Call for Nomination Documents

RH Supervisory Control System - Technical Summary

Technical Summary of the RH Supervisory Control System to be used for Call for Nominations

TECHNICAL SUMMARY

Remote Handling Supervisory Control System

Call for Nomination

Purpose

The purpose of the contract is to carry out the detailed design and manufacture of the Remote Handling Supervisory Control System.

Background

ITER is a joint international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power. The partners in the project - the ITER Parties - are the European Union (represented by EURATOM), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA. ITER is being constructed in Europe, at Cadarache in the South of France (see www.iter.org for an overview of the ITER project).

ITER is a nuclear installation that is licenced by the French nuclear authority (ASN). Maintenance of the ITER machine and components will be carried out by the ITER Remote Handling (RH) System. The RH System has been split-up into several RH sub-systems targeting different components of the ITER machine, and these sub-systems are procured separately as complete stand-alone systems:-

- Blanket RH System,
- Divertor RH System,
- Cask & Plug RH System,
- NB Cell RH System,
- Hot-Cell RH System,
- In-Cryostat Maintenance System.

These RH sub-systems have man-in-the-loop control systems and are operated from the dedicated RH control room(s).

The RH Supervisory Control System provides the common infrastructure to integrate the RH sub-systems together to form the overall RH System, and then integrates this as a single plant system into the overall ITER control system (CODAC).

Scope of Work

The RH Supervisory Control System has been developed to concept level and a concept design review (CDR) has been completed.

This contract covers the detail design and manufacture of the RH Supervisory Control System. The detail design shall have an intermediate preliminary design review (PDR) followed by a final design review (FDR). The manufacturing phase shall cover the manufacture of the elements and the installation and acceptance testing on the ITER site.

The RH Supervisory Control System contains hardware and software components and can be divided into 3 main elements/functions:-

- Networks (to provide RH communication infrastructure),
- Control Integration (to support integration with CODAC central control system),
- Software Applications (to support RH operation campaigns).

RH Networks

The RH Network element contains:-

- 5 digital communication networks (File, Control, Low-Latency, Interlock, Safety),
- Distributed programmable Emergency Stop system.

The networks have a double star topology and will be distributed using the CODAC network bundles. The overall network distribution is shown in figure 1, although this contract will only install the networks for RH operations in the ITER Maintenance Test Facility.
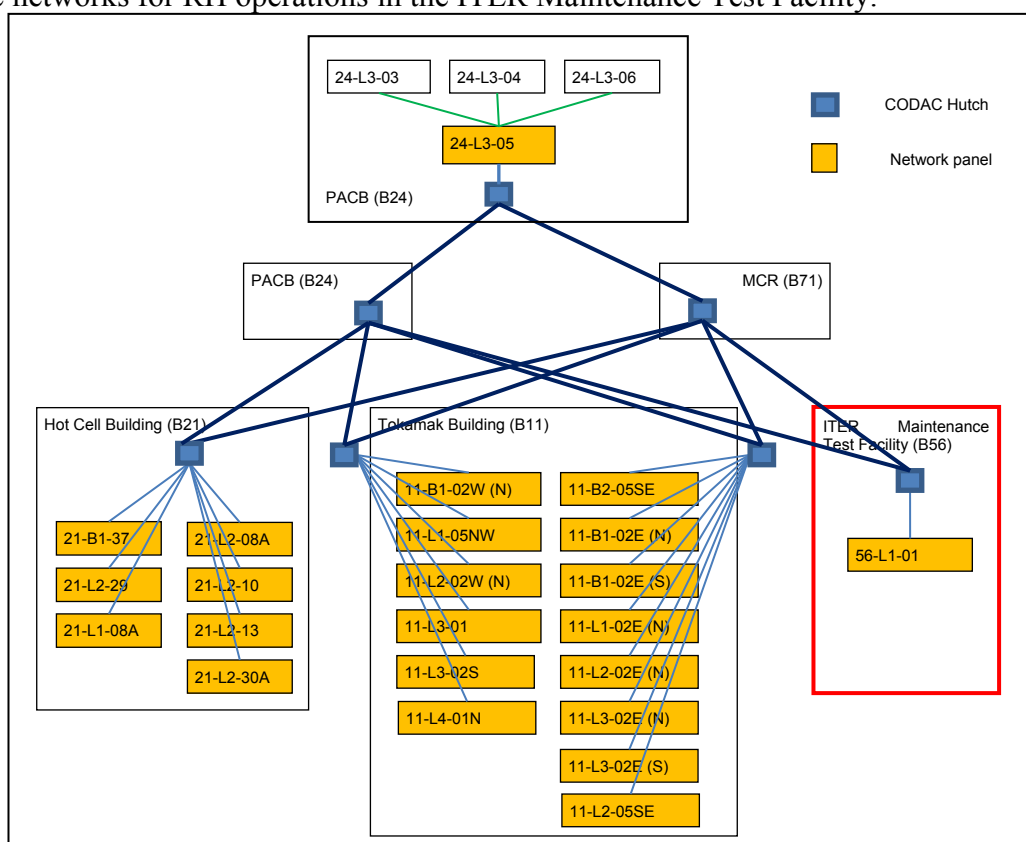

