



ALMA OSF-SCO Optical Infrastructure

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership among Europe, North America and East Asia in cooperation with the Republic of Chile.



Background

ALMA OSF-SCO currently uses a 100Mbps Microwave (MW) link.

The projected needs for full array operations is 300Mbps. Some recent developments may even move upward such value.

Considering:

- Microwave OPEX scales more or less linearly with capacity.
- Use of optical paths - dedicated Lambda or, even better, dedicated fiber (s) could cover current and long term needs;
- The EVALSO FP7 project, where ESO was one of the members, has available capacity between Antofagasta and Vitacura ESO Campus

A feasibility study for the use of optical paths was decided to ...



Goals

.... create a communication infrastructure between the OSF site and the JAO offices in Santiago capable of:

- Providing a long term (>15 years) solution infrastructure
- Coping with projected operations needs (>1Gbps) and scale further
- Minimize latency between the end sites
- Being available as soon as the array is completed (end 2013)
- Having reasonable upfront CAPEX and very low future OPEX
- If cost effective, taking advantage of the existing EVALSO capacity



Key Elements and Intention

Within the following framework:

- Performance: at least a 2.5Gbps LAMBDA
- Cost: A reasonable cost envelope
- Schedule: Delivery within 2013/Q4

ALMA is actively looking for the development of such infrastructure to connect the OSF and Santiago.

Four optical paths have been identified:

First Path: OSF – San Pedro

Second Path: San Pedro – Calama

Third Path: Calama – Antofagasta

Fourth Path: Antofagasta – Santiago Office



**First Path: OSF-
S.Pedro**

AOS

OSF



Second Path: S. Pedro-
Calama

Third Path:
Calama-
Antofagasta

ALMA

First
Path: OS
F-
S. Pedro

Fourth Path:
Antofagasta-
SCO

La Varilla

OCA

ESO





Strategic Advantages

Relevance to ALMA strategic priorities

Efficient communication is a strong pre-requisite for all type of scientific and operational processes involving remote observing facilities. With the availability of high bandwidth:

- data transfer processes can be made more efficient in both time and quality,
- data analysis, archiving, and other computational analysis can be located where more convenient, reducing operational costs,
- people interaction opportunities are increased by the enhanced quality of the audio and video
- other organizational processes and activities may be moved from OSF to SCO with substantial savings in travel and accommodation costs.

...continue



Strategic Advantages

Scientific Competitiveness

Better communication can boost also scientific results because of:

- Data quantity and quality are not bottlenecked by the remoteness of the site
- Reducing operational costs frees resources for other tasks, improving long term sustainability
- Improved cooperation among people on the different sites maximizes the exploitation of the technical and human capital of the ALMA installation.

Operations Requirements

This new system replaces the existing one without major changes at technical level for the end user. Operation is at the same level as now, but with a higher stability.



In Summary

Feasibility study completed (2011)

Project Plan been actively developed (as we speak)

No doubts about strategic importance of having it

Goal: To have it operational by end of 2013