#### 外部委託業者の募集

References: IO/25/OT/70001248/ERA **"Engineering Services for Maintainability Analysis"** (保全性解析のエンジニアリングサービス) IO 締め切り 2025 年 3 月 24 日(月)

#### ○はじめに

本事前情報通知 (PIN) は、作業契約の入札授与および実行につながる公開入札調達プロセスの最初のステップです。

本文書の目的は作業範囲と入札プロセスに関する技術的な内容の基本的な要約を提供することです。

#### 〇背景

ITER は平和利用の核融合発電の科学的および技術的な実現可能性の実証を目的とした、国際共同研究開発プロジェクトです。ITER 機構の7つのメンバーは、;欧州連合(EURATOM が代表)、日本、中華人民共和国、インド、大韓民国、ロシア連邦、および米国です。

ITER の敷地はフランス南東部のブーシュデュローヌ地区にあり、ITER 本社(HQ) もあるフランス CEA サン・ポール・レ・デュランス に近いところに位置しています。詳細については、ITER のウ ェブサイト http://www.iter.org を参照して下さい。

#### 〇作業範囲

現在の入札プロセスは、ITER GBS(地理的区分構造)レベルでの保全性解析を実施し、保全性作業を支援 するためのエンジニアリングサービスを提供するサービス契約の締結を目的としています。

ITERシステムの機器の保全性は、特に複雑で混雑したITER建屋内の場所で評価する必要があり、保全性作業を通じて実施されます。作業場へのアクセスや作業ステーションの人間工学に関しては、統合レビューの際に検証され、問題が特定され、解決策が定義され、改善の機会がITERシステム設計の反復に組み込まれることが求められます。

ITER建屋のさまざまなエリアに配置された機器へのアクセス、特に「単一障害点(SPV)」および「重要な 機器(CC)」として特定されたものについては、必要な保守作業(修正および予防保守)を実施できるよう に確保する必要があります。その一方で、作業ステーションの人間工学が尊重され、保守作業を支援するた めの一時的または恒久的な対策(例:プラットフォーム、リフティング&ハンドリング設備)が定義される 必要があります。

さらに、作業に必要な時間および個人防護具(PPE)の要件は、特に過酷な環境を持つ建屋エリアでの職業 放射線被曝(ORE)に影響を与えるため、ITER施設のORE限界の検証を支援するために考慮する必要があ ります。

保全性解析は、ITERの設計統合レビュー(DIR)を支援するために、主にITER GBSの特定の部屋または全体的なITER GBSに焦点を当て、3D ENOVIAモデルで定義された建屋環境を使用して、建設前に実施され

ることが期待されています。

作業範囲は2つの部分に分かれています:

- 確定部分:
  - > 年1の作業
- オプション部分:
  - ▶ 年2の作業
  - ▶ 年3の作業
  - ▶ 年4の作業

このフレームワークサービス契約に記載されたサービスは、必要な品質レベルで各作業を実行するために、 オンサイトまたはオフサイトにてフルタイムで実施されます。

○調達プロセスと目的

目的は、競争入札プロセスを通じて供給契約を落札することです。 この入札のために選択された調達手続きは<u>公開入札</u>手続きと呼ばれます。 オープン入札手順は、次の4つの主要なステップで構成されています。

ステップ1-事前情報通知 (PIN) 事前情報通知は公開入札プロセスの第一段階です。IOは、関心のある候補企業に対し、以下の概略日程に示された期日までに担当調達担当官に添付の関心表明フォームで以下の情報を 提出し、競争プロセスへの関心を示すよう正式に要請します。

特に注意:

<u>関心のある候補企業は、IO Ariba の電子調達ツール 「IPROC」 に登録してください(ま だ登録していない場合)。手順については、</u>

<u>https://www.iter.org/fr/proc/overview</u> を参照してください。

Ariba (IPROC) に登録する際には、お取引先様に最低1名の担当者の登録をお願いしま す。この連絡担当者は、提案依頼書の発行通知を受け取り、必要と思われる場合は入札書類 を同僚に転送することができます。

▶ <u>ステップ 2-入札への招待</u>

PIN の発行から 10 作業日経過後、提案依頼書(RFP)を 「IPROC」 に掲載します。この 段階では、担当の調達担当者に関心を示し、かつ IPROC に登録している関心のある候補企 業は、RFP が公表された旨の通知を受けることができます。その後、RFP に詳述されてい る入札説明書に従って提案書を作成し、提出します。

