



Technical Specification

Abstract

ITER will make an extensive usage of cubicles for I&C purpose. The cubicles will be procured by IO and the Domestic Agencies/local industry who will deliver their I&C embedded in these cubicles. There is a need to standardise these cubicles.

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1 Presentation

1.1 Acronyms

AC	Alternating Current
CHD	CODAC & IT , Heating and Diagnostics
CODAC	Control, Data Access and Communications
DA	Domestic Agency
DC	Direct Current
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
I&C	Instrumentation & Control
IEC	International Electrotechnical Commission
IP	Ingress Protection
IO	ITER Organization
I/O	Input/Output
PLC	Programmable Logic Controller
PS	Plant System
PSH	Plant System Host
R&D	Research & Development
RFI	Radio Frequency Interference
RO	Responsible Officer
XML	Extensible Markup Language
XSD	XML Schema Documents
VAT	Value Added Tax

DA:

This term refers to an organization appropriately formed and appointed within and by each “Party” to be the supplier of items and services to the ITER Organization (hereinafter “IO”), on the basis of defined specifications.

Supplier:

Supplier shall mean a company who submits an answer to ITER in accordance with the current request.

1.2 Summary

The I&C systems encompass Safety, Interlock and CODAC systems. These systems are split into in fund CODAC centrally procured packages and in kind Domestic Agencies procured Plant Systems.

This document aims at pre-qualifying by IO a potential supplier and products for CODAC and Interlock cubicles and decide on a solution for procurement. This process is executed through the DAs that are responsible for nominating the potential Suppliers within their industries. A second phase called qualification will be processed by IO with the pre-qualified Suppliers.

2 Project presentation

2.1 ITER presentation

ITER (“The way” in Latin) is a next generation fusion tokamak designed “to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes”. With a long lifespan over than 30 years, it is intended that ITER will be a single step between the current set of fusion experiment and DEMO, a fusion power plant designed to demonstrate safe and reliable, commercial electricity production. Construction began in 2006 in Cadarache, France and is due to last ~10 years followed by an exploitation phase of ~20 years.

ITER is a joint venture of 7 participants Teams called Domestic Agencies (CN, EU, IN, JA, KO, RF, US) each of whom will have a role in carrying out the necessary technical tasks involved in ITER’s construction and commissioning. IO has the overall responsibility for coordinating the work of the DAs supplying most of the Plant Systems.

2.2 Supply description

2.2.1 Supply and services

ITER Organization wishes to standardise cubicles for the control systems.

Plant Systems I&C, CODAC and Interlock systems will encompass:

- **Type-A:** PLC cubicles with their local power supplies, signal conditioning (for small PS) and terminal strips for connecting the process I/O
- **Type-B:** Embedded controls based solutions with their set of I/O cards, their local power supplies, signal conditioning (for small PS) and terminal strips for connecting the process I/O
- **Type-C:** signal conditioning for large PS connected to either **Type-A** or **Type-B** cubicles

Type-A, Type-B and **Type-C** could be merged for optimisation reasons. PSH racks will be defined by IO. This rack will include processors and network cards. There will be a unique PSH rack per Plant System. For optimisation reasons, this rack will be included in a cubicle fitted with either PLC or PC racks (**Type-A or Type-B**).

- **Type-D:** Wall mounted enclosures for remote I/O connected to PLCs or PC based solutions through an Ethernet Fieldbus
- **Type-E:** Interlocks cubicles similar to Type-A
- **Type-F:** Network hatches including active and passive components (Switches/Routers and Optical Fiber backbone and other networks cable termination)
- **Type-G:** Servers for CODAC and Central Interlock Systems
- **Type-H:** Storage

As a result, different types of cubicles/enclosures will be specified.

It is assumed that Safety Systems will be delivered by a supplier within their cubicles. Power supply cubicles, Audio-video conference cubicles, High Performance Computing servers are out of the scope of this document.

The preliminary studies processed during September 2008 lead to a number of more than 2000 cubicles on ITER Site. Details are not known yet (manufacturer and type of PLCs, diagnostics hardware, server brand, network switches brand and types, ...).

In addition to the hardware delivery, IO will require services from the Supplier for engineering studies, mechanical assembly, components integration within the cubicle and internal wiring, test and support.

2.2.2 Procurement scheme

The Supplier will propose a delivery scheme appropriate for ITER, taking into account the following constraints:

- Server and network cubicles will be delivered directly to IO in Cadarache
- Most of the PLC and embedded controls cubicles, wall mounted enclosures and PSH cubicles will be procured directly by the DAs and their domestic industry.
- Procurement will be in fund for IO and in kind for Domestic Agencies: it is the intention of IO to sign a framework contract with the industry encompassing all the deliveries.

2.2.3 Time schedule

The Supplier shall start the engineering studies by the beginning of 2009. The cubicles shall be delivered from March 2009 (for a first pre-serie cubicle) to March 2016 for the bulk of them.