



Call for Nomination

Design, supply and Integration of Large Scale Plant I&C systems for Diagnostics - Phase 2

Purpose

The purpose of the Contract in question is to assist the ITER CODAC (Control, Data Access and Communication) group and its contractors in the design, acquisition, usage and integration of standardized technologies from an industrial and point of view. This Contract is intended to be a Framework contract with separate Task Orders. The requested support is expected to be instrumental in the successful deployment of the standards.

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 160 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. Most of the extremely complex ITER diagnostics systems are provided by the ITER Domestic Agencies (DAs) and their partners. On their demand the IO has created several diagnostics plant I&C reference system. These systems come complete with documentation and implementation, further helping the DAs, their suppliers and diagnostic responsible officers to meet the ITER diagnostics requirements.

Scope of work

The scope of the required equipment and their supporting services can be divided in six main categories:

1. Design large scale diagnostics plant I&C based diagnostics plant I&C system engineering methodology.
2. Building or assembling ITER CODAC Fast Controllers or the electronic components used in them. The fast controllers are based on the form factors PXIe, MTCA.4 and ATCA.
3. Installation and industrial integration of the above Fast Controllers in the large scale diagnostics plant I&C.
4. Providing the ITER CODAC Core System compatible software for the above large scale plant I&C.
5. Deliver the documentation, test plan and test report for the above software and hardware components
6. Integration of the large scale plant I&C with the Central CODAC environment. Demonstrate operation orchestrated by central CODAC.
7. Provide maintenance, calibration service and component life cycle management services to the delivered Fast Controllers, components and their supporting software

The work is expected to be performed off-site mainly. Some occasional presence on-site may be required at the ITER Organization's premises and/or on a site appointed by the ITER Domestic Agency, collaborating in large scale diagnostics plant I&C.

Timetable

The tentative timetable is as follows:

Call for Nomination	February 2017
Release of Prequalification	March 2017
Release of Call for Tender	May 2017
Indicative award date	June 2017
Indicative Contract signature	July 2017
Indicative Contract start date	July 2017

Experience

The Candidates should have proven experience in the following areas:

- Skilled organization and staff in terms of Quality Assurance (possession of ISO 9001 and/or CMMI);
- Experience in integration of industrial control systems (> 1.000 inputs/outputs);
- Experience in systems engineering through all life-cycles
- Experience in the field of instrumentation;
- Maintenance of industrial control systems and computer equipment for a duration greater than 5 years;
- Knowledge of the technologies specified in the ITER standardization document, in particular Linux, EPICS, industrial computer form factors derived from the PCI-Express specification;
- Knowledge on communications and timing network protocols, such as 10 Gb/s Ethernet and IEEE-1588-2008;
- Knowledge on FPGA based data acquisition systems and their signal interfacing;
- Knowledge of installing and interfacing Siemens Step 7 series PLCs and their input/output modules;
- Experience of installing industrial rack mounted systems, D-rails, patch panels and such;
- Experience of manufacturing and configuring batches of identical industrial computer systems;

Duration of services

The Contract will be carried out over an initial firm period of three (3) years and an optional period of two (2) years. The Contract is scheduled to come into force in July 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>