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**S**outhern  
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Work Package: **SA1 – Link Upgrade**

Deliverable No: **SA1-1.5**

Deliverable Name: **Statement of Work for the  
optical infrastructure between  
Ruta5 and Santiago area (Items  
1b, 2, 3, 5a, 5b)**

Date: **2009/11/23**

Nature<sup>1</sup>: **REPORT (R)**

Dissemination Level<sup>2</sup>: **CO**

#### **Abstract**

This document defines activities, processes, and deliveries of the optical infrastructure identified as Item 1b, 2, 3, 5a, 5b in the SA1.1 Technical Specification, namely the connection from the “La Varilla” crossroad (Ruta5/B710 crossroad) to the end points in Santiago, ESO and REUNA. The procurement is executed by ESO.

<sup>1</sup> nature of the deliverable: **R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

<sup>2</sup> Dissemination level **PU** = Public  
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## LIST OF ABBREVIATIONS

ADSS	All Dielectric Self Supported (fibre cable)
DP	Data Package
DR	Design Review
CfT	Call for Tender
KoM	Kick-off Meeting
MoM	Minutes of Meeting
N/A	Not Applicable
OCA	Observatorio Cerro Armazones
PA	Provisional Acceptance
SLA	Service Level Agreement
SoW	Statement of Work
T <sub>0</sub>	Contract Start

## **1 RELATED DOCUMENTS**

### **1.1 Applicable documents**

The following Applicable Documents (AD) form part of the present document to the extent specified herein. In the event of conflict between Applicable Documents and the content of the present document, the content of the present document shall be taken as superseding.

- AD1 EVALSO-SA1-1.1, "Technical Specification for the procurement of the EVALSO optical infrastructure"
- AD2 EVALSO-SA1-1.2, "Area Survey"
- AD3 "SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL", TELEFONICA, MAY2009 and following clarifications.

### **1.2 Reference documents**

N/A

## 2 SCOPE

This SoW includes all activities and deliveries of a 10year IRU for the following items:

- Item 1a: one fibre pair from “La Varilla” crossroad, namely Ruta5/B710 crossroad, to REUNA Offices in Antofagasta (ref., AD1, 3.1 1b)
- Item 2: Fixed Wavelengths (LAMBDA 10Gbps) between REUNA Offices and TELEFONICA PoP in Santiago (ref., AD1, 3.2)
- Item3: Housing space for EVALSO equipment at TELEFONICA PoP in Santiago (ref., AD1, 3.3)
- Item 5a: Dark fibre between TELEFONICA PoP in Santiago and ESO offices in Santiago/Vitacura (ref., AD1, 3.5, 5a)
- Item 5b dark fibre between TELEFONICA PoP in Santiago and REUNA offices in Santiago/Providencia (ref., AD1, 3.5, 5b)

The procurement of this optical infrastructure is part of the EVALSO Optical Infrastructure. More on the EVALSO project and is available in AD1, chapter 2. The expected complete EVALSO Optical Infrastructure is described in AD1, chapter 3.

### **3 PROJECT DEFINITION**

#### **3.1 Item Definition**

##### **3.1.1 Item 1a: dark fibre from “La Varilla” to REUNA/Antofagasta**

The item includes:

- Connectivity in La Varilla crossroad (AD2) to the new cable under construction (AD1, 3.1, Item 1a) by a third party, not in the scope of the present contract. The connection point is a vault (provided) in the ground close to the pole of the existing cable in the proximity of the crossroad. Splice box, connection, splicing from the existing cable, additional cable to reach the vault, etc are instead in the scope.
- One dark fibre pair from the existing infrastructure, as from proposal (AD3).
- The connectivity on a patch panel (included) to be installed in a rack space (provided) at the REUNA Antofagasta offices.

The item includes all needed sub-items (fibre cable, splice` boxes, concrete man holes, end point cabinet, etc) as identified and specified in the “SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL” (ref. AD3, section 4.2 and following relevant clarifications)

The item shall comply with all requirements set in the SA1-1.1 Technical Specification for the Item 1b (ref. AD1, 3.1 and any other relevant section setting requirements for Item 1b and/or for the whole system).

In the rest of the document, the terms “Item 1b” and “existing fiber” are considered synonyms of the above item definition.

##### **3.1.2 Item 2: Fixed Wavelengths (LAMBDA 10Gbps)**

The item includes:

- The connectivity on a patch panel (included) to be installed in a rack space (provided) at the REUNA Antofagasta offices of a dark fibre connecting to the TELEFONICA POP in Antofagasta
- Connectivity from the REUNA Offices in Antofagasta to the provided PoP in Santiago using a Fixed Wavelengths (LAMBDA 10Gbps).
- The connectivity on a patch panel (included) to be installed in the housing space, as from Item 3, at the TELEFONICA PoP in Santiago.



The item includes all needed sub-items (fibre cable, connections, network and optical equipment for management of the lines and protection, etc) as identified and specified in the “SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL” (ref. AD3, section 4.3.2 “Link OTU2 (10Gbps) WITH SUPPORT”) and following relevant clarifications.

