

Technical Specifications (In-Cash Procurement)

Mechanical Engineering and Analysis Expert for 55.GL and 55.GA diagnostic systems

The Contractor shall work on mechanical design, integration and analysis of diagnostic systems 55.GL In-Vessel Lighting System (IVLS) and 55.GA Upper Wide Angle Viewing system (UWAVS).

The engineering activities in this contract shall aim at advancing the mechanical design of the components of these diagnostics in view of preparing for their manufacturing and future installation on the ITER tokamak.

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1 Preamble

This Technical Specification is to be read in combination with the General Management Specification for Service and Supply (GM3S) – [Ref 1] that constitutes a full part of the technical requirements.

In case of conflict, the content of the Technical Specification supersedes the content of Ref [1].

2 Purpose

The Contractor shall work on mechanical design, integration and analysis of diagnostic systems 55.GL In-Vessel Lighting System (IVLS) and 55.GA Upper Wide Angle Viewing system (UWAVS). The engineering activities in this contract shall aim at advancing the mechanical design of the components of these diagnostics in view of preparing for their manufacturing and future installation on the ITER tokamak. In coordination with the Technical Responsible Officers (TROs) of these systems, the Contractor shall contribute to the formulation of structural design solutions and analysis, resolution of the integration and interfacing aspects and the production of inputs for technical documentation (2D diagrams, SLS, interface sheets, assembly and maintenance plans, etc) to ensure the timely delivery and installation of these systems. Additionally, the work can include the preparation and review of technical documentation.

The Contractor shall allocate engineering resource with experience in mechanical engineering of complex scientific instrumentations, preferably optical diagnostic systems, for large scientific and / or nuclear facilities.

3 Acronyms & Definitions

3.1 Acronyms

The following acronyms are the main one relevant to this document.

Abbreviation	Description
CMM	Configuration Management Model
DIR	Design Integration Review
FDR	Final Design Review
GM3S	General Management Specification for Service and Supply
IO	ITER Organization
MAM	Model Approval Meeting
PDR	Preliminary Design Review
PRO	Procurement Responsible Officer
TRO	Technical Responsible Officer

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

3.2 Definitions

Contractor: shall mean an economic operator who have signed the Contract in which this document is referenced.

4 Applicable Documents & Codes and standards

4.1 Applicable Documents

This is the responsibility of the Contractor to identify and request for any documents that would not have been transmitted by IO, including the below list of reference documents.

This Technical Specification takes precedence over the referenced documents. In case of conflicting information, this is the responsibility of the Contractor to seek clarification from IO.

Upon notification of any revision of the applicable document transmitted officially to the Contractor, the Contractor shall advise within 4 weeks of any impact on the execution of the contract. Without any response after this period, no impact will be considered.

Ref	Title	IDM Doc ID	Version
1	General Management Specification for Service and Supply (GM3S)	82MXQK	1.4

4.2 Applicable Codes and Standards

This is the responsibility of the Contractor to procure the relevant Codes and Standards applicable to the scope of work.

5 Scope of Work

This section defines the specific scope of work for the service, in addition to the contract execution requirement as defined in Ref [1].

5.1 Definition of Activities

5.1.1 Diagnostic System Engineering

Specific activities in the scope of the contract include the followings:

- To ensure, through engineering design and analysis, the integrity and coherence of the physical interfaces of 55.GL and 55.GA, considering all internal and external requirements;
- To contribute to update and/or creation of the interfaces;
- To identify issues and propose solutions and improvements for the successful mechanical and structural design of diagnostic components on ITER;
- To ensure, through mechanical design, the maintainability of the diagnostic systems, including all safety considerations;
- To update the system space reservations inside the port areas with considerations for human and tooling access during installation and maintenance;
- To estimate reliable mechanical tolerances for the installation of mechanical components and assist in the preparation and review of functional tolerance drawings;
- To assess the assembly sequence of mechanical components for the preparation or review of assembly and installation process documentation;
- To contribute and provide technical inputs to the TROs in the preparation of gate reviews and the closure of design chits;

