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Technical Specifications (In-Cash Procurement)

Central Safety Systems Services technical specification

Technical specification for Central Safety Systems Services to provide technical services to support the design, integration and commissioning of ITER safety control systems

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1 Purpose

The purpose of this procurement is to provide technical services to support the design, integration and commissioning of ITER safety control systems. This document defines the scope and description of such services. They are structured in lots which may be awarded to different contractors. Therefore, resulting in one or several framework contracts, where each task order is a standalone engineering activity with its own budget.

2 Scope

This document describes the services to be provided in the framework of the Central Safety Systems Support Services. Such services may include activities related to the design, verification, integration, manufacturing, software development and validation of safety control systems. This document specifies the requirements for the services under the scope of this procurement. They concern both nuclear and occupational safety systems.

3 Definitions

3.1 Glossary

N/A

3.2 Acronyms

CODAC	Control, Data Access and Communication
COTS	Commercial Off-The-Shelf
CIS	Central Interlock System
CSS	Central Safety System
CSS-N	Central Safety System for Nuclear safety
CSS-OS	Central Safety System for Occupational Safety
DA	ITER Domestic Agency
DO	Design Office
HMI	Human Machine Interface
I&C	Instrumentation & Control
IDM	ITER Document Management (system)
IO	ITER Organization
IT	Information Technology
KoM	Kick-off Meeting
N/A	Not Applicable
PCDH	Plant Control Design Handbook
PFD	Probability of dangerous Failure on Demand
PFH	Probability of dangerous Failure per Hour
PIC	Protection Important Component
PIA	Protection Important Activity

PLC	Programmable Logic Controller
PSS-N	Plant Safety System for Nuclear safety
QA	Quality Assurance
RAMI	Reliability Availability Maintainability Inspectability
RD	Reference Documents
RO	Responsible Officer
SAT	Site Acceptance Tests
SCS-N	Safety Control System for Nuclear safety
SCADA	Supervisory Control And Data Acquisition
SIC	Safety Important Component
SIL	Safety Integrity Level

4 Related Documents

4.1 Applicable Standards

[AS1] IEC 61513 Nuclear power plants – Instrumentation and control important to safety – General requirements for systems, 2011

[AS2] IEC 61226 Nuclear power plants – Instrumentation and control important to safety – Classification of instrumentation and control functions, 2020

[AS3] IEC 62138 Nuclear power plants – Instrumentation and control important for safety – Software aspects for computer-based systems performing category B or C functions, 2018

[AS4] IEC 60709 Nuclear power plants - Instrumentation and control systems important to safety - Separation, 2018

[AS5] IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1 to 7, 2010

[AS6] IEC 61511 Functional safety - Safety instrumented systems for the process industry sector - Part 1 to 3, 2016

[AS7] IEC 60987: 2021, Nuclear power plants - Instrumentation and control important to safety - Hardware requirements

[AS8] IEC 62671: 2013, Nuclear power plants – Instrumentation and control important to safety – Selection and use of industrial digital devices of limited functionality

4.2 Reference Documents

The following documents are referenced in this document:

[RD1] ITER_D_82MXQK - General Management Specification for Service and Supply

[RD2] ITER_D_WC9TDH - Defined requirements for PBS48

[RD3] ITER_D_7M2YKF - Order dated 7 February 2012 relating to the general technical regulations applicable to INB - EN

[RD4] ITER_D_SBSTBM - Provisions for Implementation of the Generic Safety Requirements by the External Interveners

[RD5] ITER_D_42H8GG - Central Safety System for Nuclear Safety (CSS-N) Final DDD

[RD6] ITER_D_2YNEFU - Plant Control Design Handbook for Nuclear control systems

[RD7] ITER_D_27LH2V - Plant Control Design Handbook

[RD8] ITER_D_PSTTZL - List of ITER-INB Protections Important Activities

[RD9] ITER_D_2Z46Q4 - CSS-OS Detailed Design

5 Technical Context

5.1 Project Overview

ITER ("the way") is an international collaborative project to build a 500 MW D-T fusion reactor in Cadarache, France. The participating countries are China, Europe (27 countries), India, Japan, Korea, Russia and the United States, representing a combined population of half of the world. ITER will be the largest fusion machine ever built and the first designed to deliver a factor of 10 more output than input power, and a plasma whose lifetime is measured in minutes rather than seconds.

