Pre-tender presentation
For the
He Leak Localization System for ITER
Meeting with potential suppliers
Roger Martín Fernández
## Agenda

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Contract Scope

EP contract : Engineering and Procurement

- Preliminary (PDR) and Final Design review (FDR)
- Manufacturing Design + Manufacturing Readiness Review (MRR)
- Procurement of material (material certificates 3.1) Qualification of components under load cases
- Manufacturing
- Assembly of all subsystems
- Factory Acceptance Tests
- Packing and shipping to ITER site (Cadarache, France)

Scope of the main contract

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Scope: Leak Detection systems

In pipe inspection tool

- Propulsion system
- Visual inspection module
- Bladders
- Vacuum operation
- Control system
- 1 Control cubicle with remote controllers, PLC’s, power supplies
- Cabling and umbilical

Magnet feeders Gauging system

- 33 x Pirani gauges
- 33 x Cold Cathode gauges
- 17 isolation valves
- Supporting system
- 17 x Controllers
- Cabling
- Control system
- 2 cubicles with remote controllers, PLC’s, power supplies

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Contract allocation

One single main contract proposed type competitive with negotiation, including the following scope:

- IPIT: In pipe inspection tool
- CFVG: In Cryostat feeder vacuum gauges system

And:

- Integration to CODAC system could be managed by F4E. (OPTION 2)
- Seismic calculations could be performed by F4E. (OPTION 1)
Step 1: overview of selection phase

- **Exclusion** criteria on basis of declaration of honour

- **Selection** criteria designed to assess the **technical** and **financial** capacities. Usually set with minimum requirements to be met.

- Examples of requested **evidence**: list of projects, availability of facilities/equipment/tools, number of staff & qualifications – turnover and profit & loss account data.

- Technical selection criteria: refer to similar F4E previous calls

- **Invitation** to step 2 following a **ranking** of the candidates based upon some of the key selection criteria.
Step 2: invitation to tender

- Submission of **preliminary tender** answering F4E specifications requirements and call features

- **Possibly, negotiation** with the tenderers. Areas of negotiation: technical, model contract conditions, commercial offer

- Submission of **final tender** assessed against **award criteria** published in the tender conditions.

- **Technical** award criteria relate to the proposed approach & methodology of the tenderer towards the technical and quality/safety requirements of F4E

- **Financial** award criteria relate to the price of the tender
Documentation - Overview

- Standardized documents and models adapted to the specific characteristics of the call
- Contacts F4E/tenderers authorised under certain conditions
- F4E Industry portal [https://industryportal.f4e.europa.eu/default.aspx](https://industryportal.f4e.europa.eu/default.aspx)

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Intellectual Property provisions

Intellectual Property regime: Foreground becomes ownership of F4E

Background IP

- Pre-existing IP needed to perform the Contract or use the results.
- No assignment of rights to F4E.
- F4E could only access to it if and when needed to use Foreground.

Contracts signature date

Foreground IP

- New IP generated under the Contract.
- Ownership of F4E.
- Contractor may be allowed to use it under prior permission of F4E.

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In Pipe Inspection Tool

Leak detection and localization function will be provided by 2 IPIT’s which will be located at each TSM inlet and outlet in order to isolate a specific TS panel. RGA will be able to identify air specific scan and localize by segregation the potential panel leaking.

Insertion of the tool will be manually
System description

IPIT

- Propulsion Module
- Inflatable Bladder
- Inspection Camera
- Navigation/Inspection Camera
- Control cubicles + cabling

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System description: C

- 2 Floor standing cubicles located in gallery corner
- Cabling + connectors for all gauges (Pirani, Cold Cathode, isolation valves).
- Validation of the whole control loop signals with the final configuration (instrument, cable to junction box, junction box to controller)

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Technical requirements

- Position accuracy : ≤ 5 cm
- Propulsion based in rotary drive mechanism
- Modularity: The modules of the IPIT shall be interchangeable without the need for rewiring between the modules
- Leak rate: ≤ 1x 10^{-3} \text{ Pa.m}^3\cdot\text{s}^{-1} (\Delta P_{\text{He}}=0.1 \text{ MPa}, \text{ambient temperature}) along the spine of the tool
- Visual resolution: 2MPix in a 5 x 5mm.
- Safe retrieval of the IPIT: umbilical connecting the IPIT
- No debris or damage is allowed inside the TS manifold piping
- Material certificates acc. EN 10204 type 3.1
- Vacuum compatibility materials
- Testing set up which shall be reproduce the current configuration of the TSM
- Prototyping for design validation

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**Annex A Contract**
- Administrative clauses

**Annex B and Technical Specifications on Leak Detection systems**
- General requirements on technical, quality, project management, safety

**Technical Specifications for each subsystem**
- Technical requirements

**System load specifications**
- Preliminary versions, to be developed for the PDR

**Interface sheets**
- Preliminary versions of the ICDs will be provided. To be detailed along the design phase of the project

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**Documentation outcome for design reviews**

