Call for Expert Documents

SPSS Service Contract Specification

Description of the service required for the development of the Standard PLC Software Structure.

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<th>Approval Process</th>
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RO: Evrard Bruno

Read Access
LG: PLC group, LG: CODAC team, AD: ITER, AD: External Collaborators, AD: Section - Plant Control and Instrumentation, project administrator, RO

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1 INTRODUCTION

This document describes the technical requirements for the settlement of a service contract for the development of a Standard PLC Software Structure. The SPSS is a Software package that will be deployed on every PLC in the ITER project.

This contract consists of the service of one development engineer for 2 years. The required profile is described in the following chapters. Each bidder has to provide sufficient technical information about the involved engineer.

2 BACKGROUND AND OBJECTIVES

ITER is a fusion research facility in construction in Cadarache, France. One of the major ideas of the project is to have all subsystems built by the 7 countries participating to the experiment. This organization increases technical risks during the integration and commissioning phases.

In order to mitigate this risk, the Control Systems Division took several anticipating measures:

- Publication of a PCDH, gathering a collection of standards to be applied by all providers.
- Development of the CCS. The CCS is a software toolkit to be used by providers to develop their Control system.

As specified in the PCDH, only one line of products will be used for PLCs. The SPSS is one step further. The main purpose of SPSS is to enforce standardization in PLC Software Development. All common functions like numerical scaling, numerical values limiting, should be developed exactly in the same way on all PLCs of the project.

3 TECHNICAL SPECIFICATION

See document “SPSS Technical Specification”.

IDM location: ITER_D_6SRGGZ

4 WORK DESCRIPTION

The purpose of this contract is the development of the SPSS. The work will be broken down in several Tasks. Each task will be described in details by the ITER TRO. The contractor will evaluate the workload of every Task transmit it to the TRO before the Tasks begins.

Here is a non-exhaustive list of the Task Orders foreseen:

<table>
<thead>
<tr>
<th>ID</th>
<th>Short Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workflow Analysis</td>
<td>Definition of Workflow and use cases. We need to define the different contexts in which the application developer will use this SPSS: initial Development, maintenance on the PLC Core application, Maintenance on the SPSS, modification of one interface.</td>
</tr>
<tr>
<td>2</td>
<td>Redundant Architecture.</td>
<td>Improvement of the existing basic SPSS to support redundant architectures. This includes the development of an EPICS driver.</td>
</tr>
<tr>
<td>3</td>
<td>SPSS in CFC</td>
<td>Port of actual SPSS on CFC language.</td>
</tr>
<tr>
<td>4</td>
<td>SPSS Development</td>
<td>Development of a SPSS with CODAC interface, Hardware Interface and System Monitoring.</td>
</tr>
<tr>
<td>5</td>
<td>CODAC Interface Extension</td>
<td>Improvement of Interface with CODAC, : differentiation of the data flows: static configuration, volatile Configuration, raw data, PLC monitoring data, accurate</td>
</tr>
</tbody>
</table>
5 PROFILE DESCRIPTION

The bidding companies should be able to provide one human resource with the following qualifications or experience:

- **Education:**
  - Degree at least equivalent to 4 years of study after the High School Diploma, in the Electronic/Computer Science/Electro mechanics field or other relevant discipline.

- **Technical experience:**
  - At least 8 years of experience with PLCs.
  - Experience with Structured Text programming language.
  - Experience with at least one of the following PLC Open Communications: FETCH/WRITE, SEND/RECEIVE, Open TCP, ISO-on-TCP, LibNoDave, Modbus TCP.
  - Experience with Object Oriented Development Technologies: UML modeling, Java, C++, Python, Maven.
  - Experience with data management technologies: XML, XSLT, W3C Schema
  - Experience with software engineering methods and tools;
  - Experience in development of code generation tools.
  - Experience with Linux and Open Source technologies.
  - Experience with Control Systems in a Large Scientific Experiment is an asset.
  - Experience in the following fields would be beneficial:
    - EPICS;
    - Siemens s7-400FH range of products.;
    - Subversion, CVS or Git.