The reactor 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 with the ITER Organization (IO).

The ITER project is broken down into several "plant systems", and the individual plant systems are in many cases themselves large, expensive and complex facilities. They include the largest vacuum vessel ever built for plasma confinement, enormous superconducting magnet coils and their associated power supplies, one of the world's largest cryogenic plants to provide coolants for these coils, conventional (but large) vacuum and water cooling systems, radio-frequency systems for electron and ion heating, a small accelerator to produce a neutral beam also for heating and an array of sophisticated diagnostic equipment to monitor the plasma. Each of these subsystems will be delivered with its own control system (so-called "Plant System I&Cs") and all of these must be integrated at Cadarache.

5.2 ITER I&C Design Principles

The ITER I&C System is divided in two horizontal layers (refer to Figure 1), one for the Central I&C Systems (CODAC, Interlock and Safety Systems), and another for the different Plant Systems. Both are connected through different I&C networks (the general CODAC Systems Networks and the high integrity Central Safety Networks and Central Interlock Networks) besides other specific networks. Standardization is promoted by means of the Plant Control & instrumentation Handbook [RD7].

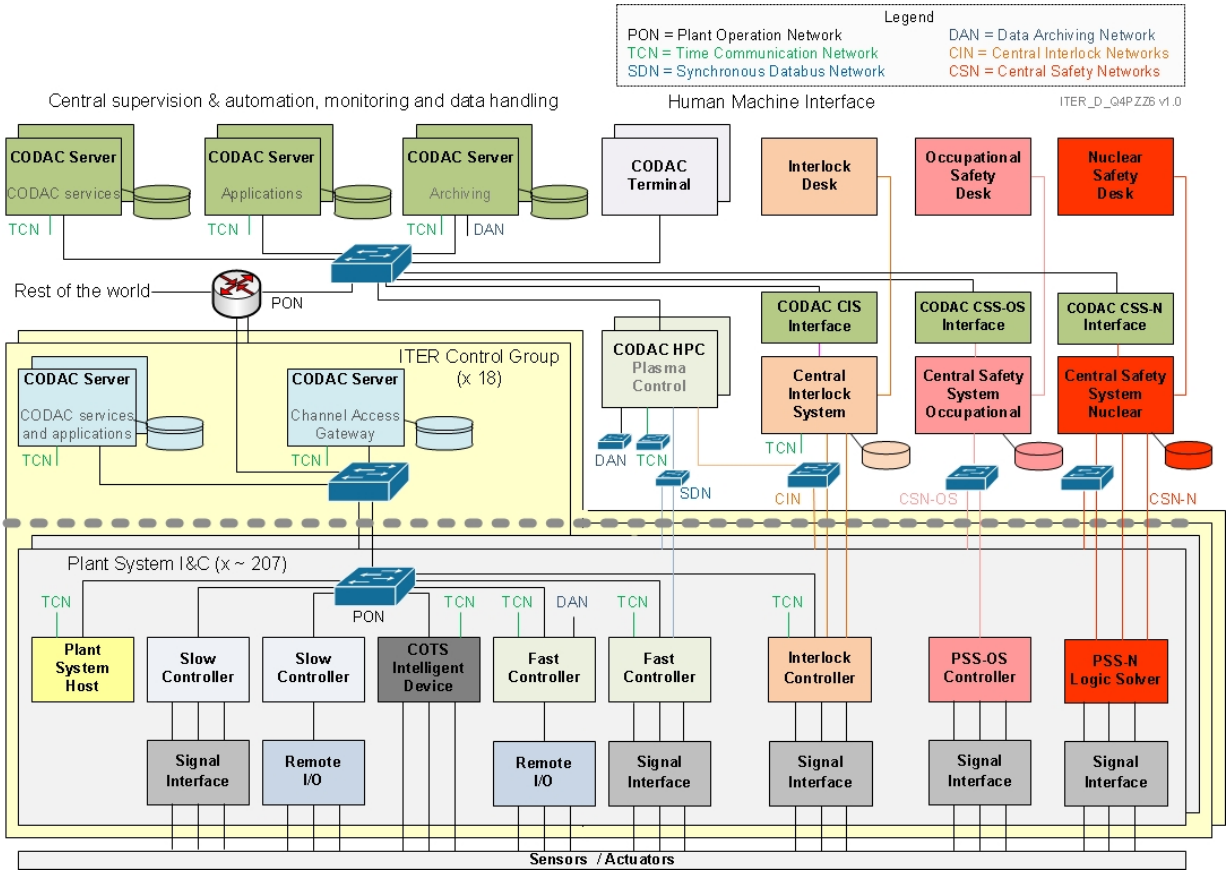

Figure 1 ITER I&C systems original arrangement (PSS scope transfers not represented)