<table>
<thead>
<tr>
<th></th>
<th>Preliminary Design Review (PDR)</th>
<th>Design</th>
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<tbody>
<tr>
<td></td>
<td>• Schemes, specifications, drawings, structural analyses and design information in sufficient</td>
<td>• Detailed final design with supporting analysis/calculations;</td>
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<td>detail for a full assessment of the preliminary design to be made;</td>
<td>• Proposed manufacturing code;</td>
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<td></td>
<td>• Proposed design validation plan;</td>
<td>• Reports of engineering studies performed with supporting calculations and analyses</td>
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<td>• Complete system functional analysis;</td>
<td>demonstrating that the design meets all code, quality and design requirements as set out</td>
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<td></td>
<td>• Complete system load specifications;</td>
<td>in Annex B and referenced associated documentation;</td>
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<td></td>
<td>• Updates to IS, ICD, DDD;</td>
<td>• Supplier qualification report;</td>
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<td>• Preliminary manufacturing and delivery schedule;</td>
<td>• Bills of materials (BOM);</td>
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<td>• Preliminary scheme of MIPs and Control Points;</td>
<td>• Detailed drawings of components and assemblies;</td>
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<td>• Proposed component identification scheme;</td>
<td>• Complete CMM;</td>
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<td>• On-site assembly plan complete.</td>
<td>• Operation plan;</td>
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<td>• Maintenance plan;</td>
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<td>• Deviation requests;</td>
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<tr>
<td></td>
<td><em>For proprietary items</em></td>
<td>• Intermediate Manufacturing and Inspection Plans (MIPs), including scheme of Control</td>
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<td>• Plan for ensuring conformance to specification;</td>
<td>Points;</td>
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<td></td>
<td>• Deviation requests.</td>
<td>• Factory tests program (including FAT);</td>
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<td>• Acceptance Requirements Plan;</td>
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<td>• Qualification summary report for PIC components;</td>
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<td></td>
<td></td>
<td>• Delivery schedule and Transportation Plan;</td>
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<tr>
<td></td>
<td></td>
<td>• Updates to ICD, IS, DDD;</td>
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<td></td>
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<td>• Design Compliance Matrix complete;</td>
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<td>• HAZOP and safety analysis of full Leak Detection and Localisation System;</td>
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<td></td>
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<td>• Updated on-site assembly plan.</td>
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<td><em>For proprietary items</em></td>
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<td>• Updated plan for ensuring conformance to specification;</td>
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<td>• Deviation requests.</td>
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<table>
<thead>
<tr>
<th>Manufacture, Assembly, Factory Acceptance</th>
<th>Manufacturing Readiness Review (MRR)</th>
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<tbody>
<tr>
<td></td>
<td>• Material certificates;</td>
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<td></td>
<td>• Detailed fabrication and assembly drawings and 3D models;</td>
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<td>• Fabrication, inspection, and control procedures;</td>
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<td></td>
<td>• Final Manufacturing and Inspection Plans (MIPs);</td>
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<td>• Welding Plan;</td>
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<td>• Code compliance;</td>
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<td>• Quality Plan (DA, contractors and sub-contractors);</td>
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<td>• Deviations requests (if any);</td>
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<td></td>
<td>• PA schedule.</td>
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<tr>
<td>Factory Acceptance Test (FAT)</td>
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<tr>
<td></td>
<td>• Inspection Plans (MIP’s) and procedures;</td>
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<td></td>
<td>• Manufacturing Dossier (MDR’s)</td>
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<tr>
<td>Delivery</td>
<td></td>
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<td></td>
<td>• Delivery schedule;</td>
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<td>• Contractors’ Release Notes;</td>
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<tr>
<td></td>
<td>• Certificates of Conformity according corresponding codes &amp; standards for proprietary items and standardized components;</td>
</tr>
<tr>
<td></td>
<td>• Instruction manuals (for installation, commissioning, operation and maintenance for each component supplied).</td>
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Considerations

The following aspects shall be considered for the execution of the project:

• Expected call publication of the contract notice: June 2019
• Maximum delivery date for the IPIT: May 2024 (TBC)
• Magnet Feeders Vacuum gauging system: Jun 2023
• The seismic analysis (Floor Response Spectra) could be performed by a different supplier with existing contract at F4E.
• Propagation of safety requirements (Defined Requirements), which will be identified in Annex B are only applicable for cables.
• I&C software programming will be performed by a different supplier with existing contract at F4E.
• Procurement of the glove box/es for the remote LDS could be supplied directly by F4e through another contract (if required).
Questions and Answers

Q1: how your Engineering team will be dimensioned to cope with that scope?
Q2: with the information given what is your foreseen time frame for the preliminary design, final design, manufacturing, assembly and testing?
Q3: which activities during design and manufacturing, assembly and testing are going to be subcontracted?
Q4: do you have some references of previous projects on In pipe inspection? Could you please show some examples?
Q5: are you comfortable with such technical requirements?
Q6: which software are you using 3D design ? And for the structural analysis?
Q7: which propulsion system do you think is more suitable for our application?
Q8: control system should be integrated to CODAC. Are you familiar with the integration of your specific control system into top level control system which requires specific requirements?

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Thank you for your attention

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