TECHNICAL SUMMARY

Call For Tender IO/19/CFT/7-513/ERA

Central Interlock System Engineering Support Services

Purpose

The ITER Interlock Control System (ICS) is the ITER Control System in charge of the implementation of the investment protection mechanisms at ITER through the automated execution of interlock functions. It is composed of the Central Interlock System (CIS), procured by PBS.46, and of several Plant Interlock Systems (PIS), provided by other plant systems.

The CIS will implement the control logic in charge of the execution of the central interlock functions, which aims at the coordination and supervision of the locally distributed PIS. For this, an architecture composed of slow (PLC), fast (FPGA based embedded controllers) and hardwired (engineered for highest reliability) technologies, following the IEC-61508 standards, has been designed.

In addition, the CIS provides support for the development of the PIS, in the way of interface and PIS prototyping, software template management, guideline creation or participation in FAT, SAT, installation and commissioning activities.

The purpose of the contract is to provide support services for the CIS team in a broad variety of activities and technologies. This support will be provided both on-site and off-site.

Background

ITER will be constructed from a large number of components or "plant systems", which will be delivered complete or in parts by the participating countries as "in kind" contributions, in compliance with contractual agreements, called Procurement Arrangement (PA), with the ITER Organization. These components will be assembled at the ITER site.

Some of these components are involved in the implementation of the ITER investment protection functions, executed locally to each plant system. The CIS is procured "in fund" by the ITER Organization, and will interface the different PIS to coordinate and assure the success of the overall investment protection strategy. To achieve their integration the Controls Division at ITER has developed a set of standards compiled in the Plant Control Design Handbook, which is publicly available at:

https://www.iter.org/mach/codac/PlantControlHandbook

Scope of work

This contract will stablish a framework and the work will be structured in individual task orders. The services to be requested in the task orders will cover the following:

- Engineering services covering the participation in the design, manufacturing, development, commissioning and testing of CIS modules, prototypes and interfaces to other systems;
- Support IO in the supervision, review and assessment of technical works performed by others: this covers the review of documentation and the participation in meetings or integration tests;
- Support the review of documentation related to plant interlock systems interfacing the CIS;
- Development and integration of software modules and functions for fast controllers, based on FPGA (National Instruments LabView) and Linux-EPICS (following CODAC platform developed at ITER);
- Support the installation of CIS components at ITER site by preparing the necessary Engineering Work Packages and technical documentation, and participate in the review and update on the related documentation;
- Support IO in the elaboration of the technical specifications for central interlock I&C functions, updating the system functional analysis and developing functional block diagrams for the different CIS modules; implementation of the functions into the fast architecture using LabView.
- Participate in commissioning activities of CIS and PIS, including factory and site acceptance tests, with the ability to carry out small interventions on the cubicles electrical and I&C arrangement;
- Complete the development of the CIS critical logging system, exploring diverse database options, including high level application for post mortem analysis of the triggered functions.
- Update of electrical drawings and logic diagrams according to ITER standards.

The work shall mainly be performed by engineers working on the ITER site although some tasks may be performed off-site.

Details on CODAC system developed at ITER can be found in the following link:
https://www.iter.org/mach/Codac

Contract schedule

The Contract is scheduled to come into force in September of 2020 for a duration of five (5) years (4 years fix and 1 optional).

Procurement timetable

The tentative timetable is as follows:

Call for Nomination Release	November 2019
Receipt of Nominations	January 2020
Issuance of Pre-qualification Application	February 2020
Receipt of Prequalification Application	March 2020
Notification of Prequalification Results	April 2020
Issuance of Call for Tender	April 2020
Tender Proposals Due Date:	June 2020
Estimated Contract Award Date:	August 2020
Estimated Contract Start Date:	September 2020

Experience

The company's experience shall cover a broad range of capabilities as listed below.

- Design, construction and operation of instrumented safety systems for large heterogeneous facilities.
- Hardware and software design and integration of safety industrial control systems, under the IEC-61508 standard.
- Functional analysis and reliability assessment of heterogeneous I&C systems.
- Installation, commissioning, acceptance testing and functionality validation of I&C functional safety systems.
- Development of software and prototypes under National Instruments cRIO platform and LabView.
- Industrial SCADA for safety related systems, especially Siemens WinCC Open Architecture.
- Review and production of I&C cabling diagrams under French standard NFC-15-100.
- Knowledge in Linux operating system, EPICS control system and databases.

Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium). All legal persons including all consortium members should be 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 form the tender procedure.

The UK is not a party to the ITER Agreement but to EURATOM Treaty. The draft Withdrawal Agreement between the EU and the UK provides that the provisions of the EURATOM treaty continues to apply to and in the UK for a transition period following its withdrawal from the EU and EURATOM. If the Withdrawal Agreement is not ratified (a no-deal Brexit) the EURATOM Treaty ceases to apply to and in the UK on the withdrawal date.

Until the Withdrawal Date, the UK remains a full member of the EU and EURATOM and until that date UK entities retain the right to participate in IO procurement procedures. In case they are selected, a Brexit clause is included in the contract. Likewise during the Transition period UK entities may participate in IO procurement procedures.

After the end of the Transition Period, when the Euratom Treaty ceases to apply to and in the UK, any UK entities bidding as a prime contractor or consortium partner, will be rejected from the IO procurement procedures. UK entities will no longer be recognised as entities of an ITER Member and will no longer have the right to participate in IO procurement procedures, unless the UK has entered into an Agreement with Euratom. Where UK entities can demonstrate a unique and specific competence in a certain field the IO, with approval of the ITER Council, may also allow them to participate in a procurement procedure.

More information on ITER Organization Procurement process can be found at:

https://www.iter.org/org/team/adm/proc/Pages/Welcome.aspx