

## Technical Specifications (In-Cash Procurement)

# Technical Summary\_Diagnostic Electrical Services Implementation

The ITER Organization needs specialist engineering expertise in order to successfully implement this key system, ensuring the final design, manufacturing, testing and installation activities are completed on time and to high levels of quality. A framework contract will be awarded with Task Orders covering the different foreseen tasks of the project.



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**TECHNICAL SUMMARY**  
**Call For Nomination**  
**IO/21/CFT/70000667/LLU**  
**Framework Contract**  
**Diagnostic Electrical Services Implementation**

## 1 Scope

The Diagnostic Electrical Services provide signal and power transmission lines to link vital diagnostic sensors and instrumentation in the ITER Vacuum Vessel with their associated electronics and power supplies in the surrounding buildings.

This contract focusses on the following parts of the overall Electrical Services:

- In-Vessel Electrical Services (55.NE.V0)
- In-Divertor Electrical Services (55.NE.D0)
- In-Vessel Electrical Feedthroughs (55.NE.V0-EFT)
- In-Cryostat Electrical Feedthroughs (55.NE.C0)

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A framework contract will be awarded with Task Orders covering the different foreseen tasks of the project.

## 2 Estimated Duration

The IO plans to award a Service Contract before the end of 2021. The estimated contract duration is 4 years with an option of extending for another 2 years.

## 3 Tentative Schedule of this Call for Tender

The indicative Call for Tender milestones are:

Call for Nomination	Mid of February 2021
Issuing of Prequalification invitations	End of March 2021
Issuing of Call for Tender	Beginning of June 2021
Submission of Tenders	End of August 2021
Award of Contract	Mid of October 2021

## 4 Work Description

The selected contractor will be required to work on a range of tasks, including:

- Integration – ensuring 3D CAD models, 2D diagrams and interfacing documents are updated and consistent;
- Review of design documents produced by Third Parties;

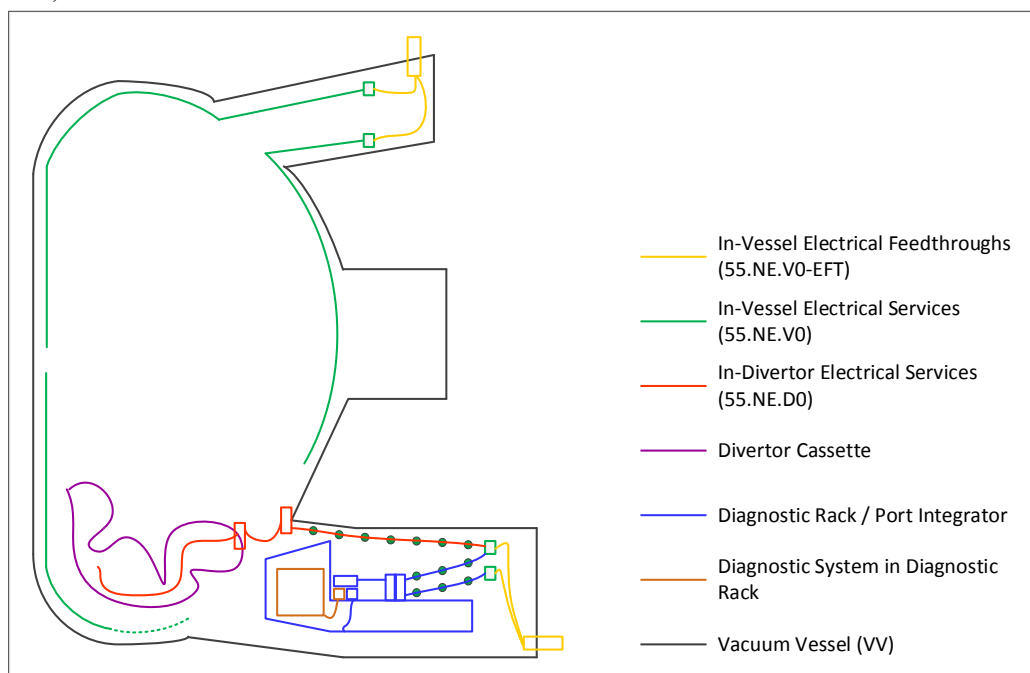
- Technical checking and independent verification of calculations produced by Third Parties;
- Production of detailed design documents, 3D CAD models, 2D diagrams and 2D drawings;
- Attendance at Design Review meetings and associated follow-up meetings;
- Manufacturing Preparation and Follow-Up;
- Review manufacturing documentation (e.g. MIPs, manufacturing specifications, factory testing reports);
- Perform site visits to suppliers;
- Organise, perform and thoroughly document Site Acceptance Tests;
- Develop and write installation procedures;
- Review installation procedures produced by Third Parties;
- Manufacture and test prototypes and tooling to support the development of installation procedures and qualification;
- Provide oversight and follow-up of on-site installation resources;
- Project management – scheduling, reporting of work, tracking of Deviation Requests and Non-Conformities;
- Requirements management and verification.