Figure 1. RH Network Distribution

The scope of the contract covers:-

- Implementation of the RH Network hardware in the ITER Maintenance Test Facility,
- Development of standard libraries for
  - RH Control and diagnostic communications,
  - RH Audio-Video low-latency communications,
  - RH Real-Time low-latency communications.

Control Integration

The Control Integration element contains (see figure 2):-

- RH Plant Controller (control RH process permissions)
- RH Plant Interlock System (ITER investment protection),
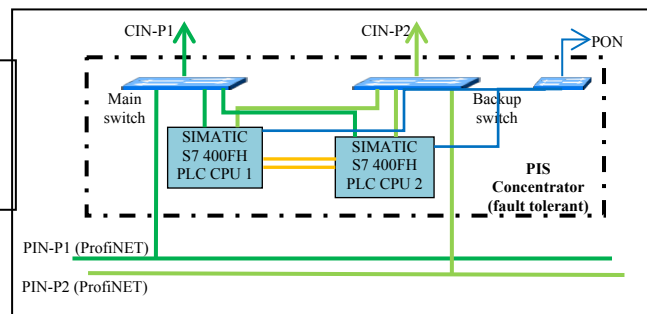- RH Plant Safety System – OS (occupational safety protection).

RH Plant Control System:
Model RH System for integration with CODAC
RH Databases.
Hardware based on CODAC standards (fast
controller).
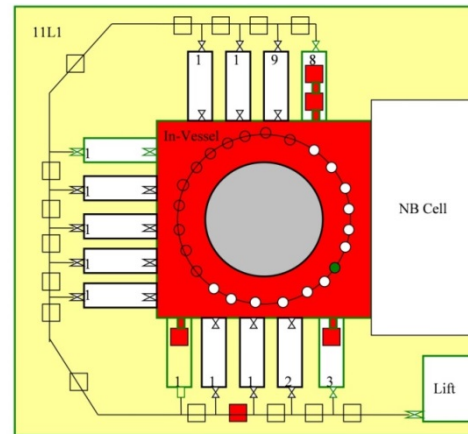
RH Plant Interlock System:
Implement RH wide investment
protection interlocks.
Hardware based on CODAC standards

RH Plant Safety System - OS:
Implement RH wide occupational
safety protection interlocks.
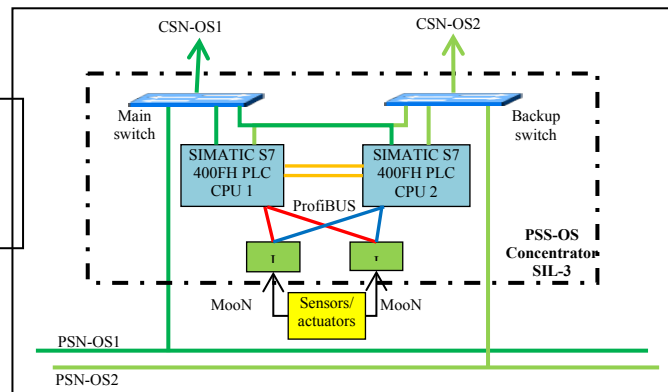Hardware based on CODAC standards

Figure 2. RH SCS Control Integration elements

Software Applications

The Software Applications element contains 3 items (see figure 3):-

- RH Supervisor (software application to coordinate RH parallel operations),
- Equipment Management System (software application to manage RH equipment lifecycle),
- RH Structured Language database (database for operation procedures).