#### このツールに登録されている企業のみが入札に招待されます。

▶ ステップ 3-入札評価プロセス

入札者の提案は、IOの公平な評価委員会によって評価されます。入札者は、技術的範囲に沿って、かつ、RFPに記載された特定の基準に従って作業を実施するために、技術的遵守を証明する詳細を提供しなければなりません。

▶ ステップ 4-落札

認定は、公開されている RFP に記載されている、コストに見合った最適な価格または技術 的に準拠した最低価格に基づいて行われます。

#### ○概略日程

概略日程は以下の通りです:

マイルストーン	暫定日程
事前指示書 (PIN) の発行	2025年3月10日
関心表明フォームの提出	2025年3月24日
iPROC での入札への招待 (ITT) の発行	2025年3月28日
明確化のための質問(もしあれば)の回答締め切り	2025年4月30日
入札提出	2025年5月16日
契約評価と授与	2024年6月
契約調印	2024年7月

#### ○契約期間と実行

ITER機構は2025年の6月ごろ供給契約を授与する予定です。予想される契約期間は12か月の固定期間に加えて、3つのオプション期間が適用されれば、さらに36か月。

#### ○経験

入札者は、付属書 I に詳細に示されている様に、その知識と関連産業分野における経験と能力がある ことを示す必要があります。

ITER での使用言語は英語で、流暢でプロレベルが必要です(ロ頭、書面とも)。

#### ○候補

参加は、個人またはグループ/コンソーシアムに参加するすべての法人に開放されます。法人とは、法 的権利及び義務を有し、ITER 加盟国内に設立された個人、企業又は機構をいいます。ITER 加盟国 は欧州連合(EURATOM メンバー)、日本、中華人民共和国、インド共和国、大韓民国、ロシア連邦、 アメリカ合衆国です。

法人は、単独で、またはコンソーシアムパートナーとして、同じ契約の複数の申請または入札に参加 することはできません。共同事業体は、恒久的な、法的に確立されたグループ又は特定の入札手続の ために非公式に構成されたグループとすることができます。

コンソーシアムのすべての構成員(すなわち、リーダーと他のすべてのメンバー)は、ITER 機構に対し て連帯して責任を負います。

コンソーシアムとして許可されるために、その点で含まれる法人はコンソーシアムの各メンバーをま とめる権限をもつリーダーをもたなければなりません。このリーダーはコンソーシアムの各目メンバ ーのために責任を負わなければなりません。

指名されたコンソーシアムのリーダーは、入札段階で、コンソーシアムのメンバーの構成を説明する 予定です。その後、候補者の構成は、いかなる変更も ITER 機構に通知することなく変更してはなり ません。かかる認可の証拠は、すべてのコンソーシアムメンバーの法的に授権された署名者が署名し た委任状の形式で、しかるべき時期に IO に提出しなければなりません。

どのコンソーシアムメンバーも IPROC に登録する必要があります。

既に技術仕様書 ref 番号 ITER\_D\_9GUSMN に記載の絶対バルブに関するフィージビリティを実施している全ての法人は本オープン入札プロセスに参加する資格はございません。

【※ 詳しくは添付の英語版技術仕様書「Technical Specification for Framework Contract in Engineering Services for Maintainability Analyses」をご参照ください。】 ITER 公式ウェブ <u>http://www.iter.org/org/team/adm/proc/overview</u>からもアクセスが可能です。

「核融合エネルギー研究開発部門」の HP: http://www.fusion.qst.go.jp/ITER/index.html では ITER 機構からの各募集(IO 職員募集、IO 外部委託、IO エキスパート募集)を逐次更新してい ます。ぜひご確認ください。

#### イーター国際核融合エネルギー機構からの外部委託 に関心ある企業及び研究機関の募集について

<ITER 機構から参加極へのレター>

以下に、外部委託の概要と要求事項が示されています。参加極には、提案された業務 に要求される能力を有し、入札すべきと考える企業及び研究機関の連絡先の情報を ITER 機構へ伝えることが求められています。このため、本研究・業務に関心を持たれる企業及 び研究機関におかれましては、応募書類の提出要領にしたがって連絡先情報をご提出下 さい。



# **PRIOR INDICATIVE NOTICE (PIN)**

# OPEN TENDER SUMMARY

## IO/25/OT/70001248/ERA

For

# **Engineering Services for Maintainability Analysis**

#### <u>Abstract</u>

The purpose of this summary is to provide prior notification of the IO's intention to launch a competitive Open Tender process in the coming weeks. This summary provides some basic information about the ITER Organisation, the technical scope for this tender, and details of the tender process for the procurement of the engineering services to perform maintainability analyses at ITER GBS levels to support the Maintainability activity.

