PROJECT / DESTINATION:

EMIR

TITLE:

STATEMENT OF WORK FOR THE CONFIGURABLE SLIT UNIT CONTRACT
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DOCUMENT CHANGE RECORD

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<td>1</td>
<td>28/07/06</td>
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SUMMARY

This document constitutes the Statement of Work for the Procurement of the Configurable Slit Unit (IN-EM-CU) of the EMIR Instrument for the Gran Telescopio Canarias (GTC)
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<td>ATP</td>
<td>Authorization to Proceed</td>
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<td>ATS</td>
<td>Authorization to Ship</td>
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<td>DR</td>
<td>Design Review</td>
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<td>CSU</td>
<td>Configurable Slit Unit</td>
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<td>EMIR</td>
<td>Espectrógrafo Multiobjetos InfraRojo</td>
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<td>EPT</td>
<td>EMIR Project Team at the IAC</td>
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<td>FEM</td>
<td>Finite Elements Model</td>
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<td>GTC</td>
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<td>IAC</td>
<td>Instituto de Astrofísica de Canarias</td>
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<td>ICD</td>
<td>Interface Control Document</td>
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<td>SOW</td>
<td>Statement of Work</td>
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<td>SQR</td>
<td>System Qualification Review</td>
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<td>TBC</td>
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<td>TBD</td>
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1. INTRODUCTION

The Configurable Slit Unit, CSU (Product Tree code IN-EM-CU), for EMIR shall consist of a cryogenic reconfigurable slit mechanism to generate a multi-slit configuration, a long slit or an imaging aperture at the entrance focal plane. The mechanism shall be capable of modifying the position, length and width of the different field slits. The CSU shall be mounted onto the front plane of the EMIR Optical Bench (a detailed description of the EMIR general layout is included in R.1)

This document contains the Statement of Work for the procurement of the CSU.

2. DEFINITIONS

2.1 Contractor

Entity which is chosen to provide the services and products specified in this Statement of Work.

2.2 Bidder

One who proposes a price at a public auction.

3. SCOPE

The Scope of the Procurement defined by this document shall be:

- The design, fabrication, integration and test of the Configurable Slit Unit, according A.1 and this SOW
- The transport of the items to the IAC facilities at La Laguna Central Site

The Contractor shall have to demonstrate that the items under its responsibility fulfil the specifications and accomplishes with all the interfaces defined with the rest of EMIR Subsystems, as described in section 4.

A stand-alone Control System shall be provided by the Contractor to be used during the acceptance tests. This Acceptance Control System is included within the deliverables of this procurement and shall be delivered to the IAC after the tests at factory.
4. REQUIREMENTS

4.1 Applicable Specifications

The Configurable Slit Unit shall be designed and manufactured in accordance with the specifications (A.1) and the Interface Control Documents (A.2 and A.3).

The Interface Control Documents (ICDs) are based on a preliminary concept of EMIR. The input ICDs will contain the geometrical envelope, the preliminary mechanical interfaces and the preliminary interface with the EMIR Control System at least. The ICDs shall be updated during the design phase. This shall be considered as a natural evolution of the design phase and not a change in the specifications. In any case, any change to the ICDs has to be approved by the EPT. The mechanical, electrical and control interfaces shall be frozen at the DR.

4.1.1 Non defined requirements (TBCs and TBDs)

Requirements that are not defined are marked as TBD, whereas unstable requirements are marked as TBC. In these cases, either the EPT shall define and freeze the requirements before the DR or the Contractor, as part of the Design, shall submit for approval to the EPT alternatives based on justified calculations or standard engineering practices. All the requirements shall be perfectly defined at the DR.
5. WORK BREAKDOWN STRUCTURE

All the work to be carried by the Contractor shall be structured as shown in Figure 5.1. The description of each work package shall at least include: Purpose, Task Definition, Inputs and Deliverables.

![Diagram of Work Breakdown Structure]

Figure 5.1 Work Breakdown Structure

5.1 Development phases

The work shall pass through the following phases:

- **Design**

  The goal of this phase is to develop the Design of the CSU, from which it will be possible to produce the manufacturing drawings. The concept proposed by the Contractor shall fulfil the specifications and interface constraints. Otherwise, a configuration change proposal has to be prepared, justified and submitted to the EPT for evaluation and approval.

