

Optical Diagnostics Performance Analysis

Technical Specifications

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1 Abstract

This document describes technical needs of **Fusion Diagnostics Design including Optical analysis**, including activities and follow up activities.

2 Background and Objectives

ITER is a major new device that is under construction in Cadarache in Provence, 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. They will provide all the information to show and understand the performance of the device.

Many of these devices are based on optical effects and as a result light is required to be collected from the tokamak and transported to an area where it can be sampled and analysed.

The work described below is related to performance assessment of defined system concept to ensure that procurements can be carried out. Most of these procurements are at the functional specification level and hence significant experience in the fusion and optical field is required to allow an optimum system to be specified.

3 Scope of Work

The objective of this contract is to provide to the Diagnostics team analysis of Reflections of various systems to support the Procurement arrangement preparation, specifically provide an analysis of optical systems so that it can be judged to pass a Concept design review. The work would be mostly (approximately 80%) carried out at the Contractor-site.

4 Estimated Duration

The duration shall be for approximately 220 working days from the starting date of the contract spread over approximately 12 months.

5 Work Description

- Provide reflections analysis of various systems to support the system procurement in the IO diagnostics Division. (The consultant is expected to be familiar with the Light Tools ray-tracing code although others may be acceptable)
- Provide advice to the IO on the optimisation of the proposed diagnostic channels orientation and optical dump design. Assist in optimising arrangements of optical diagnostics to improve their performance.
- Provide results for various light emission sources and various reflectivity properties.
- Any other work as appropriate to support the Division objectives, this would include working on any other Diagnostics systems as appropriate.

[The software can be provided by IO if necessary and input related to the radiation sources will also be provided]

6 List of deliverables and due dates

A report is generally expected at the end of each piece of work and more specifically a summary report should be provide at the end of each month.

Week	Deliverable	Dates
1	Progress report	Latest 1 month after starting date
2	Progress report	Latest 2 months after starting date
3	Progress report	Latest 3 months after starting date
4	Progress report	Latest 4 months after starting date
5	Progress report	Latest 5 months after starting date
6	Progress report	Latest 6 months after starting date
7	Progress report	Latest 7 months after starting date
8	Progress report	Latest 8 months after starting date
9	Progress report	Latest 9 months after starting date
10	Progress report	Latest 10 months after starting date
11	Progress report	Latest 11 months after starting date
12	Progress report	Latest 12 months after starting date

7 Acceptance Criteria

The selection will be done taking into account the following criteria:

- | | |
|----------------------------|-----|
| 1) Expert CV and Interview | 70% |
| 2) Price | 30% |

8 Specific requirements and conditions

9 Work Monitoring / Meeting Schedule

Meetings and progress reports

The work will be managed by means of Progress Meetings and/or formal exchange of documents transmitted by emails which provide detailed progress. Progress Meetings will be called by the ITER Organization, to review the progress of the work, the technical problems, the interfaces and the planning.

The main purpose of the Progress Meetings is to allow the ITER Organization/Diagnostics Division and the Contractor Technical Responsible Officers to:

- a) Allow early detection and correction of issues that may cause delays;
- b) Review the completed and planned activities and assess the progress made;
- c) Permit fast and consensual resolution of unexpected problems;
- d) Clarify doubts and prevent misinterpretations of the specifications.

In addition to the Progress Meetings, if necessary, the ITER Organization and/or the Contractor may request additional meetings to address specific issues to be resolved.

For all Progress Meetings, a document describing tasks done, results obtained, blocking points must be written by the engineer. Each report will be stored in the ITER IDM in order to ensure traceability of the work performed.

Every 3 months, the Contractor shall submit to ITER Organization a Progress Report to be issued five working days before the each Progress Meeting so that the report can be reviewed prior to, and discussed at, that Meeting.

The quarterly Progress Report shall illustrate the progress against the baseline work plan and indicate variances that should be used for trending. Performance indicators suitable to measure the progress of the work as compared to the approved work plan shall also be reported in the Monthly Progress Report.

10 Payment schedule / Cost and delivery time breakdown

Interim monthly payments.

Quality Assurance (QA) requirement

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 document [ITER Procurement Quality Requirements \(22MFG4\)](#)

Prior to commencement of the task, a Quality Plan [Quality Plan \(22MFMW\)](#) 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.

Prior to commencement of any manufacturing, a Manufacturing & Inspection Plan [Manufacturing and Inspection Plan \(22MDZD\)](#) must be approved by ITER who will mark up any planned interventions.

Deviations and Non-conformities will follow the procedure detailed in IO document [MQP Deviations and Non Conformities \(22F53X\)](#)

Prior to delivery of any manufactured items to the IO Site, a Release Note must be signed [MQP Contractors Release Note \(22F52F\)](#).

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, it should fulfil IO document on Quality Assurance for ITER Safety Codes [Quality Assurance for ITER Safety Codes \(258LKL\)](#).

11 References / Terminology and Acronyms