

Call for Nomination Documents

Technical Summary_Diagnostics Plant I&C Coordination and Development

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Technical summary

Diagnostics Plant I&C Coordination and Development

Purpose

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Background

ITER Instrumentation and Control (I&C) System comprise the complete control, interlock and safety systems required to operate the ITER device. ITER I&C system has two layers, central coordination and local plant systems. The central systems are “in-fund”, i.e. procured by ITER Organization (IO), while plant systems are “in-kind”, i.e. procured by the seven ITER Domestic Agencies. It is expected there will be more than 170 plant systems. In order to ensure integration and maintainability, the instrumentation and control of plant systems are subject for standardization.

The technology choices made up to now include Siemens Simatic S7 programmable logic controller (i.e. Slow Controller), PCI Express based industrial and instrumentation computers and I/O bus systems (i.e. Fast Controller), IEEE-1588, EPICS (Experimental Physics and Industrial Control System) open source software tool kit, Linux, XML, as well as the application of industry standards like IEC 61226, IEC 61513, IEC 60880, IEC 61508 and IEC 62138.

Plant System Host (PSH) is a logical element in CODAC conceptual design, interfacing the CODAC control system with each plant system. It will be located within a Plant-System. Fast Controllers are carrying out typical I&C data acquisition and actuator management tasks. Mini-CODAC is another logical element which allows running a reduced set of CODAC control system during the construction, commissioning and maintenance of a plant system. The Mini-CODAC contains tools to manage the Network Equipment of the Plant System in the absence of the centralized management system.

ITER requires extensive diagnostics to meet the requirements for machine operation, protection, plasma control and physics studies. The realization of these systems is a considerable challenge, not only because of the harsh environment and the nuclear requirements but also with respect to plant system Instrumentation and Control (I&C). All the 45 diagnostics systems will require a large number of high performance fast controllers. The ITER Organization (IO) has published a set of documents to help the design of the I&C, called the Plant Control Design Handbook (PCDH). It defines mandatory rules for the system interconnect while providing guidelines and catalogues for the choice of the plant system I&C fast controllers. A common approach for the development for diagnostics plant I&C is documented in a guideline which is based on the ITER standards and methodologies. Most of the extremely complex ITER diagnostics systems are provided by the ITER Domestic Agencies (DAs) and their partners.

Scope of work

1. Diagnostics Plant I&C Coordination.
 - a. Monitor diagnostics plant I&C development activities in the domestic agencies in terms of schedule and maturity based on ITER standards and methodologies
 - b. Follow-up on I&C system development issues between central teams and teams in domestic agencies.
 - c. Promote compliance of the common approach for all life-cycle phases covering specification, design, implementation, testing and integration of the plant systems I&C.
2. I&C procurement management for IO Supplied Diagnostics System
 - a. Support diagnostics TRO for IO supplied diagnostics systems in all matters related to procurement of plant I&C. This includes plant I&C interlock and safety systems and their integration with central systems.
 - b. Ensure that requirement capture, detailed design, manufacturing and acceptance testing follow the common approach
 - c. Enforce that the plant I&C systems meets the operational needs of the tokamak
3. Develop plant I&C systems for IO supplied diagnostics systems
 - a. Design, manufacture and test IO supplied diagnostics I&C systems. This includes the development of plant I&C interlock and safety systems and their integration with central safety systems as required by the diagnostics.
 - b. Plan the integrated commissioning to assure readiness for plasma operations

French nuclear regulations such as INB-174 apply to the ITER facility. ITER may require the contractor to perform the work either on the ITER site, or at remote locations such as the contractor's usual place of business.

Timetable

The tentative timetable is as follows:

Call for Nomination	May 2017
Release of Prequalification	June 2017

Release of Call for Tender	Sept. 2017
Indicative award date	Dec. 2017
Indicative Contract signature	Dec. 2017
Indicative Contract start date	Jan. 2018

Experience

The Candidates should have proven experience in the following areas:

- The Candidate shall have experience in design, formal system engineering methodology of large or complex instrumentation and control projects using formal system engineering methodologies
- The candidate shall have experience in manufacturing, testing, and validation of those systems.
- The candidate shall have experience in commissioning and integration activities of those systems.
- The candidate shall have experience in electrical engineering end resolving complex issues such as EMC, radiation and magnetic field protection and related international standards.

Duration of services

The Contract will be carried out over an initial firm period of four (4) years and an optional period of two (2) years. The Contract is scheduled to come into force in December 2017.

Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State. A legal person cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be a permanent, legally-established grouping or a grouping, which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization. The consortium cannot be modified later without the approval of the ITER Organization.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Bidders' (individual or consortium) must comply with the selection criteria. IO reserves the right to disregard duplicated references and may exclude such legal entities from the tender procedure.

Reference

Further information on the ITER Organization procurement can be found at:

<http://www.iter.org/org/team/adm/proc/overview>

