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Aim of the Contract

The aim of this Framework Contract is to, via a series of Specific Contracts,

✓ with the final design documentation developed under the FPAs, as input data, provide support on the production of the build-to-print design specifications of the Diagnostics, this involves production of build-to-print drawings and refinement of bill of materials and manufacturing specifications, to obtain a detailed and robust documentation package for the procurement of the Diagnostics;

✓ and to provide industrial expertise on the evaluation of the Diagnostics designs and solutions, in order to get a critical view on the manufacturing and assembly feasibility.
Successful completion of the aims of the Contract will require the delivery of the following services:

- **Production of build-to-print drawings**
- **Refinement of manufacturing specifications**
- **Provision of industrial expertise**

The Diagnostics systems and components for which the services listed above shall be provided within the scope of this Contract are:

- Low Field Side Collective Thomson Scattering
- Core-plasma Charge Exchange Recombination Spectrometer
- Equatorial Visible/Infrared Wide Angle Viewing System
- Tokamak services
- Radial neutron camera
- Bolometers
- Plasma Position Reflectometry
- Pressure gauges
Scope of services

Production of build-to-print drawings

Provision of the following services, as required to support the FDRs, the resolution of FDRs chits, and the preparation of necessary technical documentation for the procurement of the Diagnostics:

- Thorough **review and understanding of the available technical documentation** of the Diagnostics.
- **Identification of technical issues**, missing or inadequately defined technical information on the available 3D models, bill of materials and 2D drawings affecting the manufacturing and assembly phases.
- Production of a **justified proposal of modifications** on the available 3D models, bill of materials and 2D .
- Upon F4E’s approval of the proposed modifications, refinement of available 3D models, bill of materials and 2D drawings.
- **Production of the missing 3D CAD files**, from the existing 3D models, ensuring that for each sub-part to be manufactured a CAD file at the level of detailed design maturity in ENOVIA exists and it is consistent with the assembly sequence and free of interferences.
- **Refinement of the bill of materials** clearly identifying, as minimum, all the components, materials, standards parts and purchase accessories references.
- **Production of the set of missing 2D drawings** necessary for the procurement of the Diagnostics from the 3D models, containing all the necessary views and sections for components details and assemblies description, defining fully and clearly the manufacturing and assembly requirements. of the systems
Scope of services

Refinement of manufacturing specifications

Provision of the following services, as required to support the FDRs, the resolution of FDRs chits and the preparation of necessary technical documentation for the procurement of the Diagnostics:

- **Thorough review and understanding of the available technical documentation** of the Diagnostics systems and components subject to this Contract.

- **Identification of technical issues**, missing or inadequately defined manufacturing requirements on the available manufacturing specifications impacting the manufacturing and assembly phase.

- **Production of a justified proposal of modifications** on the available manufacturing specifications ensuring its clearance, completeness, accuracy, understandably, usage of best practices and compliance with applicable codes & standards (e.g. definition of missing manufacturing requirements for UHV compatibility, changes needed in the test plan in order to comply with the applicable codes & standards, etc.).

- Upon F4E’s approval of the proposed modifications, **refinement of available manufacturing specifications**.
Scope of services

Provision of industrial expertise

Provision of the following services, as required to support the Preliminary Design Reviews, the Final Design Reviews and the resolution of chits:

- Thorough review and understanding of the available technical documentation of the Diagnostics
- Critical assessment of the current designs and solutions, from an industrial perspective, regarding one or more of the different aspects of the designs including:
  - manufacturability and inspectability studies;
  - evaluation of compliance of the manufacturing and testing plan with applicable codes and standards;
  - tolerance studies of sub-assemblies and final assemblies;
  - studies of vacuum compatibility and resulting requirements;
  - evaluation of compliance with nuclear licensing regulations;
  - requirements management and verification;
  - cost of fabrication;
  - nuclear waste management & decommissioning studies;
  - risk analyses;
- Provision of findings on the potential issues of current designs affecting the manufacturing and assembly phases.
- When necessary, identification and justification of new best value technological conceptual proposals
- Provision of a risk assessment identifying risks affecting the manufacturing and assembly phases.
- Provision of a detailed cost breakdown of the designs
Boundaries

The Contract **excludes**

- The design of the Diagnostics themselves which is being conducted under FPAs.
- The procurement of any hardware.

*Additional boundaries will be defined by F4E in each Specific Contract as appropriate.*
Items supplied by F4E

F4E will supply the necessary inputs for the supplier to provide the required services under the Specific Contracts, by

• **providing the design documentation** packages produced under the FPAs encompassing the designs of the Diagnostics listed in Section 2.1.1., including e.g. 3D CAD models of the different systems; 2D drawings of the main views identifying critical tolerances and materials; input material for the specifications and tests; etc.

• **providing access to the relevant protected background IP assets** (e.g. patents), necessary for the use of the provided documentation in order to carry out each specific contract and only **for the purpose of fulfilling the Specific Contracts**.

• **providing means to access the sources of necessary advise**; e.g. communication channels with the designers of the Diagnostics;

• and **providing necessary additional input data itself** (e.g. Design Description Document, relevant technical reports, etc.).

F4E will **not** provide:

• Any access to any protected background IP assets other than those stated above.
• Any access to scientific journals, codes & standards, or any other publications.
• Any software.
• Nor any license.
Unless otherwise stipulated in the Specific Contract, subject to prior due justification by the Supplier and written approval by F4E, the three conditions below shall be met by the Supplier:

• All services and supplies to be provided under the Contract shall not use any background protected intellectual property (e.g. patents, utility models, know-how, trade secrets).

• All services to be provided under the Contract shall exclude any highly specialised or proprietary component or restricted/specialised manufacturing technology, or any other element, which could potentially restrict to a single economic operator future procurement related to the subject matter of the Contract.

• The Supplier shall ensure that all activities provided under the Contract do not restrict the existent procurement paths of the Diagnostics designs.
The following software tools shall be used for the execution of Specific Contracts:

- **CAD system:**
  - Dassault Systems CATIA v.5, including Mechanical and Equipment&Systems modules.
  - ENOVIA
  - Q-checker
- **Scheduling:**
  - PRIMAVERA P6 Project Management Release 8.0.0.
## Indicative schedule – tendering phase

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Indicative schedule – execution phase

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BTP design specifications – multiple task orders
Effort needed & organization

- (1) provide support on the preparation of build-to-print design specifications of the Diagnostics;
- and to (2) provide industrial expertise on the evaluation of the Diagnostics designs and solutions.

The staff effort needed to perform the first task of this contract will be approximately 27 ppy and the estimate duration will be 4 years starting from the end of 2017.

The staff effort needed to perform the second task of this contract will be approximately 8 ppy and the estimate duration will be 4 years starting from the middle of 2016.

Indicative list of individuals:
One (1) project manager
One (1) quality representative
One (1) CAD designer (senior)
Four (4) CAD designers/drafters
One (1) senior engineer
One (1) manufacturing expert
One (1) weld expert
One (1) materials expert
One (1) vacuum expert
One (1) nuclear expert
Thank you for your attention

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