The Central Safety Systems (CSS) form together with CODAC and the Central Interlock System (CIS) the ITER I&C Central Systems.

Furthermore, ITER I&C is divided vertically into the following tiers:

- Conventional controls.
- Interlock controls for investment protection.
- Nuclear safety controls.
- Occupational safety controls.

5.3 ITER Safety Control Systems

As mentioned in the previous section, the Safety Control Systems (SCS) are split depending of the type of hazards to be mitigated:

- The Safety Control System for Nuclear safety (SCS-N) addresses radiological hazards.
- The Safety Control System for Occupational Safety (SCS-OS) copes with non-radiological hazards.

The Central Safety System for Nuclear safety (CSS-N) coordinates the individual protection provided by the intervention of locally distributed Plant Safety Systems for Nuclear safety (PSS-N) in charge of the activation of additional protections in order to remove or reduce the detected hazardous conditions. This coordination is performed via the Central Safety Network for Nuclear safety (CSN-N). Moreover, the CSS-N provides operator interfaces via the safety operator desks located in ITER control rooms to perform manual commands and display monitoring information.

The SCS-N implements category A, B and C nuclear safety functions. It is subject to a nuclear qualification process according to the requirements of IEC 61513 and associated IEC standards.

The Central Safety System for Occupational Safety (CSS-OS) coordinates the individual protection provided by the intervention of locally distributed Plant Safety Systems for Occupational Safety (PSS-OS) in charge of the activation of additional protections in order to remove or reduce the detected hazardous conditions. This coordination is performed via the Central Safety Network for Occupational Safety (CSN-OS). Additionally, the CSS-OS provides operator interfaces via the operator desks located in ITER control rooms to perform manual commands and display monitoring information.

The SCS-OS implements safety instrumented functions up to SIL-3 and is compliant with the IEC 61511/61508. The CSS-OS and several PSS-OS are developed according to the IEC 61511 lifecycle although other PSS-OS may directly follow IEC 615108.

The implementation of the control logic of most PSS-N and many PSS-OS has been transferred to the CSS-N and CSS-OS respectively, which now combine their role of coordination of the different PSS with the implementation of control logic and the direct interface with sensors and actuators. As a result, the architectures of the SCS-N and SCS-OS were modified and became more distributed.

The implementation of the ITER safety I&C functions follows the schedule of the corresponding plant systems according to the ITER research plan. As a result, the CSS-N and CSS-OS are deployed progressively in different deliveries.

A first version of the Nuclear Safety Control System is currently under manufacturing and testing, including the backbone of the architecture and the implementation of safety controls of the first ITER systems to be commissioned. More deliveries will integrate into the existing system.

The architecture used to implement category A and B functions is hardwired and HIMA Planar 4 has been selected as logic solver; the architecture of systems implementing category C functions is computerized and based on safety PLCs Siemens S-400 FH. The SCADA is WinCC-OA.

The CSS-N design is described in [RD5] and the main requirements for the interfacing PSS-N are summarized in the Plant Control Design Handbook for Nuclear Control Systems [RD6].

The first version of the CSS-OS has recently passed its Site Acceptance Tests and is now operations. Several PSS-OS have also been delivered and integrated into the central system. The system will be completed in the following years. Moreover, the CSS-OS has been assigned the supervision of the ITER fire detection and extinction systems. This new scope is currently being implemented for the first batches of fire panels and the complete ITER site should be covered within 5 years.

The architecture is based on Siemens S7-400 FH (although some PSS-OS might use S7-1500 F) and the SCADA product selected is also WinCC-OA. The CSS-OS design is available in [RD9].

