

## **Technical Specifications (In-Cash Procurement)**

# **CFE - Mechanical design of the Divertor Flow Monitor components in ISS and PCSS**

This document describes technical needs for specialist work relating to development and integration of the mechanical design of the Flow Monitor diagnostic components located in the Interspace and Port Cell of Equatorial Port 8, and impacted by the Disruption Mitigation System (DMS) in that port. The result of this work will be integrated in the overall design of the Flow Monitor for the Preliminary Design Review.

## Table of Contents

<b>1</b>	<b>PURPOSE</b> .....	<b>2</b>
<b>2</b>	<b>SCOPE</b> .....	<b>2</b>
<b>3</b>	<b>DEFINITIONS</b> .....	<b>2</b>
<b>4</b>	<b>DURATION</b> .....	<b>2</b>
<b>5</b>	<b>WORK DESCRIPTION</b> .....	<b>2</b>
<b>6</b>	<b>RESPONSIBILITIES</b> .....	<b>4</b>
6.1	Contractor’s Responsibilities .....	4
6.2	IO’s Responsibilities .....	4
<b>7</b>	<b>LIST OF DELIVERABLES AND DUE DATES</b> .....	<b>4</b>
<b>8</b>	<b>ACCEPTANCE CRITERIA</b> .....	<b>5</b>
<b>9</b>	<b>SPECIFIC REQUIREMENTS AND CONDITIONS</b> .....	<b>5</b>
<b>10</b>	<b>WORK MONITORING / MEETING SCHEDULE</b> .....	<b>5</b>
<b>11</b>	<b>DELIVERY TIME BREAKDOWN</b> .....	<b>5</b>
<b>12</b>	<b>QUALITY ASSURANCE (QA) REQUIREMENTS</b> .....	<b>5</b>
<b>13</b>	<b>CAD DESIGN REQUIREMENTS</b> .....	<b>6</b>
<b>14</b>	<b>SAFETY REQUIREMENTS</b> .....	<b>6</b>

## 1 Purpose

This document describes technical needs for specialist work relating to development and integration of the mechanical design of the Flow Monitor diagnostic components located in the Interspace and Port Cell of Equatorial Port 8, and impacted by the Disruption Mitigation System (DMS) in that port. The result of this work will be integrated in the overall design of the Flow Monitor for the Preliminary Design Review.

## 2 Scope

The objective of this contract is to provide the 55.GE Flow Monitor Diagnostic with mechanical design of components located in Interspace and Port Cell that is compatible with the integrated equatorial port 8 including the recently added DMS in that port. This includes:

- Mechanical design of the Active Optical Alignment Mechanism (“optical hinge”) located in the interspace.
- Mechanical design of the Divertor Flow Monitor mirror boxes in the Interspace and Port Cell
- Design of the shielded cabinet in the Port Cell
- Update of physical and functional interfaces of the Divertor Flow Monitor with Equatorial Port 8, taking into account the impact of the DMS.
- Support to structural and thermal assessment of the Divertor Flow Monitor components in the Interspace and Port Cell
- Drafting of technical documentation for the Divertor Flow Monitor Preliminary Design Review
- Support to Divertor Flow Monitor prototyping activities
- Support to update of the Divertor Flow Monitor System Load Specifications for Ex-vessel components

The design of the 55.GE Flow Monitor diagnostic is within the scope of IO-CT. The diagnostic is slated for installation in Equatorial Port 8.

## 3 Definitions

CRO Contractor Responsible Officer

IDM ITER Document Management system

IO ITER Organization

IO-CT ITER Organization – Central Team

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER\\_D\\_2MU6W5\)](#).

## 4 Duration

The duration shall be for 12 months from the starting date of the task order. Services shall be provided 95% at the IO work site.