  A detailed layout of the CSU shall be generated, including a 3-D mechanical model. Product performances shall be verified and instrument requirements shall be validated by finite element analysis and standard spreadsheet models. A preliminary plan shall be developed for verification and quality assurance. The areas of high risk shall be identified and a plan shall be developed for mitigation.
An important goal of this phase is to define all the external interfaces with other EMIR subsystems. Special emphasis has to be placed in closing the interface between the CSU and the EMIR Control System, by selecting the electrical driving hardware (actuators, encoders, brakes and limit switches) and the mechanism control equipment (motion controller and drives, switch read electronics and power supplies). The electrical hardware and control equipment shall be proposed by the Contractor and approved by the EPT.

This phase will start with the Authorization to Proceed (ATP). A Design Review (DR) of the preliminary stage of the design will take place previous to the detailed definition of the DTU. The mechanical interfaces with EMIR and the interfaces with the EMIR Control System shall be closed before this date.

• Manufacturing, Assembly and Tests at Factory

The goal of this phase is to produce and assemble the final CSU, and to test that the produced CSU meets the specified requirements.

This phase will start after the DR is approved by the EPT and the fabrication drawings have been generated. At this point the EPT will release the Authorization to Manufacture (ATM). Note that partial ATM’s can be issued for individual components, with long delivery time or fabrication period, even before DR.

This phase will finish with the System Qualification Review (SQR). The approval of this review by the EPT includes the Factory Acceptance of the CSU and the Authorization to Ship (ATS) the assembled CSU to the IAC.

• Transport to the facilities at the IAC

Transport of the CSU to the IAC Headquarters at La Laguna.

• Acceptance at the IAC

The Final Acceptance shall be made at the IAC after the SQR is passed and approved by the EPT, the ATS is given and the DTU is received at the IAC.

In the following sections, the purpose and the minimum list of deliverables are presented. The Bidder shall complete the work descriptions by defining the Task Definition, Inputs and complete the List of Deliverables.

5.2 Work packages

5.2.1 Mechanical Design

Purpose:

The Contractor shall fully develop the design of CSU. The more relevant work to be performed is:
• Identify the technical solutions for the CSU concept presented in the Contractor’s technical proposal, confirming their feasibility
• Dimensioning and analysis of all the components to make the design compliant with the specifications. This analysis will include the structural and thermal Finite Elements Models (FEMs) needed to verify the CSU performance
• Selection of all the commercial components to be purchased
• Participate in the definition of the mechanical interfaces between the CSU and the EMIR Support Structure. This will also include the necessary interfaces to mount calibration masks to be located in the focal plane (the design and procurement of calibration masks is responsibility of the EPT). The interface control shall be performed by the EPT. The interfaces shall be frozen at the DR. The Contractor and the EPT will agree the calendar for discussion of draft versions of this interface
• Submit the preliminary stage of the design for DR

The mass properties of the CSU shall be frozen as soon as possible during the design. It shall be frozen in any case at the DR.

Task Definition:

By Bidder.

Inputs:
The Applicable and Reference documents listed in Annexes A and B.

Deliverables:

To be delivered to the IAC before DR:

• Design Report: This/these document/s shall include:
  – A mechanical and functional description of the design proposed
  – An analysis report including the calculations (error budgets, structural, positional tolerances, thermal behaviour, reliability, etc.) done to verify the performances of the proposed design
• Finite Element Models (structural and thermal) used for analyses
• Preliminary 3D Model of the CSU
• Assembly drawings

To be delivered to the IAC before ATM:

• Manufacturing 2D drawings

To be delivered to the IAC after SQR:

• Compliance Matrix, showing the specification and interface fulfilment
• A list of mechanical components, including the component description, manufacturer, supplier, etc.
• Finite Element Models (structural and thermal) used for analyses
• An “as built” 3D model of the DTU
• The “as built” 2D drawings of the DTU

