

Technical Specifications (In-Cash Procurement)

Tech Specs for Boundary and first wall diagnostic expertise

This document describes technical needs of Boundary and first wall diagnostic expertise

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1 Purpose

This document describes technical needs of **Boundary and first wall diagnostic expertise**.

2 Scope

The work aligns with the ITER project, currently under construction in France. This device will study the Fusion concept on a scale previously unequalled on earth. To study the behaviour of this device, a set of monitoring systems (called diagnostics) are required. This will provide all the information to show and understand the performance of the device. The work involves technical expertise for four diagnostic projects: IR thermography, divertor TS, pressure gauges, RGA. They have a common feature, namely a strong presence in the divertor area of the machine and measurements in the FW/Plasma boundary area.

3 Definitions

IO: ITER Organization

DA: Domestic Agency

RGA: residual Gas Analysis

SSD: See System Design

IO-TRO : ITER Organization technical Responsible Officer.

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER_D_2MU6W5\)](#).

4 References

Links inserted in text.

5 Estimated Duration

The duration of the services is 2 years from the contract start date.

6 Work Description

The work involves technical expertise for four diagnostic projects: IR thermography, divertor TS, pressure gauges, RGA. These systems are all in their procurement phase, with the majority of the technical work undertaken by IODAs, Japan, Russia, Europe and US, respectively. They are each managed by an ITER Organization (IO) Technical Responsible Officer (TRO). They have a common feature, namely a strong presence in the divertor area of the machine and measurements in the FW/Plasma boundary area. The work to be done is to provide technical expertise to work with the TRO. It involves many areas of activity that have to be documented:

- Meeting preparatory notes, including agenda and draft attendee selection;
- Meeting notes for IO meetings called by interfacing systems and review bodies;
- Draft minutes for IO and DA meetings;
- Draft deviation requests;
- Technical input in support of project change requests and other actions;
- Draft interface sheets;
- Draft assembly procedures;

- Input documents, presentations, meeting notes related to Port integrator DA meetings;
- Input documents, presentations, meeting notes related to Interface meetings;
- Technical review notes for DA technical documents in IO IDM. Documents include technical reports, draft deviation requests, compliance and requirements matrixes etc. Several technical documents per month need to be reviewed;
- Input documents, presentations, meeting notes related to Monthly DA meetings
- Implementation reports for IO-related actions from DA meetings;
- Implementation reports for Chit resolution from IO and DA design reviews; Amended and reviewed sections of IO schedule;
- Record of progress against schedule;
- Schedule improvements and fix scheduling problems;
- Input documents, presentations, meeting notes related to meetings of DA representatives with IO experts;
- Guidance notes for DAs on execution of PA technical activities;
- Updated and re-evaluated loads, including nuclear loads and other engineering specifications;
- Contributions to design workshops on specific topics (e.g. shutters, neutronics);
- Updated measurement requirements;
- Technical specifications for R&D tasks;
- Drafts and amended requirements-related documentation including joint documents with plasma operations;
- Project risk register updates (technical, cost and schedule);
- Annual internal review of progress (schedule, cost and risk evolution) and related documents;
- Input documents, presentations, meeting notes related to at workshops and conferences.

7 Responsibilities

Services to be provided mainly (>50%) at the IO work site.

Travel to the DA or other sites may be required to carry out the work.

8 List of Deliverables and due dates

The main deliverables are provided in a quarterly report with 4 Work Packages as follows:

1. WP1: IR Thermography
 1. Summary of DA and IO meetings attended
 2. Summary of DA technical Documents Reviewed
 3. Summary of schedule updates
 4. Summary of interface and CAD evolution
 5. Technical recommendations, risks and mitigation measures
 6. Other required actions and progress
2. WP2: Divertor Thomson
 1. Summary of DA and IO meetings attended
 2. Summary of DA technical Documents Reviewed
 3. Summary of schedule updates
 4. Summary of interface and CAD evolution

5. Technical recommendations, risks and mitigation measures
6. Other required actions and progress
3. WP3: Pressure gauges
 1. Summary of DA and IO meetings attended
 2. Summary of DA technical Documents Reviewed
 3. Summary of schedule updates
 4. Summary of interface and CAD evolution
 5. Technical recommendations, risks and mitigation measures
 6. Other required actions and progress
4. WP4: RGA
 1. Summary of DA and IO meetings attended
 2. Summary of DA technical Documents Reviewed
 3. Summary of schedule updates
 4. Summary of interface and CAD evolution
 5. Technical recommendations, risks and mitigation measures
 6. Other required actions and progress

The report shall have appendix with a complete list of all relevant IO IDM, CAD (Enovia, SSD) and all other relevant database references with version number.