6 Work description

This summary covers the technical services to be provided to IO under the scope of this contract, which cover both the SCS-N and the SCS-OS.

The Contract is divided into five (5) lots. They are described below including indicative services and deliverables.

The tasks orders will be issued per lot.

6.1 Lot 1: System engineering services

This lot concerns mainly the technical support to the design, manufacturing and validation of the CSS-N and CSS-OS. IO may request support for that activities and to guide and review the design of the PSS-N and/or PSS-OS.

In addition, IO may request support to develop the functional specifications of nuclear and/or occupational safety I&C functions. These functional specifications define the control logic of the safety functions, the functional interface between systems and serve as input for the implementation of the control logic.

The lot includes as well other engineering support activities in areas such as cabling, HMI specification, testing or selection of hardware and software components.

Services

1. Assessment of input documentation related to the plant system design and safety analyses to extract the relevant information to prepare the functional specifications.
2. Write the functional specifications, both at overall and detailed level.
3. Production of logic diagrams.
4. Definition of functional interfaces between systems.
5. Draft Human Machine Interface (HMI) diagrams for the specification of the CSS-N and/or CSS-OS mimics using drawing tools such as Visio.
6. Participation in risk analyses.
7. Elaboration of design documentation of the CSS-N and CSS-OS.
8. Review of engineering documentation provided by CSS contractors or by other actors within the ITER project.
9. Review testing procedures and reports.
10. Support IO in the preparation of technical specifications.
11. Technical assessment of hardware and software products and elaboration of proposals for its possible use in ITER safety systems.
12. System sizing estimations based on preliminary inputs.
13. Definition of cabling interfaces, both internal to the control system and external with the filed, and preparation of cabling diagrams and termination reports using ITER tools (e.g. SEE Electrical Expert) and templates.

Deliverables

1. Overall and detailed nuclear safety functional specifications.
2. Overall and detailed occupational safety functional specification.
3. Control logic diagrams.
4. Signal and variable lists and functional interface tables.
1. HMI diagrams. Design documentation such as design description and diagrams.
2. Review reports of documentation.
3. Design description documents and presentations.
4. Technical specifications.
5. Assessment reports about hardware and software products.
5. Technical reports.
6. Cabling diagrams and termination reports.

6.2 Lot 2: Interface and structure services

IO may request support to define and maintain the interfaces of the CSS-N and/or CSS-OS. This covers the interfaces with other plant systems for the implementation of safety functions as well as those related to the infrastructure such as with power supply and cable trays systems and the physical integration in buildings. Physical separation and independence requirements shall be taken into account as well as the compliance with the environmental conditions.

Services

1. Definition of physical and functional interfaces with interfacing plant systems according to the functional specifications and process and layout constraints.
2. Keeping up-to-date project databases with CSS-N and CSS-OS equipment.
3. Maintaining physical interfaces of CSS equipment verifying consistency between 3D models and 2D drawings and resolution of clashes and other conflicts.
4. Upgrade and maintain up-to-date cabling diagrams under CSS scope.
5. Definition of cabling interfaces, both internal to the control system and external with the filed, and preparation of cabling diagrams and termination reports using ITER tools (e.g. SEE Electrical Expert) and templates.
6. Review of cabling diagrams and drawings of other systems to check compliance with defined interfaces and technical requirements.
7. Definition of interfaces with services and auxiliary systems.
8. Assessment of compliance of CSS-N and CSS-OS layout with applicable separation and routing rules and qualification envelope.
9. Support the preparation of installation documentation.

Deliverables

1. CSS-N and CSS-OS interface documents with interfacing systems. Those documents define the functional and technical interfaces with other ITER systems.
2. Update of CSS-N and CSS-OS equipment data in project databases.
3. Technical notes justifying the correct integration of CSS components.
4. Cabling diagrams and termination reports.
5. Review reports of drawings and cabling diagrams of other plant systems.
6. Interface sheets with services and auxiliary services.
7. Assessment report of compliance of CSS-N and CSS-OS layout with applicable requirements.

6.3 Lot 3: Prototypes and commissioning support services

IO may request support to realize prototypes or mock-ups of nuclear or occupational safety systems and testing tools. The support covers specification, design, manufacturing and testing.

