Call for Expertise

Expert Support for In-cryostat Assembly

Technical Specification

ABSTRACT

This contract covers the provision of specialised Installation Engineering support for the ITER Machine Assembly and Installation (MAI) Section.
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1. ABSTRACT

This contract covers the provision of specialist tokamak assembly support for the ITER Machine Assembly and Installation (MAI) Section.

2. BACKGROUND AND OBJECTIVE

2.1 The ITER project

The ITER project aims to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes and to gain the knowledge necessary for the design of the next-stage device, DEMO, or the DEMOstracion fusion power plant.

Receiving 50MW of input power, the ITER Machine is designed to produce 500 MW of fusion power for extended periods of time. This represents ten times more than the input power needed to keep the plasma at temperature. It will therefore be the first fusion experiment to produce net energy. It will also test a number of key technologies, including heating, control, and the diagnostics and remote maintenance that will be needed for DEMO.

Further information can be found on the ITER website (http://www.iter.org) and also at the web pages of the ITER Parties that can be accessed via the ITER website.

2.2 The ITER Organization

ITER is a joint international research and development project for which initial construction activities have recently started.

The seven Members of the ITER Organization are the European Union (represented by EURATOM), Japan, The People’s Republic of China, India, the Republic of Korea, the Russian Federation and the USA. ITER will be constructed in Europe, at Cadarache, in southern France, where the ITER Organization (IO) has its headquarters.

The Members of the ITER Organization will bear the cost of the project through its 10-year construction phase, and its 20-year operational phase before decommissioning. With respect to the construction of the ITER machine, most of the components will be contributed by the Members as in-kind contributions. The remaining investment will be via cash contributions from the members.

2.3 Machine Assembly and Installation section – The Mission

The mission of the Machine Assembly and Installation section (MAI) is to assemble the ITER machine, to provide planning, oversight and to undertake the installation of plant systems. In detail, the MAI section is charged to:

- provide design direction and advice, and be responsible for the approval of all plant system designs from the aspect of assembly and installation,
- design assembly tools, write procedures and prepare schedules for the assembly of the machine, undertake the assembly of the machine, undertake the Tokamak system installations, ensuring close coordination with the relevant Department and system Responsible Officers;
- define the integrated assembly and installation plan and approve plant system installation procedures and plans,
- define and implement a global alignment and metrology plan for ITER, including an appropriate site datum network,
- define and coordinate the implementation of an Integrated Logistics Support strategy for ITER to ensure lifecycle management of plant systems, components, spares and facilities: from design, through construction, operation and maintenance,
- coordinate the global transport, reception, handling and storage of plant system components, spares and tools.

2.4 Objective of the Contract

The objective of this contract is to provide the MAI section with expert, on-site assembly engineering support, in the form of an appropriately qualified and highly experienced installation expert (hereafter known as the Senior Assembly Support Engineer). The Senior Assembly Support Engineer will be deployed in close support on the ITER site, Cadarache, France, to complete the scope of work (section 3) that includes the provision of expertise and guidance in respect of the technical studies and Assembly Plan development for the In-Cryostat components of the Machine.

Under this contract the Senior Assembly Support Engineer will also provide expertise and guidance on general assembly matters. With reference to the Mission Statement contained in section 2.3 of this document, guidance could be required in support of any of the charges of the section, or in respect of any assembly related matter defined by the Leader of the MAI section.

3. SCOPE OF WORK

The scope of work includes, but shall not necessarily be limited to:

- Assessing the assembly feasibility of the main In-Cryostat (ex-vessel) components for assembly phases 1 and 2, developing assembly plans, outline assembly procedures and associated tooling concepts, preparing (or validating / updating existing) resource-loaded assembly schedules and identifying areas where development / mock-ups are required. The component installations to be studied are separated into a number of tasks of related components with specific assembly interfaces:
  - PF Coils (1, 2, 3, 4, 5 and 6);
  - Central Solenoid;
  - Torus Cryo Pump Housing;
  - NB Ports cryostat components;
  - Port cells bellows (lower, equatorial and upper);
  - Cryostat Shielding;
  - IVV.

- Providing advice and expertise on any aspects related to assembly operations as required by the Leader of the Machine Assembly and Installation section;
- Attending internal design reviews, reviewing design documentation as required.
- Preparing interface documentation according to IO procedures and templates, including liaising with members of system design teams, collecting the necessary information and preparing draft technical documents for review and approval
- Participation in the preparation, and tendering of any contracts with Assembly related scope;
• Preparation, editing assembly procedure for each component to be studied and review of documents in the English language, including documents in connection with manufacturing, construction, testing for the components concerned.

4. ESTIMATED DURATION

The contract duration shall be for an initial period of 12 months with an option for an additional 12 months, and shall cover 220 working days per year, in accordance with the working practices of ITER.

5. WORK ARRANGEMENTS AND ASSIGNMENTS

For the Senior Assembly Support Engineer full-time presence at the ITER site is necessary for the effective performance of his duties.

Details of work to be performed by the Senior Assembly Support Engineer will be specified as needs arise by the Technical Responsible Officer mentioned in the contract, or his authorized deputy.

Each work task will be kicked-off with a specific meeting convened for this purpose.

6. LIST OF DELIVERABLES AND DUE DATES

The planned scope of work, and associated deliverables are defined in the Detailed Work Schedule (DWS), see Annex 1. The DWS is the result of an ongoing planning process and the planned scope and deliverables will vary according to variations in Project objectives, schedule and/or priorities. The IO reserves the right to vary the scope and deliverables of this contract accordingly.

Each package of work to be performed will be kicked-off with the Senior Assembly Support Engineer before its commencement, and a specification for the work package, schedule and form of deliverables agreed.

A monthly progress report shall be submitted and it shall reflect the agreed deliverables for that month.

7. ACCEPTANCE CRITERIA

All deliverables will be subject to the approval of the Technical Responsible Officer mentioned in the contract, or his authorized deputy.

8. WORK MONITORING / MEETING SCHEDULE

Completion of work items will be confirmed by the Technical Responsible Officer mentioned in the contract, or his authorized deputy. For longer tasks an interim monitoring point may be defined.

9. REQUIRED QUALIFICATIONS AND EXPERIENCE

The contract Senior Assembly Support Engineer shall have:
- A university degree in Mechanical Engineering or a related discipline, or combination of qualifications and experience acceptable by ITER;
- Recent relevant experience (ideally a minimum of 15 years) covering all aspects of the assembly of large, tightly tolerated mechanical systems preferably in a nuclear fusion (tokamak) environment;
- Fluent in the English language, written and spoken;
- Demonstrated ability to develop innovative solutions to complex assembly problems;
- Knowledge of Quality Assurance systems and their practical application;

10. Quality Assurance (QA) Requirement

The Contractor shall work in accordance with the standards set out by ITER QA.
ANNEX 1

DETAILED WORK SCHEDULE
FOR TECHNICAL SPECIFICATION REF. ITER_D_A4XL8E