

Summary: Concept Design - Fast Deployment Device for ITER

1 Introduction

ITER will be the largest and most complex vacuum system yet to be built. Situated in Southern France, adjacent to the French CEA Cadarache site, the ITER facility covers approximately 190 hectares and is designed to study the fusion reaction between the hydrogen isotopes tritium and deuterium.

It is expected that water leaks from the Tokamak Cooling Water System (TCWS) Primary Heat Transfer Systems (PHTS) into the main vacuum vessel (VV) and helium leaks into the cryostat from the thermal shield and magnet systems will result in a reduction of the availability of the ITER machine and hence method(s) of leak localisation and repair must be developed to minimise machine down time caused by leaks,

Due to the complexity of the machine, and the progression to an active environment, traditional methods of leak localisation may not be applicable to ITER. Personnel access to facilitate in-situ leak testing will be at best limited and during the active phase of the project severely restricted. Hence a challenge for ITER is to develop methods of leak localisation capable of operation in the ITER environment, with a minimum of human intervention and loss of machine availability, capable of sub-centimeter spatial resolution.

2 Scope

Under the scope of the contract the Contractor shall perform studies into the integration of a fast deployment device to be utilised in the ITER main vessel and cryostat for leak localisation.

On the basis of such studies the Contractor shall develop a concept design of remotely operated fast deployment device capable of operation in the ITER main vacuum and cryostat. In addition, the Contractor shall define the steps required to bring the concept to an ITER relevant demonstration.

2.1 Planned Approach

The following envisaged plan describes how the contract will be performed:

2.1.1 Feasibility Study, Collection of Information & Preliminary Analysis

The Contractor shall perform analysis of the current ITER design in order to assess the feasibility of installing a fast deployment device for leak localisation in the main vacuum vessel and cryostat. The Contractor shall consider the use of the ITER cask system for deployment of the device into the VV. The Contractor shall propose methods of deployment of the system into the cryostat and study the feasibility of permanent installation of the device(s) in the VV and cryostat.

2.1.2 Preliminary Design, Integration & Operational Studies

The Contractor shall develop a conceptual design of fast deployment device for integration with the ITER systems. The conceptual design shall be described through the preparation of 3D models and supporting documentation.

The conceptual design shall extend to integration and operational studies.

Using digital simulations the Contractor shall assess the accessibility and deployment scenarios of the concept device and propose design features to be incorporated into the ITER design to realise the concept.

2.1.3 Plan to ITER Demonstration

The Contractor shall define the required actions to bring the concept design developed as part of this contract to an ITER like demonstration.

The Contractor shall define a supporting plan of R&D and prepare estimates of the resources required to execute the plan. The duration of the R&D plan shall be limited to 2 calendar years.

3 Schedule

The tentative timetable of activities is as follows:

Action	Tentative date(s)
Call for Pre-qualification	10 June 2010
Call for tender	30 July 2010
Tender submission	End September 2010
Contract Award	October 2010
Start of contract	November 2010
End of contract	November 2011

4 Experience

The potential tenderers should have proven experience in the following areas:

- 1) The Contractor and its personnel shall have adequate experience in the development of remotely operated robotic devices.
- 2) Contractor's access to experimental facilities for the demonstration of concepts is considered to be advantageous.

5 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 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 partners) shall be jointly and severally liable to the ITER Organization.

The consortium groupings shall be presented at the pre-qualification stage. The consortium cannot be modified later without a written approval of the ITER Organization.