Technical Specifications (In-Cash Procurement)

Technical Summary-Call for Nomination for the Framework Contract on Prototype Design, Development and Testing for the ITER Disruption Mitigation System

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Technical Summary

Call for Nomination

Prototype Design, Development and Testing for the ITER Disruption Mitigation System

1. Purpose

The purpose of this Contract is to design, develop and test prototypes for the ITER Disruption Mitigation System (DMS). The prototypes will be of specific components from the DMS design that are at preliminary design level but require further development and testing to characterize their performance and to use the lessons learn to improve the design.

2. Background

ITER is the next generation fusion experiment and is presently being constructed at Cadarache, in southern France. This experiment will study the potential of controlled nuclear fusion to provide safe, clean and virtually limitless energy for humankind. In order to protect the machine form the consequences of uncontrolled plasma disruptions during high power operation, a Disruption Mitigation System (DMS) is being designed, a rendition of the DMS is shown in Figure 1. The DMS is a protection of investment component with the purpose to reduce the thermal and electromagnetic loads and to dissipate the energy of runaway electrons. The current DMS is based on Shattered Pellet Injector (SPI) technology. This works by freezing gases, such as hydrogen, deuterium, neon, argon and their mixtures, into a solid pellet, and firing the pellet with a high gas pressure pulse against a tilted plate, causing the pellet to shatter into shards. The shards will enter the plasma, ablate and, through radiation, the thermal and electromagnetic loads will be reduced. The efficiency of the mitigation process is determined by various parameters including shard size, distribution, and velocity.
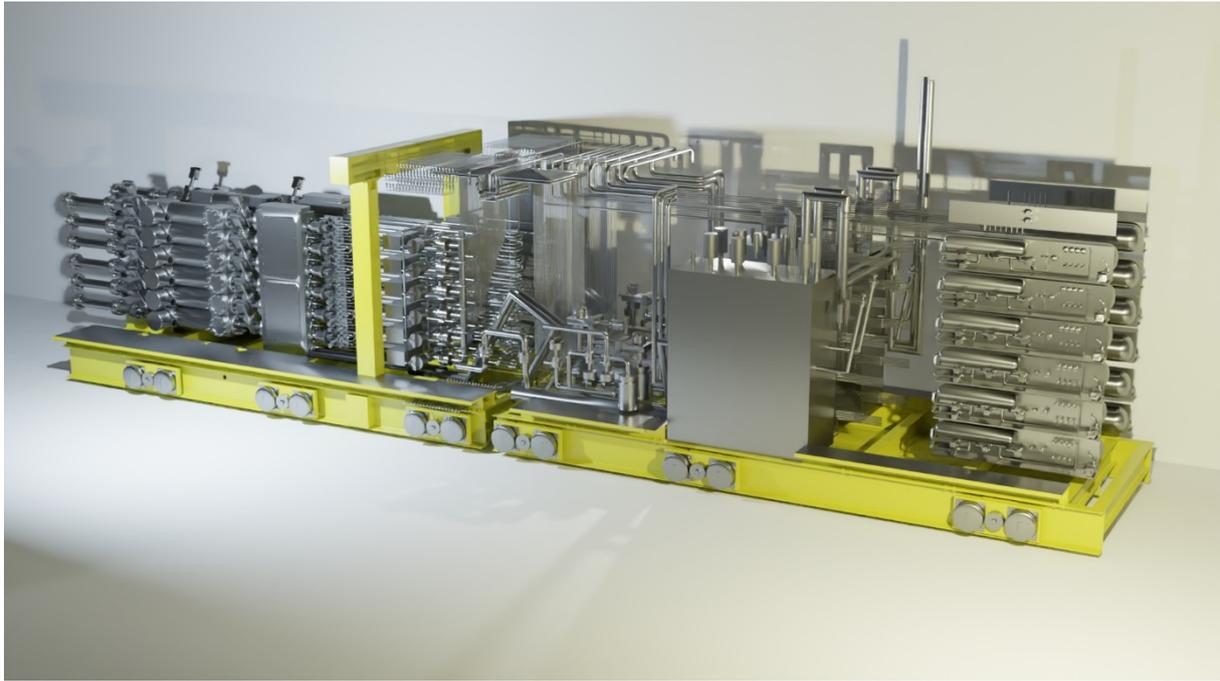
Figure 1: Rendition of the ITER DMS

