SUMMARY

Call For Nomination IO/12/CFN/7551/BGD

Service Contract for Central Interlock System Final Design, procurement, commissioning and maintenance

Purpose

The Interlock Control System or ICS is the ITER control system in charge of implementing the investment protection functions. It is composed of the Central Interlock System or CIS (PBS-46) and around thirty Plant Interlock Systems (PIS). Among these, a maximum of ten PIS will interface the CIS through the fast architecture.

The purpose of the contract is to provide the CIS final design, procurement, commissioning and maintenance from its first version in 2016 and the subsequent versions up to ITER first plasma in 2020.

Background

The investment protection at ITER is provided by the Interlock Control Systems. These are the systems in charge of implementing all the instrumented protection functions of the tokamak and its associated plant systems. These functions are divided into:

- Local interlock functions, which are limited to one plant system and have no effect on the rest of the machine. The interlock event and the mitigation action are performed within the same plant system.
- Central interlock functions, which involve two or more plant systems.

The local functions are implemented by the different Plant Interlock Systems (PIS) while the central actions are implemented by the Central Interlock System (CIS) via the PIS of each plant system involved.

The ITER Interlock Control System is therefore formed by:

- One Central Interlock System (CIS).
- One or more Plant Interlock System (PIS) for each plant system involved in one or more investment protection functions (around 50 PIS expected at the final ITER configuration)
- The interlock networks:
  - Central Interlock Network (CIN) connects the different PIS with the CIN.
Plant Interlock Networks (PIN) connects the PIS with the different elements of its plant system (i.e. sensors, actuators and other controllers).

During the past two years, an R&D campaign has been carried out to develop the design of the slow and fast architectures for the Central and Plant Interlock Systems.

**Scope of work**

The Central Interlock System according to its current design consists in:

- The 12 cubicles hosting the CIS critical equipment
- The two interlock operator desks
- The interlock test, simulation and training facility
- The CIS-CODAC interface
- The interlock system tools
- The hardwired interlocks loop (discharge loop)
- The 50 interface boxes for the discharge loop clients

The contract will have 3 parts:

1. **Final design and engineering of CIS (June 2013 – February 2015):**

   This phase starts once the Chits 1 of Preliminary Design Review are solved and finishes with the resolution of Chits 1 and 2 of the Final Design Review.

2. **Procurement of CIS v1, installation and commissioning (March 2015 – April 2016):**

   This phase includes:
   - CIS hardware procurement
   - Installation
   - SAT and stand-alone validation
   - Verification of the CIS logic.

3. **CIS upgrade from v1 to First Plasma Versions (May 2016 – November 2020):**

   The contractor will be also required to, based on the current project development, answer to the different technical questions which will be encountered during the preliminary design phase of the Central Interlock System.

All tasks defined in the different phases shall be executed in close collaboration with the CODAC ITER Organization team and take into account other activities, internal and external, with any relevance to this contract (i.e. CIS prototyping, machine protection functions identification, preparation of the CIS preliminary design, etc.).

**Duration of services**

The Contract is scheduled to come into force in the third quarter of 2013 for a duration of seven (7) years.
Procurement Time table

A tentative time table is outlined as follows:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call for Nomination release</td>
<td>10th July 2012</td>
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<tr>
<td>Receipt of Nominations</td>
<td>6th August 2012</td>
</tr>
<tr>
<td>Issuance of Prequalification Application</td>
<td>Mid-August 2012</td>
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<tr>
<td>Prequalification Application due date</td>
<td>End September 2012</td>
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<tr>
<td>Issuance of Call for Tender</td>
<td>Early November 2012</td>
</tr>
<tr>
<td>Tender Proposals Due Date</td>
<td>Early January 2013</td>
</tr>
<tr>
<td>Estimated Contract Award Date</td>
<td>June 2013</td>
</tr>
<tr>
<td>Estimated Contract Start Date</td>
<td>July 2013</td>
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</tbody>
</table>

Experience

The acceptance criteria for the selection of the tender cover a broad range as listed below.

- A solid experience working with research institutions and facilities especially with ITER and/or other tokamak projects.
- Capability to understand the processes involved in the protection of the ITER machine.
- Experience in hardware integration of interlocks industrial control systems
- Experience in the field of instrumentation and signal interfacing;
- Relevant experience in the design, construction and operation of instrumented interlock systems based on Siemens S7 redundant PLC technologies.
- Familiarity with IEC 61508 standards
- Experience on contract and project managing for large multidisciplinary I&C projects
- Experience in EMI effects on I&C components and EMC rules to apply in harsh environment.
- Experience in development under Siemens S7-400 FH technologies
- Experience in development under NI cRIO and flexRIO technologies.
- Experience in FPGA based data acquisition systems and their signal interfacing;
- Knowledge of interfacing Siemens Step 7-400FH series PLCs and their input/output modules;
- Experience working with EPICS.

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