

Technical Specifications (In-Cash Procurement)

Diagnostic Expert Support for 55.G8 Erosion Deposition Monitor

CFE for:-

This document describes technical needs for specialist support work in the ITER Port Plug and Diagnostic Division, for oversight of the development and design of the 55.G8: Erosion Deposition Monitor Diagnostic and general support for the in-vessel diagnostic (IVD) section.

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1 Purpose

This document describes technical needs for specialist support work in the ITER Port Plug and Diagnostic Division, for oversight of the development and design of the 55.G8: Erosion Deposition Monitor Diagnostic and general support for the in-vessel diagnostic (IVD) section.

2 Scope

The work aligns with the ITER project, currently under construction in France. To study the behaviour of this device, a set of monitoring systems (called diagnostics) are required. The work involves technical expertise for:

- Supervising optical, mechanical and opto-mechanical design development related to Erosion Deposition Monitor, towards PDR;
- Supervise analyses like load, thermo-hydraulic, electromagnetic, structural, neutronic, safety, risk analysis etc. towards PDR;
- Help the TRO in managing the interfaces and port plug integration during the design phase;
- Help in preparing presenting the PDR materials of the system by generation the required documents as well as help in solving the Chits generated during the reviews and start progress towards an FDR.

This system has already gone through the CDR, PDR is planned for October 2022 and FDR approximately 1 year later.

3 Definitions

DA	Domestic Agency
DPP	Document Production Plan
IO	ITER Organization
IO-CT	ITER Organization (Central Team)
IO-TRO	ITER Organization Technical Responsible Officer
PPD	Port Plug and Diagnostic Division

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

4 References

[R1]	R. Reichle, et al, Journal of Nuclear Materials 463 (2015) 180–184	LINK
[R2]	G. Pedrini, et al, Appl. Optics 58(5), A147–A155 (2019)	LINK
[R3]	Conceptual Design Review of 55.G8:Erosion Monitor Diagnostic System	Q7APKA
[R4]	Panel final report on CDR of 55.G8: Erosion Monitor	SA6ECY

5 Estimated Duration

The duration shall be for twelve (12) months. Services to be provided 80% - 100% at IO work site, during the COVID pandemic this can be reduced in line with ITER guidelines for on-site presence (“new-normal”).

No work shall commence prior to the date of final signature of the Contract.

6 Work Description

The Contractor shall:

- Update where needed the document production plan (DPP) of the Erosion monitor and generate, or update, the required documents.
- Supervise the engineering and design contract for the PDR of the EDM and once the PDR has been held the contract for FDR
- Follow up on resolving of the chits generated during CDR and PDR of the Erosion Monitor diagnostic for ITER, together with engineering and design contractor
- Lead the development of the design through Preliminary and Final Engineering design by supporting in Optical, Optomechanical and Mechanical designs
- Supervise the Thermal and Hydraulic, Neutronics and Electromagnetic analysis and structural analysis etc. of this diagnostic in close cooperation with the Diagnostic Engineering section
- Assist the division in the diagnostic port plug integration relevant to the diagnostic
- Assist the division in generating the relevant documents for getting the design reviewed during the Design Reviews pertaining to the above activities
- Liaise with and drive the work with the Institut für Technische Optik, *ITO*, through the existing Cooperation Agreement. This will involve organising regular meetings with their team and follow-up on ongoing contracts, ensuring timely delivery of the ITO agreed deliverables.

7 Responsibilities

7.1 Contractor's Responsibilities

In order to successfully perform the tasks in these Technical Specifications, the contractor shall:

- Strictly implement the IO procedures, instructions and use templates;
- Provide experienced and trained resources to perform the tasks;
- Contractor's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures;
- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security IO rules.

7.2 IO's Responsibilities

The IO shall:

- Nominate the Responsible Officer to manage the contract (IO-TRO);
- Organise a monthly meeting(s) on work performed;
- Provide offices at IO premise and required IT equipment and software;
- Grant the access to the IDM as co-author to the contractor, in order to upload documentations;
- Review documents in a timely fashion