3. Scope of work

The ITER DMS Prototypes will require experience in one or more of four subject areas and due to the differing specialities; the framework contract requires expertise in the following areas:

- Cryogenics
- Gas Handling
- Vacuum
- General Engineering

As this is a framework contract to support the DMS design the exact work cannot be specified in detail at this stage. However, the following prototypes, or work on a sub-component that will make up one of these prototypes, are likely to be required:

- Gas board and component test bed
- Gas supply manifold
- Cold head
- Prismatic cryostat
- Cryogenic Distribution Box (CDB) and cold test box and testing
- Propellant recovery
- Alignment procedure and hardware

For all tasks ITER Organization (IO) will write technical specifications listing the work required and other requirements.

For a typical task IO would create a technical specification for the prototype to be developed. This technical specification is likely to include:

- Functional requirements
- Preliminary Design Data
    - Drawings/CAD model
        - Including a space reservation for future changes
    - Underlying Calculations supporting the design and the function
    - Component selection or suggestions
        - Certain components have already been qualified for use at ITER and their use may be mandatory.
    - Assumptions

The contractor would then develop the design further the typical stages would be:

- Final design
    - Check supplied assumptions and calculations are appropriate and update if required.
    - Confirm component selection
        - Market surveys of existing components, single options selection etc.
    - Update to the design.
- Manufacturing
    - Create manufacturing drawings
    - Manufacture prototype
    - Manufacturing dossier
    - Create lessons learned document including changes that could be made to aid manufacturing/inspection etc.
- Testing
    - Create plan that shows how functional requirements will be tested.
    - Test component
    - Issue report showing functional requirements have been met or if not suggested changes for an iteration of the design.

Candidates are expected to have the experience in the four expertise areas i.e. Cryogenics, Gas Handling, Vacuum and General Engineering. Candidates are invited to submit offers for one or more of the four expertise areas (corresponding to their area of expertise and experience), or bid as a grouping/consortium for all the prototypes.

4. Timetable

The tentative timetable is as follows:

Item	Tentative date(s)
Call for nomination (CFN) issued	T0
Call for nomination submission	T0+1 month
*Pre-Qualification (PQ) issued	T0+2 months
*Pre-Qualification (PQ) Application submission	T0+3 months
Call for tender (CFT) issued	T0+5 months
Call for tender submission	T0+7 months
Framework Contracts Award (includes MAC recommendation)	T0+10 months
Framework Contract Signature	T0+11 months (=T1)
Start of Framework Contracts and 1st Task Order	T1+1 month
Completion of first task order	T1+7 months
Completion of Framework Contract	T1+48 months
(In case of extension option with another 2 years) Completion of Framework Contract	T1+72 months

*The ITER Organization may reserve the right to combine PQ and CFT together at its sole discretion. In such a case, subsequent events for tender process will be re-scheduled by combining PQ and CFT (i.e. PQ & CFT issued: T0 + 2months) and updated schedule will be informed to Tenderers.

5. Experience

The acceptance criteria for the selection of the tender cover a broad range of technical capabilities, and the Contractor and its personnel shall have adequate experience in the areas as listed below:

- design and operation of vacuum, pressurised and cryogenic systems;
- ability to manufacture/assemble the required components;
- ability to control the quality by implementing a quality plan;
- capable of handling flammable gases (e.g. hydrogen, deuterium);
- design on control systems and data acquisition including high time resolutions.

6. 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 groupings shall be presented at the pre-qualification stage. The tenderer's composition cannot be modified without the approval of the ITER Organization after the pre-qualification.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Candidates (individual or consortium) must comply with the selection criteria. The IO reserves the right to disregard duplicated reference projects and may exclude such legal entities from the pre-qualification procedure.

7. Conflict of Interest

The IO plans to hold a Call for Tender for the manufacturing of the DMS at the later stage in future. The selected Contractor for this Contract will be allowed to participate in the future tender, however, the candidates for this Contract should note the following conditions:

1) The selected Contractor shall develop the design which will ensure the future competition of manufacturing tender (e.g. design manufacturable by multiple suppliers or so). The detailed conditions will be clarified at the call for tender stage.

2) Any results from this Contract will be owned by the IO who may disclose them to the tenderers at the next Call for Tender.

The IO may reject any offer not in compliance with the above principles or terminate the Contract if the selected Contractor can not comply with them.