5.2.2 Electronics and Control System Design

Purpose:

The Contractor shall be responsible for the following tasks:

• Specification of the architecture of the driving electronics and associated software. The driving electronics is the hardware which controls the motion of the CSU elements to form the required multi-slit pattern, including the full opening. The associated software runs inside the driving electronics and provides, at least, the basic functionality required to produce the desired operation. It accepts inputs from a higher level system to command the driving electronics on its full capacities

• Definition of the routines and functionalities of the low level software. This routines are likely to be combined to generate more complex functionalities of the DTU supervised by a higher level system

• The Contractor will supply the source code and the development tools to modify it in case of non standards tools

• List of commands accepted by the low level software.

• The design and implementation of an Acceptance Control System which will be used for the Verification and Acceptance Tests. This Acceptance Control System will be a stand-alone system that will not be necessarily integrated with the rest of the EMIR Control System, but its compatibility and easy integration is encouraged

• The selection and procurement of the actuators, encoders, sensors, switches, drives, controllers, power supplies and the signal conditioning electronics of the sensors, which are part of the deliverable components of the CSU. Electro-mechanical components and electronics items shall be proposed by the Contractor and approved by the EPT.

• The selection, specification and procurement of all the electrical connectors and the cables to connect each electro-mechanical element to a connector situated in a selected point in the CSU. The position of these points shall be agreed between the Contractor and the EPT. It is also a responsibility of the Contractor the cabling and interfacing between the different parts of the equipment. Connectors and cables shall be proposed by the Contractor and approved by the EPT.

• The Contractor shall provide the routing solution and the corresponding routing elements to allow the passing of the cables from each electro-mechanical element to the connection points.

• Temperature sensors shall be provided by the Contractor, previously agreed with the EPT. A simple conditioning electronics to verify that temperature sensors are operative
shall be provided by the Contractor. Housing for temperature sensors shall be included in the interface drawings

- Participate in the definition of the electrical interface between the CSU and the EMIR Control System. The interfaces shall be frozen at the DR. The Contractor and the EPT will agree the calendar for discussion of draft versions of this interface

- Submit the design for DR

Task Definition:

By Bidder.

Inputs:

The Applicable and Reference documents listed in Annexes A and B.

Deliverables:

To be delivered to the IAC before DR:

- General description of the driving electronics including:
  A. Technology (VME, CompactPCI, custom based on...)
  B. Programmability and programming language
  C. Commands accepted and examples
  D. CSU info retrieved from the driving electronics (in process, stopped, errors, etc)
  E. Command interface type (serial, CanBus, RS-422,...) and maximum distance from the CSU driving electronics to the high level control hardware.
  F. Power supply requirements

- A document describing the selection of the electro-mechanical and electronics components of the CSU

- A document describing the selection of the components of the Acceptance Control System

- A preliminary list of electro-mechanical and electronics components and control hardware, including the component description, manufacturer, supplier, etc. Data shall be supplied in Ms-Excel database tables

- The preliminary routing of cabling

- Compliance Matrix, showing the specification and interface fulfilment

- The input data to validate the interface with the EMIR Control System

- A description of the operating procedure and capabilities

- The Contractor can propose at this DR, provided the adequate documentation has been delivered, the approval of some components (long lead items) of the design that could be on the critical path

To be delivered to the IAC before start manufacturing-procurement:

- Data sheets of the electro-mechanical and electronics components of the CSU
• Data sheets of the electronic components of the Acceptance Control System
• A list of electro-mechanical and electronics components and control hardware, including the component description, manufacturer, supplier, etc. Data shall be supplied in Ms-Excel database tables
• Specification of the cabling, including routing, connector pinout, etc., according the template supplied by the EPT

To be delivered to the IAC after SQR:

• An “as built” list of electro-mechanical and electronics components and control hardware
• Hardware and software of the Acceptance Control System and the development system required to modify it in case of non standard development systems are used
• Document/s describing the software design of the Acceptance Control System. The source code shall be included
• User and Installation Manuals of the Acceptance Control System, including configuration parameters, software limits, motion profiles (acceleration ramps, current limits, speed profiles, etc.), etc.