## **1** Introduction

This Prior Indicative Notice (PIN) is the first step of an Open Tender (OT) Procurement Process leading to the award and execution of a Framework Service Contract.

The purpose of this document is to provide a basic summary of the technical content in terms of the scope of work, and the tendering process.

## 2 Background

The ITER project is an international research and development project jointly funded by its seven Members being, 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 St. Paul–Lez-Durance in southern France, which is also the location of the headquarters (HQ) of the ITER Organization (IO).

For a complete description of the ITER Project, covering both organizational and technical aspects of the Project, visit <u>www.iter.org</u>.

## 3 Scope of Work

The present tender process is aiming to set up a Service Contract for the provision of engineering services to perform maintainability analyses at ITER GBS levels to support the Maintainability activity.

The **maintainability of ITER systems components** needs to be assessed, in particular in complex and congested ITER building's locations and will be implemented through the Maintainability activity. The maintainability, in terms of workplace accessibility and workstation ergonomics, must be verified at the occasion of the integration reviews to ensure that issues are identified and resolution actions defined, and that opportunities for improvement are incorporated, within the ITER systems design iterations.

Accessibility to components located in the different ITER building areas, in particular those that are identified as Single Points of Vulnerability (SPV) and Critical Components (CC) must be ensured to perform the required maintenance tasks (corrective and preventive), while at the same time, workstation ergonomics are respected, and temporary, or permanent, provisions are defined to support the maintenance tasks (e.g., platforms, lifting & handling equipment).

In addition, the time and PPE requirements to perform the tasks will have an impact on the **Occupational Radiation Exposure** (ORE), in particular in building areas with a hostile environment, and need to be taken into consideration to support the verification of ORE limits for the ITER facility.

The maintainability analyses are expected to be performed by ITER Geographical Breakdown Structure (GBS), focusing on specific rooms of each ITER GBS or on the overall ITER GBS, to support Design Integration Reviews (DIR) prior to Construction, using the building environment as defined in 3D ENOVIA models.

The scope of work is split into two parts:

- Firm part:
  - ➢ Year 1 activity.

#### • Optional part:

- ➢ Year 2 activity.
- ➢ Year 3 activity.
- > Year 4 activity.

The services described in this Framework Service Contract shall be performed full time, on-site or offsite as best required to execute each activity with the required level of quality.

## 4 **Procurement Process & Objective**

The objective is to award a Framework Service Contract through a competitive bidding process.

The Procurement Procedure selected for this tender is called the **Open Tender** procedure.

The Open Tender procedure is comprised of the following four main steps:

Step 1- Prior Information Notice (PIN)

The Prior Information Notice is the first stage of the Open Tender process. The IO formally invites interested Suppliers to indicate their interest in the competitive process by returning to the Procurement officer in charge the attached "Expression of Interest and PIN Acknowledgement" by the date indicated under the procurement timetable.

#### Special attention:

Interested tenderers are kindly requested to register in the IO Ariba e-procurement tool called "IPROC". You can find all links to proceed along with instruction going to: <u>https://www.iter.org/fr/proc/overview.</u>

When registering in Ariba (IPROC), suppliers are kindly requested to nominate at least one contact person. This contact person will be receiving the notification of publication of the Request for Proposal and will then be able to forward the tender documents to colleagues if deemed necessary.

Step 2 - Invitation to Tender

After at least 15 working days of the publication of the PIN, normally the Request for Proposals (RFP) will be published on our digital tool "Iproc". This stage allows interested bidders who have indicated their interest to the Procurement Officer in charge AND who have registered in IPROC to receive the notification that the RFP is published. They will then prepare and submit their proposals in accordance with the tender instructions detailed in the RFP.

#### Only companies registered in this tool will be invited to the tender.

➢ Step 3 − Tender Evaluation Process

Tenderers proposals will be evaluated by an impartial evaluation committee of the IO. Tenderers must provide details demonstrating their technical compliance to perform the work in line with the technical scope and in accordance with the particular criteria listed in the RFP.

➢ Step 4 − Contract Award

A Service contract will be awarded on the basis of the Best Value For Money methodology according to the evaluation criteria and methodology described in the RFP.