8 List of Deliverables and due dates

№	Deliverable	Dates*
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№	Deliverable	Dates*
D01	<p>Supervise 55.G8 mechanical design and engineering contract TO#01:</p> <p>This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity.</p> <p>In this period we expect to see the production of a consolidated design with a more detailed Structural Integrity Report</p> <p>Criteria for completion: 2-month summary report in IDM</p>	T0 + 02 m
D02	<p>Supervise 55.G8 mechanical design and engineering contract TO#01:</p> <p>This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity.</p> <p>In this period we expect to see the closure of the vast majority of the CDR category 2 chits and finalisation of most documents required for the PDR, including a full Structural Integrity Report.</p> <p>Criteria for completion: 2-month summary report in IDM</p>	T0 + 04 m
D03	<p>Supervise 55.G8 mechanical design and engineering contract TO#01:</p> <p>This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity.</p> <p>In this period we expect to have the PDR for the 55.G8 and start the work on launching the next Task Order in the 55.G8 engineering framework contract.</p> <p>Criteria for completion: 2-month summary report in IDM</p>	T0 + 06 m
D04	<p>Supervise 55.G8 mechanical design and engineering contract TO#01:</p> <p>This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity.</p> <p>In this period we expect to resolve some of the PDR category 1 chits and at least produce a chit resolution report. We also expect to have the next Task Order for this framework contract in place.</p> <p>Criteria for completion: 2-month summary report in IDM</p>	T0 + 08 m

№	Deliverable	Dates*
D05	Supervise 55.G8 mechanical design and engineering contract TO#02: This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity. In this period we expect to continue resolving the PDR category 1 & 2 chits and since we are now in the next framework Task Order the work should start to progress towards the FDR design updates. Criteria for completion: 2-month summary report in IDM	T0 + 10 m
D06	Supervise 55.G8 mechanical design and engineering contract TO#02: This deliverable consists of the day-to-day supervision of the contract that brings the design to PDR and assisting TRO with preparations for design reviews, document production, chit resolutions and supplementary activities. Progress will be measured through monthly progress meetings and their minutes, it is a longer-term activity. In this period we expect to see a first new draft System Load Specification and work towards an updated Structural Integrity report that resolves most of the chits from the PDR and starts to pave the way towards the FDR. Criteria for completion: 2-month summary report in IDM	T0 + 12 m
* T ₀ – date of the kick-off meeting of the contract The order of delivery can be varied by mutual agreement to suit the needs of the project.		

The contract shall contain a provision for travel and subsistence for missions, conferences, manufacturer visits, etc., where needed and as agreed with IO before the travel commences. Mission provision expenses should be included in the deliverable report, providing the mission details and the amount of the expenses. Payment is subject to the deliverable report approval by IO CRO.

9 Acceptance Criteria

These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of regular progress reports and deliverables.

Report and Document Review criteria:

Reports as deliverables shall be stored in the ITER Organization's document management system, IDM by the selected candidate for acceptance. A named ITER Organization's Contract Technical Responsible Officer is the Approver of the delivered documents.

The Approver can name one or more Reviewers(s) in the area of the report's expertise.

The Reviewer(s) can ask modifications to the report in which case the selected candidate must submit a new version. The acceptance of the document by the Approver is the acceptance criterion.

10 Specific requirements and conditions

Experience of all skills and techniques in deliverable list – in particular:

- Experience in the field of laser based interferometry in general and digital holography in particular
- Experience with dual wavelength interferometry and or pulsed interferometry will be preferred. Also preference will be given to person with experience in temporal & spatial phase shifting methods and wave front manipulation. Experience in design and applications of interferometers in high vibration environments will be an added qualification
- Experience in leading and guiding high end interferometric facility will be highly desired
- Previous experience in working in design of ITER diagnostics will be an added qualification
- Experience with creating scientific and technical documents and presentations

11 Work Monitoring / Meeting Schedule

The work will be managed by means of Progress Meetings and through the formal exchange of documents and transmitted by emails which provide detailed progress.

Progress Meetings will be called by the ITER Organization or the contractor. They will be held monthly. Progress meetings will involve the contractor and the IO-TRO. External experts will be invited to discuss technical or contractual matters. For all Progress Meetings, minutes, including action items, shall be written by the contractor and be stored in the ITER IDM in order to ensure traceability.

12 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 \(ITER_D_258LKL\)](#).

13 CAD Design Requirements (if applicable)

Not Applicable

14 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 ([PRELIMINARY ANALYSIS OF THE IMPACT OF THE INB ORDER - 7TH FEBRUARY 2012 \(AW6JSB v1.0\)](#)).

Compliance with [Defined requirements for PBS 55 - Diagnostics \(NPEVB6 v2.0\)](#) or its flowed down requirements in [SRD-55 \(Diagnostics\) from DOORS \(28B39L v5.5\)](#) is mandatory.