## 5 Work Description

The work on the 55.GE Flow monitor consists of the following tasks:

- (1) Mechanical design of the Active Optical Alignment Mechanism (“optical hinge”) located in the interspace.
- (2) Mechanical design of the Divertor Flow Monitor mirror boxes in the Interspace and Port Cell
- (3) Design of the shielded cabinet in the Port Cell
- (4) Update of physical and functional interfaces of the Divertor Flow Monitor with Equatorial Port 8, taking into account the impact of the DMS.
- (5) Support to structural and thermal assessment of the Divertor Flow Monitor components in the Interspace and Port Cell
- (6) Drafting of technical documentation for the Divertor Flow Monitor Preliminary Design Review
- (7) Divertor Flow Monitor port integration activities
- (8) Support to Divertor Flow Monitor prototyping activities
- (9) Support to Divertor Flow Monitor diagram update
- (10) Support to update of the Divertor Flow Monitor System Load Specifications for Ex-vessel components

The progress on each of these eight tasks will be summarized in a Progress Report. Each progress report constitutes a deliverable (D1-D6) and will report tangible progress on one or more tasks above.

Following the completion of D1-D5, Final Report (D6) on the complete PDR mechanical design and interfaces will be provided as a last deliverable. By the time of the Final Report, detailed, complete, and properly documented design of items 1-3 above shall be developed and support to items 4-10 above shall be provided.

This work involves the many areas for which the Contractor will be requested to generate documents:

- Meeting notes for IO meetings called by interfacing systems and review bodies;
- Technical input in support of project change requests and other actions;
- Draft and/or update interface sheets;
- Draft assembly procedures;
- Input documents, presentations, meeting notes related to Port integrator meetings;
- Input documents, presentations, meeting notes related to Interface and Integration (vessel, building and ports) meetings;
- Technical review notes for technical documents in IO IDM. Several technical documents per month may need to be reviewed;
- Input documents, presentations, meeting notes related to Monthly meetings
- Implementation reports for IO-related actions from Monthly meetings;
- Implementation reports for Chit resolution from IO design reviews; Amended and reviewed sections of IO schedule;
- Guidance notes for execution of technical activities;
- Updated and re-evaluated loads, including nuclear loads and other engineering specifications;

- Contributions to design workshops on specific topics (e.g. diagnostic maintenance, neutronics, hazard identification);

## 6 Responsibilities

### 6.1 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.

### 6.2 IO's Responsibilities

The IO shall:

- Nominate the Contract Responsible Officer (CRO) to manage the Contract;
- Organise regular meeting(s) on work performed;
- Provide offices at IO premises.

## 7 List of Deliverables and due dates

D1	Progress report #1 on Tasks 1-10 from section 5	T0 + 2 months
D2	Progress report #2 on Tasks 1-10 from section 5	T0 + 4 months
D3	Progress report #3 on Tasks 1-10 from section 5	T0 + 6 months
D4	Progress report #4 on Tasks 1-10 from section 5	T0 + 8 months
D5	Progress report #5 on Tasks 1-10 from section 5	T0 + 10 months
D6	Final report on Tasks 1-10 from section 5	T0 + 12 months

T0 represents the contract Kick-Off Meeting date.

## 8 Acceptance Criteria

These criteria shall be the basis of acceptance by IO following the successful completion of the services:

- The deliverables will be in the form of reports as indicated in section **Error! Reference source not found.** “List of Deliverables and due dates”.
- The deliverables will be posted in the Contractor’s dedicated folder in the ITER Organization’s document management system IDM.
- The CRO for the contract is the Approver of the delivered documents.
- The CRO can ask modifications to the report in which case the Contractor must submit a new version.

The acceptance of the document by the Approver is the acceptance criterion.

## 9 Specific requirements and conditions

- Experience with the mechanical design for complex optical diagnostics
- Experience with work in CATIA
- Experience with techniques in deliverables list
- Experience with generation of technical documents
- Experience with technical risk analysis

## 10 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. They will be held as needed and at least bi-monthly, either on the IO site or via videoconference. External experts will be invited to discuss technical matters. Kick-Off Meeting will be organized by IO within two weeks from the contract signature.

## 11 Delivery time breakdown

See Section 8 “List Deliverables section and due dates”.

## 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

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.

## 14 Safety requirements

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

Compliance with [Defined requirements for PBS 55 - Diagnostics \(NPEVB6 v2.0\)](#) or its flowed down requirements in [SRD-55 \(Diagnostics\) from DOORS \(28B39L v5.2\)](#) is mandatory.