#### **Procurement Timetable**

The tentative timetable is as follows:

Milestone	Date
Publication of the Prior Indicative Notice (PIN)	10 <sup>th</sup> March 2025
Submission of expression of interest form	24 <sup>th</sup> March 2025
Invitation to Tender (ITT) advertisement	28 <sup>th</sup> March 2025
Clarification Questions (if any) and Answers	30 <sup>th</sup> April 2025
Tender Submission	16 <sup>th</sup> May 2025
Tender Evaluation & Contract Award	June 2025
Contract Signature	July 2025

## 5 Quality Assurance Requirements

Prior to commencement of any work under this Contract, a "Quality Plan" shall be produced by the Supplier and submitted to the IO for approval, describing how they will implement the ITER Procurement Quality Requirements.

## 6 Contract Duration and Execution

The ITER Organization shall award the Service Contract around June 2025. The estimated contract duration shall be 12 months firm + 36 additional months if the 3 options of one year each are released.

## 7 Experience

The tenderer shall demonstrate their technical and industrial experience related to the scope of work as detailed in Annex I.

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

#### 8 Candidature

Participation is open to all legal entities participating either individually or in a grouping/consortium. A legal entity is an individual, company, or organization that has legal rights and obligations and is established within an ITER Member State, being, the European Union (represented by EURATOM), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA.

Legal entities cannot participate individually or as a consortium partner in more than one application or tender of the same contract. 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.

In order for a consortium to be acceptable, the individual legal entities included therein shall have nominated a consortium leader with authority to bind each member of the consortium, and this leader shall be authorised to incur liabilities and receive instructions for and on behalf of each member of the consortium.

It is expected that the designated consortium leader will explain the composition of the consortium members in its offer. Following this, the Candidate's composition must not be modified without notifying the ITER Organization of any change. Evidence of any such authorisation to represent and bind each consortium member shall be submitted to the IO in due course in the form of a power of attorney signed by legally authorised signatories of all the consortium members.

Any consortium member shall be registered in IPROC.

## 9 Sub-contracting Rules

All sub-contractors who will be taken on by the Contractor shall be declared together with the tender submission. Each sub-contractor will be required to complete and sign forms including technical and administrative information which shall be submitted to the IO by the tenderer as part of its tender. The IO reserves the right to approve any sub-contractor which was not notified in the tender and request a copy of the sub-contracting agreement between the tenderer and its sub-contractor(s).

Sub-contracting is allowed but it is limited to one level and its cumulated volume is limited to 30% of the total Contract value.

# EXPRESSION OF INTEREST & PIN ACKNOWLEDGEMENT

To be returned by e-mail to: <u>Emilio.Rondinella@iter.org</u> copy <u>Kristel.Jeanmart@iter.org</u>

TENDER No.	IO/25/OT/70001248/ERA
DESIGNATION of SERVICES:	Engineering Services for Maintainability Analysis
OFFICER IN CHARGE:	Emilio Rondinella – Procurement Division ITER Organization

Signature:	COMPANY STAMP
Name:	
Position:	
Company:	
Tel:	
E-mail	
Date:	



IDM UID 9LFVEN

version created on / version / status 23 Jan 2025 / 1.4 / Approved

EXTERNAL REFERENCE / VERSION

#### **Technical Specifications (In-Cash Procurement)**

# **Technical Specification for Framework Contract in Engineering Services for Maintainability Analyses**

The document specifies the requirements for a Framework Contract regarding engineering services to perform maintainability analyses at ITER GBS levels to support the Maintainability activity.

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# 1 Preamble

This Technical Specification is to be read in combination with the General Management Specification for Service and Supply (GM3S) [1] that constitutes a full part of the technical requirements.

In case of conflict, the content of the Technical Specification supersedes the content of [1].

# 2 Purpose

This technical specification document describes the scope of work to be performed under the Framework Contract service for the Maintainability activity.

# **3** Acronyms & Definitions

#### 3.1 Acronyms

The following acronyms are the main one relevant to this document.

Abbreviation	Description
CC	Critical Component
DIR	Design Integration Review
GBS	Geographical Breakdown Structure
ORE	Occupational Radiation Exposure
PBS	Plant Breakdown Structure
PPE	Personal Protective Equipment
SPV	Single Point of Vulnerability

For a complete list of ITER abbreviations see: ITER Abbreviations (ITER\_D\_2MU6W5)

## **3.2 Definitions**

Accessibility: Accessibility refers to the relative ease with which an assembly or component can be reached for repair, replacement, or servicing.