5.2.3 Support and Test Tools

Purpose:

The Contractor shall be responsible for the specification/design and procurement/fabrication of the support and test equipment that is not an integral part of the end item but is required to handle, inspect, test, calibrate, service, repair and overhaul it. This includes equipment required at the facilities of the Contractor and at the IAC facilities.

As a minimum, the Contractor shall provide:

• The specific tools and equipment needed to mount, dismount and align the CSU
• The handling tools to handle and mount the CSU inside EMIR using a standard crane

Other needs like dummies, reference optics, small tools, etc. shall be included and budgeted in this WP according to the Contractor proposal for tests, assembly procedures and maintenance tasks.

Task Definition:

By Bidder.

Inputs:

The Applicable and Reference documents listed in Annexes A and B.

Deliverables:

To be delivered to the IAC before DR:
• A preliminary list of the support and test equipment required at factory and at the IAC main facilities
• Input data for the preparation of the ICDs (if needed) between EMIR and the handling equipment proposed by the Contractor using them

To be delivered to the IAC after SQR:

• An “as built” list of the support and test equipment required at factory and at the IAC main facilities
• Specification/design of each support and test equipment
• The support and test elements required at the IAC facilities
• References Certification: for each reference item (test plate, reference sample, length reference, etc) needed for acceptance measurement, the Contractor shall deliver a report with a certification of the properties of those items

5.2.4 CSU Production and Tests

Purpose:

The Contractor shall be responsible for:

• Manufacturing all the components of the CSU (including the thermal shields)
• Procurement of all the commercial components
• The Contractor shall include a sufficient number of spares as to permit the replacement of at least six bars with all the components needed to ensure its full motion and the control of it. As for the CSU parts which are eventually needed to induce, permit, guide and/or control the motion of the bars and which are in common for the whole or partial set of bars, one spare of each of these shall be included by the manufacturer.

The manufacturer shall include a detailed list of the spare components on its proposal.
• The Contractor shall include a sufficient number of spares as to permit the replacement of those parts of the CSU electronic and control system which are of difficult supply. This difficulty may arise because of the non-commercial class of the items and/or because of the long delivery time of them.

The Contractor shall include a detailed list of the spare components on its proposal.
• Preparation of the Integration Procedures. This document shall describe the detailed protocol and procedures to assemble and disassemble the components of the CSU
• Perform the assembly
• Preparation of the Factory Acceptance Plan. This document shall describe the procedures and the sequence of inspections and tests to be performed after fabrication and assembly for the acceptance of the CSU at factory. The inspection and test results must prove to the satisfaction of the EPT that the CSU satisfies all the specifications and the interface constraints according the Verification Matrix included in A.1 (see section 4.1). Also the verification methods shall be according the Verification Matrix.
be paid to define the functional tests of the mechanism and the metrology verification of the interfaces. The Acceptance Plan shall be reviewed and approved by the EPT.

- Perform the Factory Acceptance Tests

Cold tests can be performed either at the IAC (using the IAC cryogenic test bench) or at Factory during this phase (using the Contractor’s own cryogenic test equipment). In both cases the Contractor will keep the full responsibility of this work package. Should the tests are to be performed at the IAC, the composition of the Contractor staff attending the operations at the IAC, which will always include the test co-ordinator holding the responsibility on behalf of the Contractor, will be negotiated between the Contractor and the EPT prior to the beginning of the test period. The final option for the test site is to be proposed by the Contractor and approved by the EPT. The IAC has the following facilities available for cold tests:

- Specific designed cryostat with free cold space, cold interfaces, optical windows and electrical connectors made to fulfil the CSU requirements
- Vacuum pumping and measurement gauges
- Temperature measurement electronics
- Precision mechanical measuring devices, including a 3D coordinate measuring machine Mitutoyo FJ-805 (total range of 800x500x450 mm) that can performs non-contact measurements
- Suitable clean room with needed hardware/tools and experienced laboratory technicians

Any additional facilities, components, tools, perishable goods, cryogenic coolant, etc, will be covered by the Contractor.

