commissioning of the systems;
7. Preparation and management of operation plans of the systems;
8. Preparation and management of maintenance activities.

The contractor's work on diagnostics within the ITER Organization scope will consist, in addition to the above activities, in:

9. Design development from concept to manufacture readiness;
10. Prototyping definition, production, and tests;
11. Preparation and management of procurement,
    a. Preparation of Technical Specifications,
    b. In-house small series production and assembly;
    c. Follow-up of procurement contracts.

Part of the activities will be done remotely (like points [1.;4.] or [9.; 11.] above) or on ITER site (like points 4. to 8.).

3 Area of expertise

The company shall allocate personnel with adequate experience for the work. Experience in Tokamaks and/or Nuclear Engineering is desirable in most cases.

The specific areas of expertise to be covered are:

- System engineering, interface definition, prototyping and manufacturing, acceptance testing, installation, commissioning, and documentation of diagnostic systems;
- General diagnostics physics, engineering, design and development with ability to cover issues from sensor to data analysis, including expertise in vacuum-physics, mechanical design engineering and analysis, design engineering, electromagnetic analysis, thermo-mechanics, hydraulics, optics, image-processing;
- Optical and microwave diagnostics physics, engineering, design, development and integration – including Thomson scattering systems, Interferometers, Polarimeters, radiometers and reflectometers;
- Spectroscopic diagnostics physics, engineering, design, development and integration – including laser induced fluorescence, Vacuum-Ultra-Violet spectroscopy, X-ray imaging, X-ray spectroscopy, hard X-ray monitoring;

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- Project management in a technical and complex environment, including wok site coordination.

4 Experience

The candidates shall have experience in:

- Design, formal system engineering methodology of large or complex diagnostics projects using formal system engineering methodologies;
- Manufacturing, testing, and validation of those systems;
- Commissioning and integration activities of those systems.

5 Estimated Duration

The contract will be carried out over an initial firm period of four (4) years and an optional period of two (2) years. The contract is expected to come into force in the first quarter of 2023.

6 Indicative Timetable

The below table presents an indicative timetable aiming at the start of contract in the first half of 2023.

Milestone	Date
Call for Nomination	August 2022
Release of Prequalification	September 2022
Release of Call for Tender	January 2023
Indicative award date	April 2023
Indicative Contract signature	May 2023
Indicative Contract start date	May 2023

7 Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State. A legal person cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be a permanent, legally-established grouping or a grouping, which has been constituted informally for a specific tender procedure.

All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization. The consortium cannot be modified later without the approval of the ITER Organization.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Bidders' (individual or consortium) must comply with the selection criteria. IO reserves the right to disregard duplicated references and may exclude such legal entities form the tender procedure.

Bidders will have to be hold an active Ariba Network account and be registered with IO I-PROC digital system to be able to participate to the tender.

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8 Reference

Further information on the ITER Organization procurement and link to registration to Ariba Network and I-PROC can be found at:

http://www.iter.org/org/team/adm/proc/overview