RH Supervisor System: Planning RH campaigns and tracking progress from the control room Supervisor station

RH Equipment Management System: Tool for managing RH equipment lifecycle

RH Structured Language Database: Database to support the RH Structured Language procedures and motion sequences
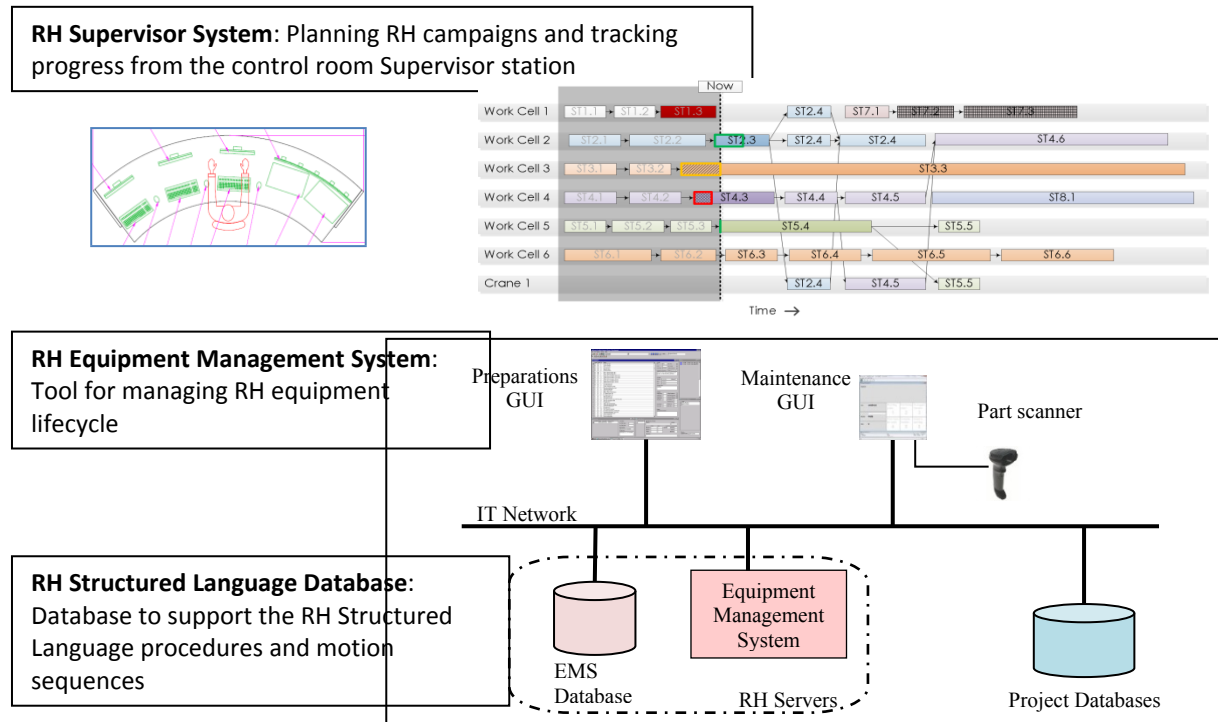
Figure 3. RH SCS Software Applications

Timetable

The tentative timetable for setting up the contract is as follows:-

- Call for nomination   June 2017
- Pre-Qualification   July 2017
- Call for Tender: September 2017
- Award of the Contract: January 2018

Experience

The company shall have ISO-9001 accreditation, shall be recognised for their knowledge and expertise in developing control system solutions, and shall have wide experience in:-

- Specification and deployment of communication networks,
- Development of network communication software,
- Development of high integrity safety control systems according to IEC 61508,
- Development of solutions based on the Siemens S7 PLC range,
- Development of SCADA solutions,
- Design and build of control cubicle hardware,
- Development of control system software for general purpose controllers,
- Implementing programmable Emergency Stop pushbutton networks in compliance with ISO-13850,
- Development of software solutions based on underlying relational database (PostgreSQL),
- Maintenance management systems,
- Developing software according to ISO 12207 or equivalent.

Experience and knowledge of the ITER project and CODAC is an advantage.

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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