The item shall comply with all requirements set in the SA1-1.1 Technical Specification for the Item 2 (ref. AD1, 3.2 and any other relevant section setting requirements for Item 2 and/or for the whole system) and include the provisions needed to implement the Add&Drop functionality in the Copiapo and La Serena nodes, as detailed in AD1, 3.2.1.

In the rest of the document, the terms “Item 2” and “Lambda” are considered synonyms of the above item definition.

### **3.1.3 Item3: Housing space at TELEFONICA PoP in Santiago**

The item includes housing space as defined in the “SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL” (ref. AD3, section 4.3.6) and following relevant clarifications.

The item shall comply with all requirements set in the SA1-1.1 Technical Specification for the Item 2 (ref. AD1, 3.3 and any other relevant section setting requirements for Item 3 and/or for the whole system).

### **3.1.4 Item 5a: Dark fibre between TELEFONICA PoP and ESO**

The item includes:

- The connectivity on a patch panel (included) to be installed in the housing space at the TELEFONICA POP in Santiago.
- Continuous Dark Fiber between the TELEFONICA PoP in Santiago and the ESO Vitacura office.
- The connectivity on a patch panel (included) to be installed in a rack (provided) in the ESO Data Center.

The item includes all needed sub-items (fibre cable, connections, etc) as identified and specified in the clarification meeting held on June 25<sup>th</sup> and reported in writing on July02 that fully replace what in the proposal “SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL” (ref. AD3, section 45).

The item shall comply with all requirements set in the SA1-1.1 Technical Specification for the Item 2 (ref. AD1, 3.5 Item 5a and any other relevant section setting requirements for Item 5a and/or for the whole system).

In the rest of the document, the terms “Item 5a” and “ESO fiber” are considered synonyms of the above item definition.

### 3.1.5 Item 5b: Dark fibre between TELEFONICA PoP and REUNA

The item includes:

- The connectivity on a patch panel (included) to be installed in the housing space at the TELEFONICA POP in Santiago.
- Continuous Dark Fiber between the TELEFONICA PoP in Santiago and the REUNA Providencia office.
- The connectivity on a patch panel (included) to be installed in a rack (provided) in the REUNA Data Center.

The item includes all needed sub-items (fibre cable, connections, etc) as identified and specified in the clarification meeting held on June 25<sup>th</sup> and reported in writing on July02 that fully replace what in the proposal “SCHEDULE, MANAGEMENT, AND TECHNICAL PROPOSAL” (ref. AD3, section 45).

The item shall comply with all requirements set in the SA1-1.1 Technical Specification for the Item 2 (ref. AD1, 3.5 Item 5b and any other relevant section setting requirements for Item 1b and/or for the whole system).

In the rest of the document, the terms “Item 5b” and “REUNA fiber” are considered synonyms of the above item definition.

## 3.2 Project Phases Definition

No intermediate phases are defined. As the system is structured in items that can be delivered and preliminary tested independently, three groupings are defined:

- The infrastructure in the Santiago metropolitan area including items 5a, 5b and 3, namely the dark fibers connecting the ESO and REUNA end points to the TELEFONICA Pop and the housing space.
- The LAMBDA (Item 2)
- The fiber to Antofagasta (Item 1b)

## 3.3 Project Schedule and Key Milestones

The project schedule encompassed approximately eight months. Assuming the contract signature as  $T_0$ , key Milestones are:

<u>Kick-off Meeting</u> (KoM)	$T_0 + 2weeks$
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<u>Design Review (FDR)</u>	T <sub>0</sub> + 6weeks
<u>Provisional Acceptance of Item 3 + 5a +5b (PA-3-5a-5b)</u>	T <sub>0</sub> + 10weeks
<u>Provisional Acceptance of Item 2 (PA-2)</u>	T <sub>0</sub> + 14weeks
<u>Provisional Acceptance of Item 1b (PA-1b)</u>	T <sub>0</sub> +24weeks
<u>Provisional Acceptance for the whole system (PA)</u>	T <sub>0</sub> +36weeks

### 3.4 Deliverables

#### 3.4.1 Deliverable Items

Items 1b, 2, 3, 5a, 5b as defined in 3.1 and their maintenance as defined in AD1sections 4.4 and 4.5 over the IRU period.

#### 3.4.2 Deliverable Documents

Up to PA:

- Project Management Plan: draft 3 days before KoM, final as part of the DR DP
- PA/QA Project Manual: draft 3 days before KoM, final as part of the DR DP
- Complete set of Technical Specification for all Items (specification, plans, attenuation verification, material lists, logistic, test plan and procedures, ...): draft one week before DP, final one week after DR. Update according to “as build” at PA.
- Operation Manual with detailed description of:
  - All physical interfaces (panels, cable coding, etc)
  - SLA
  - Monitoring data
  - Coordinates of the call centre and modality to report faults
  - Any other provisions or instructions needed for the operation of the system over the whole period.

Draft version delivered one week before DP, final at PA.

After PA:

- SLA report every 6 month, as defined in AD1, 4.5.2.
- Updated version of any delivered document that may result from the implementation of agreed changes.