The lot includes the preparation and execution of CSS-N and CSS-OS Site Acceptance Tests (SAT) covering these types of tests:

- Visual Inspection Test
- Energization Test
- Interface and communication test
- Application Function Test
- System Function Test

The lot includes the participation in the acceptance testing and integration of PSS-N and/or PSS-OS.

Finally, IO may request support on the overall commissioning activities of the nuclear and occupational safety functions (i.e. full loop tests with the sensors and actuators connected to the control system). This includes development of procedures and execution of commissioning tests.

Services

1. Specification, selection of hardware and software components and detailed design of prototypes, mock-ups and/or temporary subsystems.
2. Specification, design and development of testing tools to support acceptance and integration tests of ITER safety systems and components (both hardware and software).
3. Development of software for safety PLCs and SCADA for prototypes, mock-ups and/or temporary subsystems.
4. Preparation and execution of CSS test procedures. Preparation of test reports.
5. Mounting, integration and testing of prototypes, mock-ups and/or temporary subsystems.
6. Participation in the acceptance testing of PSS-N and/or PSS-OS.
7. Definition and execution of integration procedures for PSS-N and/or PSS-OS.
8. Development and execution of test procedures for the overall commissioning of ITER safety functions.
9. Technical assessment of hardware and software products and elaboration of proposals for its possible use in ITER safety systems.
10.

Deliverables

1. Specification and design documents of prototypes, mock-ups and/or temporary subsystems.
2. Software for prototypes, mock-ups and/or temporary subsystems.
3. Prototypes, mock-ups and/or temporary subsystems.
4. CSS test procedures and test reports.
5. Test reports of prototypes, mock-ups and/or temporary subsystems.
6. Reports on acceptance tests of PSS-N and/or PSS-OS.
7. Integration procedures, tests plans and reports for PSS-N and/or PSS-OS.
8. Overall commissioning tests procedures and reports.

6.4 Lot 4: Software development services

IO may request the development of standard and/or safety classified software for the CSS-N and CSS-OS. It may cover the implementation of applicative functions, development of software packages such as control libraries or other technical solutions. The software may be required to comply with standards such as IEC 61508-3 or IEC 62138. The production of associated documentation and verification and validation activities are under the scope of the lot.

IO may request the modification of already existing software.

Services

1. Development of standard and safety classified software to be deployed on the CSS-N and/or CSS-OS.
2. Development of software packages such as PLC and SCADA control libraries or other technical solutions for implementing specific functionalities for CSS-N and/or CSS-OS.
3. Planning and production of documentation associated to software lifecycle.
4. Testing of software.
5. Verification with the adequate level of independence.

Deliverables

1. Source code.
2. Software design documentation.
3. Testing procedures and reports.
4. Code of the software tools developed for testing the software.
5. Software user documentation.

6.5 Lot 5: Qualification and compliance with standards support services

ITER nuclear and occupational safety systems comply with IEC 61513 and IEC 61511/61508 respectively. The contractor may be requested to support the implementation of the applicable lifecycle; for instance, reviewing output documentation produced by others.

The Contractor may be requested to propose document templates to standardize and ease the compliance with the standards. The purpose of such templates is to adapt the requirements of the applicable standards to the characteristics of the ITER project.

The work may include the assessment of compliance with the NFC-15100 of CSS and PSS subsystems.

Moreover, IO may request support on the on-going qualification of COTS components to be used for nuclear applications for ITER. This support may consist in review of documentation produced by others, fulfilling the role of independent verifier, as well as support the formalization of the qualification (e.g. preparation of templates).

Finally, the Contractor may be requested to perform analyses, for the SCS-N or the SCS-OS, on the following topics:

- Human factors
- Common cause failure
- PFD/PFH calculations
- RAMI

Services

1. Review and assessment of output documentation of IEC 61513 lifecycle or related to other associated IEC safety standards or RCC-E.
2. Development of template documents to support demonstration of compliance with IEC 61513 lifecycles.
3. Review and assessment of output documentation of IEC 61511/61508 lifecycle.
4. Development of template documents to support demonstration of compliance with IEC 61511/61508 lifecycles.
5. Functional safety assessment according to IEC61511/61508.
6. Review and assessment of qualification reports of COTS products (hardware and software) for the SCS-N according to standards such as IEC 60987 [AS7] or IEC 62671 [AS8].
7. Review of procedures to maintain the qualification and obsolescence management
8. Execution of analyses on human factors, common cause failure or reliability on ITER safety systems.
9. Assessment of compliance with NFC-15100.