ITER may require the contractor to perform the work either at remote locations such as the contractor's usual place of business, or at the ITER site, or at a location to be established and maintained by the contractor within easy reach of the ITER site.

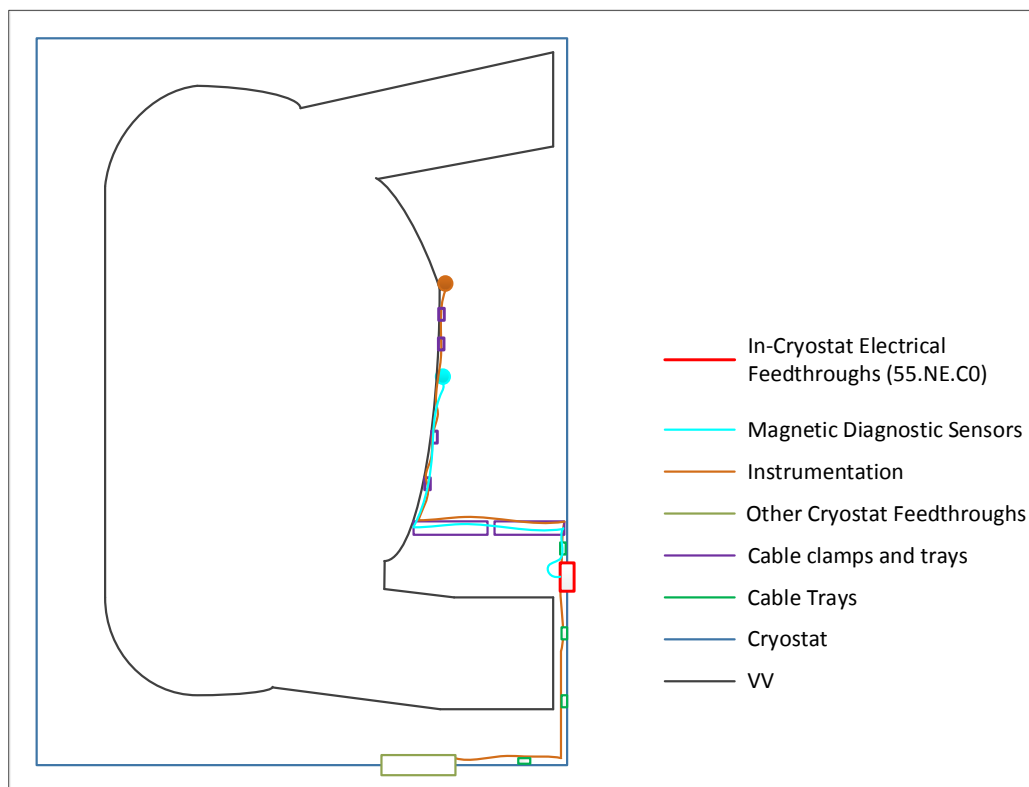
#### 4.1 Description of the system

The Diagnostic Electrical Services provide signal and power transmission lines to link vital diagnostic sensors and instrumentation in the ITER Vacuum Vessel with their associated electronics and power supplies in the surrounding buildings.

This framework contract focusses on parts of the Diagnostic Electrical Services close to the ITER Vacuum Vessel, attached to its inner and outer surfaces (55.NE.V0, 55.NE.V0-EFT and 55.NE.C0) or attached to major machine components housed inside the Vacuum Vessel (55.NE.D0).



