CODAC Remote Participation Application Engineering Services

Call for Nomination

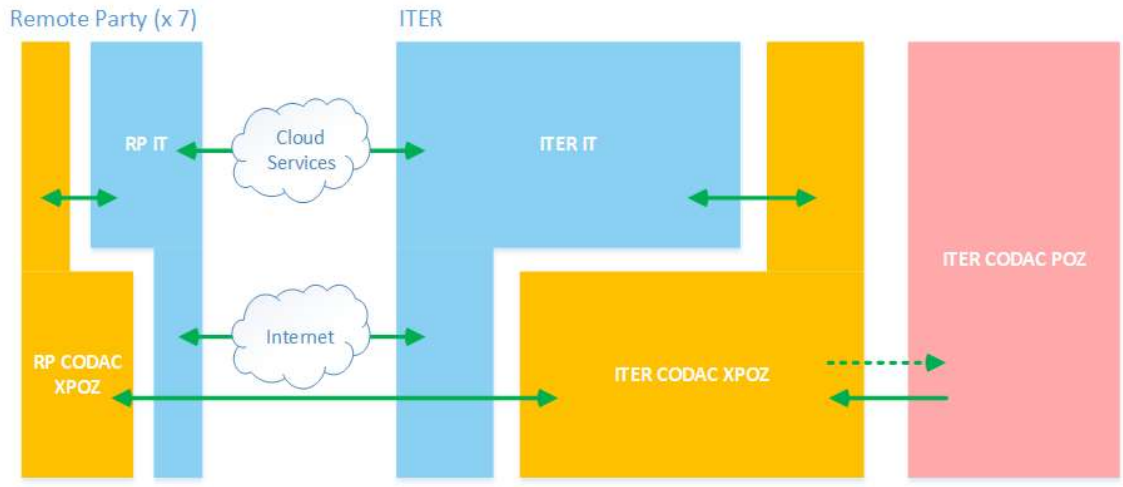
Purpose

This document describes the technical and administrative scope linked to a framework service contract (FWC) to assist ITER Controls Division with development and integration of remote participation (RP) applications. The FWC will be awarded to a Contractor selected through a competitive process. Finally, this document provides the main technical requirements necessary for potential Candidates to understand if they have the overall technical and professional capacity in relation to the technical scope of the Contract.

Background

ITER CODAC is the control system of the ITER nuclear fusion power reactor. ITER agreement calls for scientific collaboration and wide dissemination of results across international partners participating in the project. It is thus important to provide the necessary infrastructure to support remote participation in the ITER experiment, data exchanges and effective collaboration.

ITER networks are structured into Plant Operation Zone (POZ), networks external to Plant Operation Zone (XPOZ), and general-purpose office infrastructure (IT). POZ and XPOZ host CODAC services, with the remote participation data exchange activities happening primarily in XPOZ. IT networks are used for human interaction and non-CODAC-specific activities. More and more of these services are now assured with Cloud technologies. Remote parties, which represent at least seven ITER partners, possess similar IT networks, and may optionally deploy an XPOZ network segment hosting remote CODAC clients.



CODAC control system environment is Red Hat Enterprise Linux (RHEL)-based, with main programming languages C, C++, Java and Python. Open source software EPICS and Control

System Studio are used as main automation technologies. IT environment is Microsoft Windows, using Microsoft solutions for office appliances and telecommunication.

Remote participation features are heavily centered around platform-neutral web technologies, such as Web Services in Java environment, Node.js, … Some critical portions of software (such as gateways) could be coded using high integrity software approach (static analysis, security and stress testing, …).

Scope of work
A non-exhaustive list of activities includes:

- taking into account ITER CODAC design and existing ITER IT eco-system, propose software architecture and technologies suitable for specific remote participation tasks;
- develop web-enabled or network-oriented applications in Linux, Windows or Cloud environments;
- assist with adaptation of existing CODAC applications to remote participation (for example, by providing wrapper interface, plugins or gateways);
- bring developed solutions to a state where they could be handed off to third parties for maintenance (packaging, documenting, …);
- demonstrate specific human-to-system operation and human-to-human telecommunication scenarios, as foreseen by ITER Operations and CODAC;
- harden existing applications using secure coding techniques, dedicated testing and adaptations in the infrastructure;
- provide internal security assessment and assist in preparation of materials required for external security audits.

It is not expected to develop large applications in scope of this contract, but rather a number of small end user applications, "glue" code, web sites or web services, with the aim of integrating existing applications to the extent possible.

High volume, high performance data distribution services over large distances are generally outside of scope of this contract; however, the Contractor may be asked to integrate data handling interfaces or participate in integrated operation testing.

The contract is purely software-oriented; no hardware is expected to be transferred between ITER and the Contractor, or purchased from this contract budget. Portative devices (cameras, headsets, tablets …) could be needed for various telecommunication testing activities; this will be decided on a case-by-case basis.

Developed software will not be subject to any specific external qualification or certification.

Timetable
The tentative timetable is as follows:

Call for Nomination	June	2021
Pre-Qualification	August	2021
Call for Tender	October	2021
Contract Award	March	2022
Contract Start	April	2022

Contract duration

The projected contract duration is 3.5 years (2022 – 2025).

Experience

Contractor is required to have comprehensive experience in the modern Web, Cloud and telecommunication technologies. Specific experience requested:

- experience with Java / JavaScript, Python, basic understanding of C/C++ languages;
- experience with building and deploying web sites using JavaScript-based frameworks (Node.js, TypeScript, React, …);
- experience with building and deploying secure Java-based web services;
- experience with deployment of solutions in Cloud (MS Azure, AWS, Google Cloud or similar);
- experience with tailoring telecommunication solutions (using Microsoft Teams as an example) by developing and deploying specific business applications;
- experience with basic principles of distributed control systems, including interaction of control systems with enterprise resource planning (ERP) software;
- strong experience in cyber and web security;
- experience with data encryption, digital signatures, certificates;
- understanding of software high availability principles and methods;
- experience with software configuration control (Git or Subversion), continuous integration (Jenkins or similar), software packaging;
- experience with software quality improvement (static analyzers like SonarQube, unit testing, code coverage, etc);
- knowledge of ITER CODAC software is not required, but would be considered an advantage;
- knowledge of the control system security regulatory framework (IEC 62645, IEC 62443, IAEA and French ANSSI regulations, etc.) is not required but would be considered an advantage.

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 that are:

- European Union (EURATOM Members) and provisionally UK,
- Republic of India,
- Japan,
- People's Republic of China,
- Republic of Korea,
- Russian Federation,
- United States of America.

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 groupings shall be presented at the pre-qualification stage. The tenderer's composition cannot be modified without the approval of the ITER Organization after the pre-qualification.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities.

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

https://www.iter.org/proc/generalinfo