**Contractor:** shall mean an economic operator who have signed the Contract in which this document is referenced.

**Human Factors and Ergonomics:** ergonomics (or human factors) is the discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

**Maintenance:** the organized activity, both administrative and technical, of keeping structures, systems and components in good operating condition, including both preventive and corrective aspects. ITER Maintenance Plan is defined in [9].

**Maintainability:** ability of an item under given conditions of use, to be retained in, or restored to, a state in which it can perform a required function, when maintenance is performed under given conditions and using stated procedures and resources.

**Task:** The task consists of the set of prescribed objectives, goals, which are defined by work organization, and assigned to workers. Task is a required, recommended, or permissible action, intended to contribute to the achievement of one or more outcomes of a process.

**Working situation:** The concept of working situation, in its ecological approach, covers the task, the physical environment where the task is performed (i.e. the premises, the equipment, the tools, the available information), the procedures, the objectives to be reached in terms of performance and safety, the work organization (including the means of worker's supervision). These characteristics are observable. Working situation is a situation where one or several tasks are performed by an individual or a group of individuals (working together [collaboration] or independently but sharing the same workspace / working simultaneously [coactivity]) in a given operation context (normal/routine, degraded, incidental-accidental).

**Workplace:** The physical area where a person performs tasks. It may include physical fixtures such as furniture, equipment, hallways, stairs, vehicles, and displays and is affected by environmental variables such as lighting, temperature, and noise.

**Workspace:** Volume allocated to one or more persons in the work system to complete the work task. Workspace is one of the dimensions taken into account in the design for Accessibility.

**Workstation:** A location where the operator may spend only a portion of the working shift. It is a subset of the workplace. An operator may travel and work at several different workstations in the workplace. Combination of work equipment for a particular person in a workspace.

# 4 Applicable Documents & Codes and standards

## 4.1 Applicable Documents

This is the responsibility of the Contractor to identify and request for any documents that would not have been transmitted by IO, including the below list of reference documents.

This Technical Specification takes precedence over the referenced documents. In case of conflicting information, this is the responsibility of the contractor to seek clarification from IO.

Upon notification of any revision of the applicable document transmitted officially to the contractor, the contractor shall advise within 4 weeks of any impact on the execution of the contract. Without any response after this period, no impact will be considered.

Ref	Title	IDM Doc ID	Version
[1]	General Management Specification for Service and Supply (GM3S)	82MXQK	1.4
[2]	Maintainability Design Plan	BBNPZ2	1.1
[3]	Working Instruction for Scoping and Identification of Critical Components for Operations	39DWTY	2.0
[4]	Safe Access for Maintainability	RUGWUK	1.4
[5]	Human and Organizational Factors Lessons Learned and Standard Requirements for ITER Maintenance and Local Operations	YQSQ46	3.6
[6]	Ergonomic Guideline on physical constraints/limits applicable to upper limb	WLLRBU	2.1
[7]	Identification of space reservations related to accessibility, operability and maintainability	94DLFK	1.0

	SERVICE		
Ref	Title	IDM Doc ID	Version
[8]	Protective Equipment and Hostile Environment Layout	RBYZ42	1.2
[9]	ITER Maintenance Plan	7E5YZY	2.1
[10]	Design Integration Review Procedure	3CNWMT	3.0
[11]	Working Instruction for Construction Readiness Review	QXW4KQ	3.2
[12]	Guideline for Systems Maintainability	BBNAYB	1.1
[13]	Standard Maintenance Templates Handbook	63P48A	1.0
[14]	Procedure for ITER CAD Data Exchanges	2NCULZ	4.2

## 4.2 Applicable Codes and Standards

This is the responsibility of the contractor to procure the relevant Codes and Standards applicable to that scope of work.

Ref	Title
CS1	EPRI 1015139: Guidelines for Inspectability for New Plant Components
CS2	EPRI NP-4350: Human Engineering Design Guidelines for Maintainability
CS3	ASD Technical Report 61-424: Guide to Integrated System Design for Maintainability (1961)
CS4	MIL-STD-1472F (23 August 1999) - DESIGN CRITERIA STANDARD - HUMAN ENGINEERING
CS5	MIL-STD-470 Maintainability Program Requirements (for Systems and Equipment)
CS6	MIL-STD-471A, Maintainability Verification/Demonstration/Evaluation
CS7	IEC 60300-3-10:2001 Dependability management - Part 3-10: Application guide - Maintainability
CS8	IEC 60706-2:2006 Maintainability of equipment - Part 2: Maintainability requirements and studies during the design and development phase
CS9	IEC 60706-3:2006 Maintainability of equipment – Part3: Verification and collection, analysis and presentation of data.