The EPT reserves the right to take part in all or part of the inspections, qualification and acceptance tests.

- Elaborate the Maintenance and User Manuals

- All the required information about the position and accessibility of the CSU inside EMIR shall be provided to the Contractor by the EPT

**Task Definition:**

*By Bidder.*

**Inputs:**

*By Bidder.*

**Deliverables:**

*To be delivered to the IAC before DR:*

- Integration Procedure
- Preliminary Factory Acceptance Plan
To be delivered to the IAC before SQR:

- Factory Acceptance Plan

To be delivered to the IAC after SQR:

- The reports including the results of the CSU Test Program, according the Factory Acceptance Plan
- All the necessary Maintenance and User Manuals. These manuals shall include at least the following information:
  1. Installation procedure and plan
  2. Instructions of operation
  3. Theory of operation (functional operation, a detailed technical description of the components, etc)
  4. Description of the preventive and predictive maintenance tasks
  5. Corrective maintenance. Troubleshooting
  6. Diagrams and drawings
  7. The manuals (if any) of the commercial items included

The Contractor shall provide the EPT with detailed maintenance information, originated either from the Contractor itself or from the original supplier of the equipment. This information shall describe the maintenance tasks, in such way as to facilitate definition of the maintenance procedures. This includes access to particular points, task duration and frequency, manpower, support and test equipment and facilities required. Also the manpower skills required to perform the task and the training needs, if any, shall be defined.

- Updating of “as built” specifications and design documents, if any modification arises
- Updating of “as built” 3D model, if any modification arises
- Updating of “as built” 2D drawings, if any modification arises

Any changes on the design and analysis documentation arising after the manufacturing and assembly of the system shall be included in the appropriate documents.

5.2.5 Transport

Purpose:

Cleaning, protection, packing and shipping of the CSU to the IAC Headquarters at La Laguna.

The Contractor shall also be responsible for unpacking the items at the IAC facilities. The integrity of the items shall be verified by the Contractor by visual inspection, in the presence of a representative of the EPT.

Transport for all additional tools necessary to perform the integration, alignment or tests of the CSU at the IAC Headquarters at La Laguna.
### Task Definition:

*By Bidder.*

### Inputs:

*By Bidder.*

### Deliverables:

- The cleaning and protection procedures for transport. These procedures shall be submitted to the EPT for approval
- The Procedure for unpacking and removal of protection from the hardware at the point of delivery. These procedures shall be submitted to the EPT for approval
- The CSU assembled, tested and factory accepted delivered at the facilities of the IAC
- An inspection report after the visual inspection of the items

#### 5.2.6 Acceptance at the IAC

### Purpose:

The EPT shall be responsible for:

- Preparation of the IAC Acceptance Plan. This document shall describe the procedures and the sequence of inspections and tests to be performed at the IAC for the final acceptance of the CSU. The EPT will provide copies of this plan to the Contractor for information purposes.
- Perform the IAC Acceptance Tests. The Contractor is invited to assist to these tests

*Task Definition:*

*By EPT.*

### Inputs:

*By EPT.*

### Deliverables:

*Not Applies.*

#### 5.2.7 Management and Systems Engineering

### Purpose:

The Management and Supervision of the whole work defined for in this SOW, likewise for Systems Engineering. Given the special nature of the EMIR Project, emphasis shall be placed on the strict compliance of the Configuration Control and Project Control.
At all times the Contractor shall have control of the documents pertaining to this Project.

**Task Definition:**

*By Bidder.*

**Inputs:**

*By Bidder.*

**Deliverables:**

- Monthly Reports of the work progress
- Management and project control
- Configuration change, specifications and interfaces control
- Risk analysis
- System costs

*To be delivered to the IAC before DR:*

- A requirements compliance matrix for the design. This document shall include references to other design documents or test results as required to justify the compliance of the design
- A complete list of critical items, i.e., items whose delivery is in the critical path and has direct impact on dates

*To be delivered to the IAC after SQR:*

- A requirement compliance matrix for the design as built

**5.3 Delivery**

Contractor shall be responsible for the transportation of the items to the delivery place.