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- To contribute to the preparation of model approval processes (MAM/CMAF).
- To provide engineering inputs and analysis for the completion of the Engineering Work Packages (EWPs) and Construction Work Packages (CWPs);
- To prepare and review technical specifications for installation of full systems and their components;
- To contribute to the creation and updates of the engineering diagrams (P&ID, PFD, SLD, CBD);
- To prepare documentation relevant to the scope of this contract, such as mechanical models and diagrams, components technical specifications, bills of material, assembly drawings and procedures and installation drawings and procedures;
- To provide technical inputs for the issuing of project change requests and to help mitigate the impact of Deviation Requests (DRs) and Non-Conformities (NCs);

5.1.2 Requirements

These activities require expertise in system engineering for the design, manufacturing and installation of large diagnostic components in a nuclear facility.

In particular, the candidate shall possess high-level expertise with the integration and mechanical design of Optical Diagnostic Systems in large scientific and / or nuclear facilities.

Further, he is expected to be experienced and knowledgeable for:

- Interfaces, requirements and system configuration management;
- CAD data management and CAD software (ENOVIA & CATIA, HIT builder);
- Maintenance in nuclear environment;
- Manufacturing, inspection and testing procedures;
- Design and construction processes (Preliminary and Final Design Reviews, Manufacturing Readiness Reviews, Construction and Delivery Readiness Reviews), work instruction production and management (Engineering, Construction and Installation Work Packages).

5.2 Service Duration

The duration shall be of 10 months from the starting date of the contract.

6 Location for Scope of Work Execution

The Contractor can perform the work at its own location but he is expected to be on ITER site for at minima 2 times 5-days during the contract period.

7 IO Documents

Relevant input documents will be specified and provided during the execution of the work.

8 List of deliverables and due dates

The Supplier shall provide IO with the documents and data required in the application of this technical specification, the GM3S Ref [1] and any other requirement derived from the application of the contract.

A minimum, but not limited to, list of documents is available hereafter with associated due dates:

Deliverable #	Technical Design Family (TDF)	Generic Document Title (GTD)	Description	Expected Date (T0 + X)*
D#01	Review or Decision or Recommendations Report	55.GL and 55.GA engineering – 1 st Quarter Progress Report	First quarter interim report, including: a) Record of the work performed; b) Status of CAD activities; c) Status of engineering and analysis activities. d) Miscellaneous activities relevant to the scope of the Contract.	3 months
D#02	Review or Decision or Recommendations Report	55.GL and 55.GA engineering – 2 nd Quarter Progress Report	Second quarter interim report, including: a) Record of the work performed; b) Status of CAD activities; c) Status of engineering and analysis activities. d) Miscellaneous activities relevant to the scope of the Contract.	6 months
D#03	Review or Decision or Recommendations Report	55.GL and 55.GA engineering – 3 rd Quarter Progress Report	Third quarter interim report, including: a) Record of the work performed; b) Status of CAD activities; c) Status of engineering and analysis activities. d) Miscellaneous activities relevant to the scope of the Contract.	9 months
D#04	Review or Decision or Recommendations Report	55.GL and 55.GA engineering – Final Progress Report	Final report, including: a) Record of the work performed; b) Status of CAD activities; c) Status of engineering and analysis activities. d) Miscellaneous activities relevant to the scope of the Contract.	10 months

(*) T0 = Starting date of the contract; X in months.

The Contractor is requested to prepare their document schedule based on the above and using the template available in the GM3S Ref [1] appendix II ([click here to download](#)).

9 Quality Assurance requirements

The Quality class under this contract is QC-2 [Ref 1] GM3S section 8 applies in line with the defined Quality Class.

10 Safety requirements

No specific safety requirement related to PIC and/or PIA and/or PE/NPE components apply.

11 Specific General Management requirements

Requirement for [Ref 1] GM3S section 6 applies completed with the below specific requirements.

11.1 CAD design requirements

This contract requires for CAD activities, [Ref 1] GM3S section 6.2.2.2 applies.