Deliverables

1. Review reports including proposals for improvement.
2. Template documents according to IEC 61513 lifecycles to be used by IO, the Domestic Agencies or their subcontractors.
3. Review reports including proposals for improvement.

4. Template documents according to IEC 61511/61508 lifecycles to be used by IO, the Domestic Agencies or their subcontractors.
5. Functional safety assessment report.
6. Review reports including proposals for improvement such as compensatory measures for possible gaps identified in the qualification report, if any.
7. Reports of the corresponding analyses including, in the case of calculations, all files and models so that the calculation can be reproduced by IO.
8. Reports on assessment of compliance with NFC-15100.

7 Required Competencies

Required competencies for each lot are listed below.

7.1 Lot 1: System engineering services

L1REQ-01 Experience in the functional specification of I&C safety functions including definition of logic diagrams.

L1REQ-02 Experience in the design, realization, integration, validation and testing of safety I&C systems.

L1REQ-03 Experience in large I&C systems involving heterogeneous plant systems.

L1REQ-04 Experience in producing and reviewing cabling and wiring diagrams for I&C systems.

L1REQ-05 Practical experience integrating I&C systems with central systems.

L1REQ-06 Knowledge of IEC 61508, IEC 61511 and IEC 61513 and associated standards.

L1REQ-07 Extensive practical experience with Siemens S7-400 (FH) PLC for safety systems. Experience with S7-1500 F is desirable although not mandatory.

L1REQ-08 Development of industrial SCADA for functional safety systems, in particular with Siemens WinCC OA), for HMI development, system, monitoring and data acquisition.

7.2 Lot 2: Interface and structure services

L2REQ-01 Experience in large I&C systems involving heterogeneous plant systems.

L2REQ-02 Experience in producing and reviewing cabling and wiring diagrams for I&C systems.

L2REQ-03 Experience with Siemens S7-400 (FH) PLC for safety systems. Experience with S7-1500 F is desirable although not mandatory.

L2REQ-04 Knowledge about physical separation and independence requirements defined by IEC 61513 and associated standards.

L2REQ-05 Experience in physical integration of I&C systems by using configuration management model tools (e.g. CATIA, See System Design) and in management of engineering databases for I&C systems.

7.3 Lot 3: Prototypes and early systems development services

L3REQ-01 Experience in the functional specification of I&C safety functions including definition of logic diagrams.

L3REQ-02 Experience in the design, realization, integration, validation and testing of safety I&C systems.

L3REQ-03 Experience in large I&C systems involving heterogeneous plant systems.

L3REQ-04 Practical experience in design, development and testing of prototypes and use of testing tools.

L3REQ-05 Experience in producing and reviewing cabling and wiring diagrams for I&C systems.

L3REQ-06 Practical experience integrating I&C systems with central systems.

L3REQ-07 Knowledge of IEC 61508, IEC 61511 and IEC 61513 and associated standards.

L3REQ-08 Extensive practical experience with Siemens S7-400 (FH) PLC for safety systems. Experience with S7-1500 F is desirable although not mandatory.

L3REQ-09 Development of industrial SCADA for functional safety systems, in particular with Siemens WinCC OA), for HMI development, system, monitoring and data acquisition.

L3REQ-10 Software development under Linux operating system (Python, C/C++), and IT administration of Linux environments.

7.4 Lot 4: Software development services

L4REQ-01 Experience in the design, realization, integration, validation and testing of safety I&C systems.

L4REQ-02 Practical experience in design, development and testing of prototypes and use of testing tools.

L4REQ-03 Practical experience integrating I&C systems with central systems.

L4REQ-04 Knowledge of IEC 61508, IEC 61511 and IEC 61513 and associated standards.

L4REQ-05 Extensive practical experience with Siemens S7-400 (FH) PLC for safety systems. Experience with S7-1500 F is desirable although not mandatory.

L4REQ-06 Development of industrial SCADA for functional safety systems, in particular with Siemens WinCC OA, for HMI development, system, monitoring and data acquisition.