The place of delivery of the Configurable Slit Unit shall be IAC Headquarters, La Laguna, Tenerife, Canary Islands, Spain (to be confirmed and agreed upon at the time of the contract signature).

The place of delivery of the documentation shall be the EPT at the IAC Headquarters.

**5.4 Acceptance**

The Acceptance of the Configurable Slit Unit shall be declared after successful test defined in the Factory Acceptance Plan and the IAC Acceptance Plan. Two acceptance steps shall be performed:
• Factory Acceptance
• IAC Acceptance

5.4.1 Factory Acceptance

The EPT shall declare Factory Acceptance of the CSU within two weeks after reception of Factory Acceptance Report (see 5.2.4), if all the acceptance criteria specified in the Factory Acceptance Plan are met.

5.4.2 IAC Acceptance

The EPT shall declare IAC Acceptance of the CSU after reception of the CSU at the IAC Headquarters if all the acceptance criteria specified in the IAC Acceptance Plan (see. 5.2.6) are met.

6. PROJECT MANAGEMENT

6.1 Schedule

The Contractor will maintain a Project Plan for all the activities (design steps, production steps, inspections and tests) and milestones.

The Contractor shall meet the following schedule (to be agreed between the Contractor and the EPT):

• The Authorisation to Proceed (ATP) will be given to the successful Bidder not later than TBC after final publication of call for proposals
• The Authorisation to Manufacture (ATM) will be given to the Contractor on TBD (to be defined by the Contractor and agreed with the EPT). Partial ATM’s can be given (to be proposed by the Contractor and agreed with the EPT)
• The Configurable Slit Unit assembled, aligned, tested and factory accepted, shall be received at the IAC not later than TBC after closing ATP date
• The detailed dates for the DR, and SQR shall be agreed between the EPT and the Contractor
• The detailed dates for IAC Integration and Acceptance shall be agreed between EPT and the Contractor

6.2 Reporting

The Contractor shall report monthly to the EPT. The monthly progress reports shall at least include:

1. Description of activities performed during the period
2. Activities plan for the next period
3. A list of meetings with dates, purpose and participants
4. Highlights and concerns
5. List of critical items affecting the delivery date
6. Progress of each task of the project plan and certification of completed works

The Contractor shall be responsible for the minutes of all the meetings between the Contractor and the EPT, unless agreed between the parts. The EPT will have 10 days to approve the minutes after their reception.

Independently and in addition to the monthly reports, the Contractor shall immediately notify the EPT about any event which could affect the scope or the schedule of the works.

During the design phase and according to the evolution of the design, the Contractor shall provide to the EPT with the updates of the ICDs

6.3 Reviews, Meetings and Audits

6.3.1 Kick Off meeting

A Kick Off meeting (KO) between the Contractor and the EPT will be held at the IAC Headquarters within 10 days after the Authorisation to Proceed (ATP). The Contractor shall attend this meeting with authorised representatives to agree any pending technical or contractual issue.

During the KO, the contractor technical proposal will be reviewed and commented together with the content of this SOW and the contractual technical specifications. Short term actions, those with closing date not later than one month from the KO meeting date, resulting from this meeting must be duly closed for this milestone to be considered as passed.

6.3.2 Design review meetings

The development of the design shall be submitted to reviews, with the participation of personnel of the EPT and external consultants, to be held at the IAC Headquarters. The dates and place of these reviews shall be reflected in the Project Schedule.

The Contractor shall provide the EPT with a complete set of documentation for any of the review meetings, two weeks before the date of the meeting.

After the review meeting, the EPT will have two weeks to send comments and ask for changes or additions to the work developed by the Contractor. After this period, the Contractor shall satisfactorily incorporate the changes and additions in the work stated in this SOW within the next month. After the Contractor incorporates the changes to the satisfaction of the EPT the Design Review will be considered fulfilled.

The design reviews for this SOW shall the DR. The Contractor shall cover the expenses of the contractor personnel and/or its representatives to attend this meeting.
6.3.3 Meetings at Contractor facilities

With due advance notification, representatives of the EPT will visit the Contractor facilities in a discretionary manner to ascertain progress. The EPT will have access to all of the Contractor documentation.