# 5 Scope of Work

This section defines the specific scope of work for the Framework Contract service, in addition to the contract execution requirements as defined in [1].

In agreement with ITER Project Requirements, ITER Systems, Structures and Components maintainability must be ensured:

- ITER systems must be maintained in the least time, at the least cost, with a minimum expenditure of support resources, without adversely affecting the item's performance or/and its safety characteristics.
- The maintainability of ITER systems must ensure the minimum time to recognize, isolate, and correct a malfunction, to understand and apply technical procedures, to gain access to faulty items, to repair or replace faulty items, and to test and verify accuracy and adequacy of the maintenance actions.

The maintainability of ITER systems components needs to be assessed, in particular in complex and congested ITER buildings locations (refer to Appendix A), and will be implemented through the Maintainability activity [2]. The maintainability, in terms of workplace accessibility and workstation ergonomics, must be verified at the occasion of the integration reviews to ensure that issues are identified and resolution actions defined, and that opportunities for improvement are incorporated, within the ITER systems design iterations.

Accessibility to components located in the different ITER building areas, in particular those that are identified as Single Points of Vulnerability (SPV) and Critical Components (CC) [3] must be ensured to perform the required maintenance tasks (corrective and preventive), while at the same time, workstation ergonomics are respected, and temporary, or permanent, provisions are defined to support the maintenance tasks (e.g., platforms, lifting & handling equipment). In addition, the time and PPE requirements to perform the tasks will have an impact on the Occupational Radiation Exposure (ORE), in particular in building areas with a hostile environment, and need to be taken into consideration to support the verification of ORE limits for the ITER facility.

The maintainability analyses are expected to be performed by ITER Geographical Breakdown Structure (GBS), focusing on specific rooms of each ITER GBS or on the overall ITER GBS, to support Design Integration Reviews (DIR) [10] prior to Construction [11], using the building environment as defined in 3D ENOVIA models.

The scope of work consists of maintainability analyses of ITER systems in multiple ITER GBS.

## 5.1.1 Description

The maintainability analyses in each ITER GBS shall include the following activities focusing on the working situations for the maintenance of ITER systems components:

- Accessibility analyses at the level of the workplace using 3D models to assess the relative ease with which SPV and CC can be reached for repair, replacement, or servicing (including the use of tools/equipment supporting the maintenance tasks) in agreement with Human Factors Standard Requirements for ITER Maintenance and Local Operations [5], Ergonomic Limitations [6][12] and Safe Access for Maintainability [4]
- Ergonomic task analyses at the level of the workstation using 3D models to verify if the maintenance tasks (guidance for standard equipment provided in [13]) can be performed incompliance with Human Factors Standard Requirements for ITER Maintenance and Local Operations [5] and Ergonomic Limitations [6] [12]
- Based on the accessibility and ergonomic analyses support the definition of workspace volumes in 3D models and ensure their connection to the circulation paths and escape routes, to ensure a full, and safe, trajectory allowing the maintenance tasks [7]
- Based on the ergonomic task analyses identify, whenever required, additional tools/equipment to support the maintenance tasks. This could involve, for example, permanent or temporary means of access, as well as lifting and handling provisions for the removal and replacement of heavy equipment.
- Support the definition of laydown and storage area volumes within the workplace to support the maintenance tasks [7]
- Identification of maintainability issues, estimate of the maintainability indicators (as defined in [2]), and recommendations for improvement.

In particular, based on the accessibility analyses and ergonomic task analyses listed previously, the Contractor shall be able to identify and provide solutions for tools/equipment to perform each maintenance task. These tools/equipment includes, for example, means for

inspection, permanent or temporary means of access, temporary lifting and handling provisions for the removal and replacement of heavy components, temporary provisions to transport heavy components, specific tooling for dismantling operations, temporary space for temporary storage of removed components. The solutions for tools/equipment to perform the maintenance task shall be visualized in 3D with proper attachment or fixation (whenever applicable), as means to demonstrate the feasibility of the tools/equipment implementation and of the maintenance task.