L4REQ-07 Experience developing software following IEC 62138 and/or IEC 61508-3.

L4REQ-08 Software development under Linux operating system (Python, C/C++), and IT administration of Linux environments.

7.5 Lot 5: Qualification and compliance with standards support services

L5REQ-01 Knowledge in the application of IEC 61513 standard, associated nuclear safety I&C IEC standards and RCC-E.

L5REQ-02 Practical experience in COTS product prequalification in accordance with nuclear I&C standards used in France.

L5REQ-03 Proven experience in COTS product environmental qualification (EMC, static magnetic fields, ageing, seismic) in accordance with nuclear I&C standards used in France.

L5REQ-04 Design, manufacturing, validation and commissioning of nuclear Instrumentation and Control (I&C) Systems, and with nuclear I&C qualification processes.

L5REQ-05 Experience in PFD/PFH/RAMI analysis.

L5REQ-06 Use of tools for requirements management (e.g. DOORS).

L5REQ-07 Design, manufacturing, validation and commissioning of safety instrumented systems compliant with IEC 61508 or IEC 61511.

L5REQ-08 Certification of compliance with IEC 61508 or 61511 of safety instrumented systems.

L5REQ-09 Experience with Siemens S7 safety PLCs. Experience with HIMA Planar 4 and WinCC-OA is desirable although not mandatory.

L5REQ-10 Experience evaluating the compliance of low voltage systems with NFC-1500.

8 Estimated Duration

The duration of services under this Contract will be four (4) years fixed plus two (2) year optional.

9 Responsibilities

9.1 Contractor's Responsibilities

The work will be performed according to deliverables defined in Task Orders.

In order to successfully perform the tasks in these Technical Specifications, the Contractor shall:

- Nominate a Contractor Contract Manager to be responsible for the execution of the Contract and its follow-up including contacts, meetings and progress reports throughout the duration of the Contract.
- Strictly implement the IO procedures, instructions and use templates.
- Provide experienced and trained resources to perform the tasks.
- Contractor's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures. Related valid certificates shall be provided prior starting activities.

- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security IO rules.

9.2 IO's Responsibilities

The IO shall:

- Nominate a Responsible Officer (IO-RO) to manage the Contract.
- Provide office desks at IO premises during on-site work.
- Make available procedures, information, data and any specialized equipment necessary for the Contractor to perform its functions under the scope of work.
- Provide IT equipment and access to IO network for Task Orders with a duration on IO-site longer than 6 months.

Any IT IO account creation is to be requested by IO-RO. The account duration should be limited to the required usage of the account (e.g. contract duration).

10 Acceptance Criteria

The following criteria shall be the basis of the acceptance of the successful accomplishment of the work.

Reports and design documentation as deliverables shall be stored in the IO's document management system, IDM by the Contractor for acceptance. A named IO's Contract Technical Responsible Officer is the Approver of the delivered documents. The Approver can name one or more Reviewers(s) in the area of the report's expertise. The Reviewer(s) can ask modifications to the report in which case the Contractor must submit a new version. The approval of the document by the delivery due date as set in the Task Order is a required acceptance criterion.

11 Specific Requirements and Conditions

The document General Management Specification for Service and Supply [RD1] shall be applied.

The work will be performed partially at the IO premises and at the Contractor premises. In addition, the Contractor team working on-site may request the support from other Contractor's experts off-site.

The Contractor is responsible to provide the necessary tools for administrative work for all staffs working at their premises or IO site.

The Contractor shall have and maintain the necessary equipment and licenses to run the software tools required to carry out the engineering analyses and produce the deliverables in accordance with the tools adopted by the IO. IO will grant access for the Contractor staff to IDM when appropriate.

To facilitate good communication, the Contractor shall have access to screen sharing tools, e.g. Teams clients, and the necessary equipment compatible with IO facilities.

All results obtained in the frame of the work described in this document shall be made property of the ITER Organization and can be partially or fully used for further work.

12 Contract Execution & Organisation

12.1 Work Monitoring / Meeting Schedule

As a general statement, the details of the services to be provided by the Contractor will be defined in the task order technical specification documents.