**Figure 1** Schematic showing 55.NE.V0, 55.NE.V0-EFT and 55.NE.D0, and surrounding key systems



**Figure 2** Schematic showing 55.NE.C0, and surrounding key systems

The 55.NE.V0-EFT Electrical Feedthroughs form part of the boundary between the Ultra High Vacuum (UHV) in-vessel environment and the surrounding nuclear buildings. They are Protection Important Components (PIC), with the highest Safety Important Classification (SIC-1). These components are in the Final Design phase, with the design work being performed by one of ITER's Domestic Agencies.

The 55.NE.D0 In-Divertor Electrical Services provide part of the signal chain between diagnostics mounted on the Divertor Cassettes (e.g. thermocouples, magnetic pick-up coils, etc.) and the Electrical Feedthroughs described above. The components include cables, clamps and junction boxes on the cassettes and complex plug and socket sockets, removed by remote handling robotic tools. These components are in the Preliminary Design phase, with the design work being performed by one of ITER's Domestic Agencies.

The 55.NE.V0 In-Vessel Electrical Services provide part of the signal chain between diagnostics mounted on the Vacuum Vessel walls (e.g. thermocouples, magnetic pick-up coils, etc.) and the Electrical Feedthroughs described above. The components include cables, clamps and connection boxes for a variety of cable types and diameters.

The cabling and associated hardware (in-vessel clips, clamps and junction boxes) are in manufacturing, through contracts managed by one of ITER's Domestic Agencies. The remaining components (Lower Port and marshalling area clamps and in-port connectors) are in the Final Design Phase. Preparation of manufacturing specifications is underway, ready for subsequent tendering and contract placement by the ITER Organization.

The 55.NE.C0 In-Cryostat Electrical Feedthroughs provide part of the signal chain between diagnostics mounted on the outside of the Vacuum Vessel (magnetic pick-up coils) and the cabling inside the surrounding buildings. These components are in the Preliminary Design phase, with the design work being performed by the ITER Organization.

## 4.2 Details of expected output

The purpose of this framework contract is to provide specialist engineering expertise in order to successfully implement this key system, ensuring the final design, manufacturing, testing and installation activities are completed on time and to high levels of quality.

In more detail for the different areas (note that these are indicative activities and not intended to cover all of the activities to be performed):

### **In-Vessel Electrical Services (55.NE.V0)**

- Finalisation of design documents, technical specifications, 3D CAD models and 2D drawings in order to launch the manufacturing tender (the manufacturing contract itself is outside the scope of this framework contract).
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

### **In-Divertor Electrical Services (55.NE.D0)**

- Review of design documents produced by Third Parties.
- Technical checking and independent verification of calculations produced by Third Parties.
- Attendance at Design Review meetings and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

### **In-Vessel Electrical Feedthroughs (55.NE.V0-EFT)**

- Review of design documents produced by Third Parties.
- Technical checking and independent verification of calculations produced by Third Parties.
- Attendance at Design Review meetings and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

### **In-Cryostat Electrical Feedthroughs (55.NE.C0)**

- Finalisation of design documents, technical specifications, 3D CAD models and 2D drawings in order to launch the manufacturing tender.
- Attendance and presentation at Design Review meetings and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.

- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

## 5 Specific requirements and conditions

The tenderer shall demonstrate their knowledge, experience and capabilities in the implementation of providing the service for “Diagnostic Electrical Services Implementation” in accordance with the IO technical requirements, including:

- Experience in complex mechanical design for nuclear, fusion or particle accelerator industry
- Experience in mechanical, thermal and EM load analyses
- Experience in specification, performance and technical follow-up of CAD activities, and integration in complex environments using 3D models
- Experience in vacuum design requirements and associated testing (e.g. helium leak testing)
- Experience in manufacturing specification and follow up for complex, high precision components
- Experience in specification and subsequent oversight of installation activities

The working language of ITER is English, and a fluent professional level is required (spoken and written).

## 6 Safety requirements

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

For Protection Important Components and in particular Safety Important Class components (SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

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

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision and surveillance done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Supplier and Subcontractor following the requirements of the Order 7th February 2012.

**NOTE:** There are no Protection Important Activities (PIAs) within the scope of this work but there is monitoring/oversight of Third Parties performing PIAs related to the 55.NE.V0-EFT Feedthroughs.

## **7 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.

## **8 Reference**

Further information on the ITER Organization procurement can be found at:

<http://www.iter.org/org/team/adm/proc>