If deemed necessary by the EPT, the Contractor will provide adequate office facilities and secretarial help for an EPT resident engineer at the Contractor facilities. This will be quoted simply as a per-month rate.

7. IAC QUALITY SYSTEM REQUIREMENTS

7.1 Documentation requirements

7.1.1 Electronic and paper-copy versions

The Contractor shall deliver the original and two paper copies, plus an electronic version in CD-ROM of each technical document. Drawings shall be provided both in full size and in reduced DIN A-3.

7.1.2 Formats

- The documents shall be produced using MS-Word 2000
- The drawings shall be delivered in AutoCad 2000
- Finite Element Models shall be made using Ansys v. 7.1
- The 3D dimensional model shall be delivered in Pro-Engineer Wildfire
- Database tables shall be produced using Ms-Excel 2000

The use of updated versions of the above software packages must be approved by the EPT.

7.1.3 Configuration codes

The Contractor shall use the codes established by the EPT for the Configuration elements (subsystems, components and interfaces). The EPT will provide these codes.

The Contractor shall use the coding system for drawings as established by the EPT. The EPT will provide the Contractor with instructions for coding the drawings.

The technical specification documents shall be under Configuration control. The EPT will submit these documents and the drawings referred to in the previous point to Configuration control. This means that both shall completely and unambiguously define the whole of the physical and functional characteristics of the CSU.
Each configuration document shall contain at least:

- The Contractor code (to be provided by the EPT)
- The date and the revision number
- The change control table
- The applicable and reference documents table
- The configuration elements table (which shall include all the elements that constitute the subject of the document)
- Table of contents
- A hierarchical numbering of the sections of the document so that they can be easily referenced

### 7.1.4 Templates

Drawings shall be developed using the IAC Project templates. The EPT will provide the Contractor with the templates for drawings (electronic format).

Nevertheless, the use of Contractor’s templates for drawings must be approved by the EPT.

### 7.1.5 Language

The documents shall be written in English.

### 7.1.6 Units

The Contractor shall use the International System of Units (Kilogram, meter, second).

### 7.1.7 Dates

The date system shall follow the format: day-month-year.

### 7.1.8 New editions of documents

Every new edition of any document or drawing shall be clearly identified by the Contractor.

### 7.2 Changes in the specifications

The Contractor shall make a formal request to the EPT for any change in the technical specifications of the contract, or any decision which could be in conflict with them.

The Contractor shall designate a person responsible for the configuration management. This person shall be in charge of:
Communication with the EPT on all subjects related to the configuration management.
Guaranteeing that the configuration documents generated by the Contractor meet all the EPT standards related to configuration control.
Making requests for configuration changes to the EPT

7.3 Standardization

Technical standards to be used within this contract shall be proposed by the Contractor and approved by the EPT.
8. DOCUMENTATION SUPPLIED BY THE EPT

The Applicable and Reference Documents listed at the end of this SOW will be provided by the EPT to the bidders.

Other information that shall be provided:

- Configuration element identification codes
- Templates for elaboration of drawings (electronic format)
- Templates for configuration change proposals
- Instructions for the coding of drawings
- Contractor Code
ANNEXES

A. LIST OF APPLICABLE DOCUMENTS

<table>
<thead>
<tr>
<th>Nº</th>
<th>Document title</th>
<th>Code</th>
<th>Issue</th>
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<tr>
<td>A.1</td>
<td>Configurable Slit Unit Contractual Specifications</td>
<td>DM/SR-EMI/577v.3</td>
<td>3</td>
</tr>
<tr>
<td>A.2</td>
<td>CSU Physical Envelope</td>
<td>DR/IN-EM-CU/090</td>
<td>A.0</td>
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<tr>
<td>A.3</td>
<td>CSU – OB Mechanical Interface</td>
<td>DR/IN-EM-IM-410/001</td>
<td>A.1</td>
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B. LIST OF REFERENCE DOCUMENTS

<table>
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<tr>
<td>R.2</td>
<td>CSU-EMIR Interface Control Document</td>
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