12.1.1 Contract Meetings

For the purposes of this contract, the following meetings are defined:

12.1.1.1 Kick-Off Meeting

The IO shall organize a Kick-Off Meeting (KoM) within two weeks after the contract signature. The KoM may take place in IO premises or remotely by video-conference if required by the IO. The following topics will be presented:

- General context of the contract;
- Main activities and deliverables to be produced by the Contractor.

The minutes shall be prepared by the Contractor.

12.1.1.2 Monthly Meetings

The Contractor shall organise monthly meetings in IO premises or remotely by video-conference if required by the IO for:

- General contract progress;
- Summary of the work carried out and the resources used;
- Identification of any issues in the contractual process; and
- Planning of Contractor's resources for the following months.

The Contractor Contract Manager shall participate in the monthly meetings. The minutes of these meetings shall be written by the Contractor in the simplified form of a table of action items and archived in ITER Document Management system (IDM).

12.1.1.3 Ad hoc Meetings

To be scheduled at the discretion of the IO-RO or the Contractor depending on need. The minutes of these meetings shall be written by the Contractor in the simplified form of a table of action items and archived in IDM.

12.1.2 Progress Reports

The Contractor shall submit written progress reports to the IO Responsible Officer every month. The progress report shall be in .doc(x) format and include at least the following information for the reporting period:

- Summary of the work carried out for all on-going Task Orders;
- Description of any problems encountered for all on-going Task Orders;
- References to any produced deliverables for all on-going Task Orders;
- Status and schedule of all on-going Task Orders.

Progress reports shall be submitted three working days before regular meetings and discussed there. The submission of these reports shall be performed using IDM. The progress report shall be approved by the IO-RO.

12.2 Payment Schedule

The Contractor shall supply invoices to IO at completion of a Task Order or at specified payment milestones within a Task Order. The Contractor shall send the invoices only after the corresponding deliverables have been approved by the IO-RO.

13 Quality Assurance (QA) Requirements

The organisation conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system.

The general requirements are detailed in ITER Procurement Quality Requirements (ITER_D_22MFG4).

Prior to commencement of the task, a Quality Plan must be submitted for IO approval giving evidence of the above and describing the organisation for this task; the skill of workers involved in the study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities (see Procurement Requirements for Producing a Quality Plan (ITER_D_22MFMW)).

Documentation developed as the result of this task shall be retained by the performer of the task or the DA organization for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with Quality Assurance for ITER Safety Codes (ITER_D_258LKL).

14 CAD Design Requirements (if applicable)

For the contracts where CAD design tasks are involved, the following shall apply:

The Supplier shall provide a Design Plan to be approved by the IO. Such plan shall identify all design activities and design deliverables to be provided by the Contractor as part of the contract.

The Supplier shall ensure that all designs, CAD data and drawings delivered to IO comply with the Procedure for the Usage of the ITER CAD Manual (2F6FTX), and with the Procedure for the Management of CAD Work & CAD Data (Models and Drawings 2DWU2M).

The reference scheme is for the Supplier to work in a fully synchronous manner on the ITER CAD platform (see detailed information about synchronous collaboration in the ITER GNJX6A - Specification for CAD data production in ITER Contracts.). This implies the usage of the CAD software versions as indicated in CAD Manual 07 - CAD Fact Sheet (249WUL) and the connection to one of the ITER project CAD data-bases. Any deviation against this requirement shall be defined in a Design Collaboration Implementation Form (DCIF) prepared and approved by DO and included in the call-for-tender package. Any cost or labour resulting from a deviation or non-conformance of the Supplier with regards to the CAD collaboration requirement shall be incurred by the Supplier.

15 Safety Requirements

ITER is a Nuclear Facility identified in France by the number-INB-174 (“Installation Nucléaire de Base”).

In application of the Article 14 of the ITER Agreement, for nuclear safety, the French Nuclear Regulation must be observed. The contractor must implement necessary provisions for the application of the Order 7th February 2012.

In such case the Suppliers and Subcontractors must be informed that:

- The compliance with the defined requirements for Protection Important Components (PIC) and Protection Important Activities (PIA) has to be demonstrated, see [RD2] and [RD8].
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- The contractor must comply with all the requirements expressed in [RD4].

For each requirement, the contractor must explain in its quality system the dispositions taken to implement requirements stipulated in [RD4].

Activities of this contract may be considered PIA. Each task order will specify which activities are to be considered PIA.