## 5.1.2 Service Duration

The maximum expected duration for the Framework Contract is 4 years.

# 6 Location for Scope of Work Execution

The services described in this Framework Contract shall be performed full time, on-site or offsite as best required to execute each activity with the required level of quality. Regular meetings (at minima weekly) shall be held in order to report to the Maintainability Officer the progress on the execution of this Framework Contract, and to discuss difficulties/issues encountered for decision-taking.

In case this Framework Contract is executed offsite, an additional general progress meeting shall be held on-site every month to address major issues and opportunities for improvement on the execution of the Framework Contract.

# 7 IO Documents

Under the defined scope of work, and for each maintainability analysis in an ITER GBS, IO will make available to the Contractor an input documentation package containing 3D detailed models to perform the analyses. It is the responsibility of the Contractor to identify and request for any documents that would not have been transmitted by IO, including the reference documents or the list of input data to perform the studies. The Contractor shall trace the maturity of input data used for the studies and will follow/update the studies depending on the level of maturity of data. The present Technical Specification takes precedence over the referenced documents or input data. In case of conflicting information, it is the responsibility of the Contractor to seek clarification from IO.

# 8 List of deliverables and due dates

The deliverables will be defined in each specific task order. All formal deliverables shall be stored in the exchange area of the Framework Contract and follow the workflow agreed in at the Kick-off Meeting.

# **9** Quality Assurance requirements

Not applicable.

# **10** Safety requirements

Not applicable.

## **10.1** Nuclear class Safety

Not applicable.

## 10.2 Seismic class

Not applicable.

# **11 Specific General Management requirements**

GM3S section 6 [1] applies completed/amended with the below specific requirements.

## **11.1** Contract Gates

Not applicable

## **11.2** Work Monitoring

- Weekly progress meetings for global follow-up.
- Working meetings on demand for specific requests, whenever required
- General progress meeting on-site every month.

## **11.3** Meeting Schedule

Besides the kick-off meeting at the beginning of the contract, the meetings identified in Section 11.2 are applicable.

## **11.4 CAD design requirements**

The exchange of CAD data to access the 3D detailed models (contextual data) of the concerned ITER GBS areas shall be made according to [14].

## **12 Responsibilities & Resources Profiles**

## **12.1 IO Responsibilities**

The IO will appoint a RO for the technical follow up of this contract, which is the Maintainability Officer. The Maintainability Officer will assess the performance and quality of the work and is responsible for checking the deliverables against requirements, schedule, and processes.

## **12.2** Specific Responsibilities of the Contractor

The Contractor shall be able to use the following tools as detailed below:

- **CATIA**<sup>TM</sup> **v5** / **Enovia**: the contractor is able to consult (read only) the Enovia database, using CATIA v5.
- Naviswork<sup>TM</sup>/3dxml viewer: the contractor is able to use these viewer tools.
- **Delmia**<sup>TM</sup>: the contractor ability to use this tool, or another maintainability simulation tool, will be an advantage
- **Unity**<sup>TM</sup>/**Interact** plug ins for virtual reality simulations of the maintenance tasks and ergonomic analyses: the contractor is able, or willing to learn how, to use these tools.

## **12.3** Contractor Resources Profiles

The Contractor shall provide resources with the following competencies for each yearly task order:

- **Expert** resource (1 FTE):
  - Authoritative knowledge and experience (minimum 10 years) in the development and maintenance of complex systems in nuclear facilities with a focus on Maintenance, Maintainability, Human Factors, and Ergonomics.
- **Proficient** resource (1 FTE):
  - Confirmed knowledge and experience (minimum 5 years) in the development and maintenance of complex systems with a focus on Maintenance and Maintainability
  - Experience in CAD design and 3D model implementation (CATIA<sup>TM</sup>, Navisworks<sup>TM</sup>) and on the use of specific maintainability simulation tools (e.g., Delmia<sup>TM</sup>, Process Simulate, or similar). Knowledge of Virtual/Augmented Reality Simulation tools is desirable (e.g., Unity/Interact plug-ins, or similar).

# SERVICE Appendix A Overview of an ITER GBS Environment

Each ITER GBS contains usually multiple ITER Systems (with many critical components to be maintained) and are often extremely complex areas with a high occupancy rate, low accessibility, and with several maintainability issues. An overview of the environment of one of these areas (Drain Tank Room) is provided below.