The exact content and format of each document will be defined at KoM.

### **3.5 ESO Undertakings**

- Within  $T_0 + 4$  weeks, ESO shall confirm the exact location of the end points of all fibres.
- Availability of Rack space and access at the ESO Data Centre in Vitacura in due time for the installation of 5a termination panel.
- ESO will coordinate with REUNA access to REUNA premises and availability of Rack space in due time for the installation of 2 and 5b termination panel.
- ESO will coordinate with third party for the connectivity between Item1a (not in the scope) and Item 1b.

In addition to the technical responsible person, as defined in the Contract, an ESO contact person will be designated as contact point in Santiago for technical matters.

## 4 TASKS APPLICABLE TO ALL PROJECT PHASES

### 4.1 Project Management & Control

#### 4.1.1 Project Management

- 1° The Project Management shall be separated from other projects and operations to the extent necessary to prevent interference with the effective and timely completion of the Contract.
- 2° The Contractor's Project Management Office shall coordinate and control the project resources, all technical and commercial activities, and manage all activities required to successfully complete the Contract.
- 3° The Contractor shall identify a Project Manager that shall be the principal point of contact, and have full authority to deal with all matters relate to the contract, including but not limited to technical matters.

#### 4.1.2 Project Plan

- 1° As part of the Project management Plan, the Contractor shall implement a Project Plan, identifying all activities and deliveries and their expected planned date.
- 2° Deviations from the Project Plan shall be reported to ESO, for approval insofar as such deviations may affect the contractual timeline, for information if not.
- 3° The Project Plan shall be updated or reconfirmed with each Progress Report.

#### 4.1.3 Project Reporting

Project Reports shall be delivered by the Contractor at every key milestone and, if no milestones happen in between, every two weeks.

The following reports are expected:

- KoM Report                       $T_0 + 2\text{weeks}$
- DR Report ...                       $T_0 + 6\text{weeks}$
- Progress Report                       $T_0 + 2/4/8/....\text{weeks}$
- Final Project Report    after PA

#### 4.1.4 Progress Meetings

With the exception of the key Milestone related activities, no progress meeting are planned, although a progress meeting can be called by either party during the

project execution. Unless physical presence in Chile is possible, all meetings will take place using video or tele-conference.

#### 4.1.5 Project Reviews

Considering that the system is made up by existing facilities (Items 1a, 2, and 3) or by low technological risk items (5a and 5b) only one Design Review (DR) is planned. For it:

- the review Data Package (DR-DP), as defined in 3.4.2 shall be submitted to ESO one week before the Review date
- ESO shall provide comments within the day before the Review date
- Review meetings will take place at Contractor premises and/or by Video Conference. At the review meeting, all comments are discussed and classified as:
  - Accepted
  - Rejected
  - To be Investigated (Action Items set to either ESO or the Contractor)
- Contractor shall deliver the DR Report within 3 working days from the venue.
- Unless agreed otherwise, documents are delivered in the updated version within one week after the DR

#### 4.1.6 Documentation

All documentation shall be delivered in electronic format as PDF and Source format (OFFICE 2003 compatible format) and in one signed paper copy.

Documents shall be numbered as “SA1.1-1.5-*nnn*”, where “*nnn*” is a progressive number and bear the EVALSO and FP7 logos on the front page. A MS WORD example will be provided by ESO at T<sub>0</sub>



The language for written documentation shall be English unless the documentation in Spanish is required. In such case a few pages executive summary in English shall be provided too.

## **4.2 Configuration Management**

CM will be part of the overall PA approach and described in the PA Manual (see 4.3).

Changes to the reference baseline established at the DR, as well as Requests for Waivers can be submitted by the Contractor on a free format. ESO will process all requests within 4 weeks.

Over the duration of the project, the Contractor is requested to maintain an up to date Configuration Item Data List (CIDL) tracing the identifier and status of all documentation items. Copy of such list will have to be provided as attachment to every progress report.

## **4.3 Product Assurance**

T Contractor shall develop a Project PA/QA Manual to be delivered as draft at KoM and final at DR.

## **4.4 Accommodation and Services for ESO Personnel**

N/A

## **4.5 Training**

One training session shall be delivered by the Contractor to ESO and REUNA personnel on the modality to notify operational problems and to request maintenance.

## **4.6 Restriction of Use**

The requirements set by AD1 section 4.8 fully apply.

The terms "Organizations involved" include all current members of the EVALSO projects as well current and future projects where ESO is involved.

## **4.7 Dissemination and Public Outreach**

The requirements set by AD1 section 4.9 fully apply.

## **5 ACCEPTANCE PROCEDURE**

Provisional acceptance of each Item can take place separately.

The PA of the overall system will take place after that all items have been delivered and the connection to Item 1a (not in the scope) is completed.

No SLA is applied until the overall PA milestone is reached. The use of the single items after their acceptance, but before the PA is considered to be “dry run” with no guaranteed SLA from the Contractor side. This time can be used by ESO and the EVALSO Members to carry tests and fine tuning of the system.

After PA milestone, the system is considered in operation and the SLA will be fully in place for all items.