D #	Description*	Due Dates
D01	1 st quarterly report with contents WP1, WP2, WP3, WP4	T0 + 3 months
D02	2 nd quarterly report with contents WP1, WP2, WP3, WP4	T0 + 6 months
D03	3 rd quarterly report with contents WP1, WP2, WP3, WP4	T0 + 9 months
D04	4 th quarterly report with contents WP1, WP2, WP3, WP4	T0 + 12 months
D05	Summary of schedule, cost and risk evolution for the first 12 months of the work	T0 + 12 months
D06	5 th quarterly report with contents WP1, WP2, WP3, WP4	T0 + 15 months
D07	6 th quarterly report with contents WP1, WP2, WP3, WP4	T0 + 18 months
D08	7 th quarterly report with contents WP1, WP2, WP3, WP4	T0 + 21 months
D09	8 th quarterly report with contents WP1, WP2, WP3, WP4	T0 + 24 months
D10	Summary of schedule, cost and risk evolution for the second 12 months of the work	T0 + 24 months

9 Acceptance Criteria

The deliverables will be posted in the Contractor's dedicated folder in IDM, and the acceptance by the IO will be recorded by their approval by the designated IO TRO. These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of reports as indicated in section 8, Table of deliverables.

10 Specific requirements and conditions

Development of equipment designs for fusion facilities

Design of diagnostics for large fusion installations

Operational experience of diagnostics / instrumentation with D + T

Experience of all techniques in deliverables list

Computational work with, e.g, Fortran / C / IDL / matlab)

Schematics definition

Design organization

Technical document generation

System requirements management

Technical risk analysis

11 Work Monitoring / Meeting Schedule

Work is monitored through quarterly reports (see List of Deliverables section) and at monthly project meetings for each of the four projects.

12 Delivery time breakdown

See List of Deliverables section.

13 Quality Assurance (QA) requirements

The organisation conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system.

The general requirements are detailed in [ITER Procurement Quality Requirements \(ITER_D_22MFG4\)](#).

Prior to commencement of the task, a Quality Plan must be submitted for IO approval giving evidence of the above and describing the organisation for this task; the skill of workers involved in the study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities (see [Procurement Requirements for Producing a Quality Plan \(ITER_D_22MFMW\)](#)).

Documentation developed as the result of this task shall be retained by the performer of the task or the DA organization for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with [Quality Assurance for ITER Safety Codes \(ITER_D_258LKL\)](#).

14 CAD Design Requirements (if applicable)

For the contracts where CAD design tasks are involved, the following shall apply:

The Supplier shall provide a Design Plan to be approved by the IO. Such plan shall identify all design activities and design deliverables to be provided by the Contractor as part of the contract.

The Supplier shall ensure that all designs, CAD data and drawings delivered to IO comply with the Procedure for the Usage of the ITER CAD Manual ([2F6FTX](#)), and with the Procedure for the Management of CAD Work & CAD Data (Models and Drawings [2DWU2M](#)).

The reference scheme is for the Supplier to work in a fully synchronous manner on the ITER CAD platform (see detailed information about synchronous collaboration in the ITER [GNJX6A](#) - Specification for CAD data production in ITER Contracts.). This implies the usage of the CAD software versions as indicated in CAD Manual 07 - CAD Fact Sheet ([249WUL](#)) and the connection to one of the ITER project CAD data-bases. Any deviation against this requirement shall be defined in a Design Collaboration Implementation Form (DCIF) prepared and approved by DO and included in the call-for-tender package. Any cost or labour resulting from a deviation or non-conformance of the Supplier with regards to the CAD collaboration requirement shall be incurred by the Supplier.

15 Safety requirements

ITER is a Nuclear Facility identified in France by the number-[INB-174](#) (“Installation Nucléaire de Base”).

For Protection Important Components and in particular Safety Important Class components (SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

In such case the Suppliers and Subcontractors must be informed that:

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Supplier and Subcontractor following the requirements of the Order 7th February 2012 [20].