- **Social skills:**
  - Ability to work effectively in a multi-cultural environment;
  - Ability to work in a team and to promote team work.

- **Language requirements:**
  - Fluent in English (written and spoken).

- **Computer and IT skills:**
  - Comfortable with the following Microsoft Office Tools: Outlook, Word, Excel, SharePoint, Visio.

6 ESTIMATED DURATION

This Service Contract will last for 2 years. The work is expected to be performed in close collaboration with the ITER TRO. It will be based on short development cycles (1-2 weeks) with an incremental and agile approach. A complete testing and simulation infrastructure is available in the ITER premises in Cadarache. The engineered provided will work mainly on site in the ITER premises of Cadarache. Some subtasks like documentation for example can be realized off-site. But it will be always in agreement with the ITER Technical Responsible Officer and it will be agreed during the Task definition.

7 EVALUATION CRITERIA

The selection will be done taking into account the following criteria:

- Human Ressource Expertise CV(s) 70%
- Price 30%"
8 WORK MONITORING AND MEETING SCHEDULE

For each Task, there will be a

- Kick-off meeting where the ITER Technical Responsible Officer will describe the Task. It will be the opportunity for the engineer to ask questions and expose how he will proceed.

- Development meetings, not less than every 2 weeks. Not more than every 2 days. During these meetings, it is expected to have something to demonstrate in case it is about coding. These meetings are not only follow-up meetings. The contracting engineer and the ITER Technical RO will
  - Detect and correct issues that may cause delays;
  - Review the completed and planned activities and assess the progress made;
  - Permit fast and consensual resolution of unexpected problems;
  - Clarify doubts and prevent misinterpretations of the specifications

- A final demonstration at the end of the Task.

A monthly report will be provided by the contractor. This report will include at least but not only:

- Worked hours
- The work executed for the ongoing task(s).
- The work to be executed in the next month.
- The problems encountered, if any.

9 QUALITY ASSURANCE REQUIREMENTS

For Software Developments, the Contractor will provide a development plan for each Task order. The Development will be organized in short iteration: 2 weeks maximum. Each Task order will be broken down in several iterations.

Each Task order will begin with the definition of a preliminary version of the User Manual for the application that will be developed,

Each iteration will follow the following cycle:

- Requirement Definition
- Architecture definition
- Coding-Unit Testing
- Integration Testing
- Validation

Each step will be verified.

The final version of the User Manual will be provided at the end of the Task Order.

The documentation associated to each step will be stored in a dedicated wiki or a SharePoint site on the ITER intranet.

10 PAYMENT SCHEDULE

The Contractor shall supply monthly invoices to ITER IO based on the time sheets documented in the monthly progress reports. Invoices shall be supplied only after the progress report has been approved by IO.

11 REFERENCES, TERMINOLOGY AND ACRONYMS

11.1 Acronyms

<table>
<thead>
<tr>
<th>CODAC</th>
<th>Control, Data Access and Communication</th>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CCS</td>
<td>CODAC Core System</td>
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<tr>
<td>CFC</td>
<td>Continuous Flow Chart</td>
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<tr>
<td>EPICS</td>
<td>Experimental Physics and Industrial Control System</td>
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<tr>
<td>RO</td>
<td>Responsible Officer</td>
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<tr>
<td>TRO</td>
<td>Technical Responsible Officer</td>
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<tr>
<td>UML</td>
<td>Unified Modeling Language</td>
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<td>XML</td>
<td>eXtended Markup Language</td>
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<td>XSLT</td>
<td>EXtensible Stylesheet Language</td>
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<tr>
<td>W3C</td>
<td>World Wide Web Consortium</td>
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<tr>
<td>TCP</td>
<td>Transport Control Protocol</td>
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<tr>
<td>ISO</td>
<td>International Standardization Organization</td>
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<td>PLC</td>
<td>Programmable Logic Controller</td>
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### 11.2 References

<table>
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<th>Reference</th>
<th>Description</th>
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