Collaboration of R&E Networks

REUNA
Red Universitaria Nacional

José Palacios, REUNA

EVALSO
Enabling Virtual Access to Latin-America Southern Observatories

Fernando Liello
Fernando.Liello@ts.infn.it

EVALSO: a cooperative program

EVALSO

Enabling Virtual Access to Latin-America Southern Observatories

The Consortium

UniTs, Università di Trieste

ESO, European Organization for Astronomical Research in the Southern Hemisphere

RUB, Astronomisches Institut Ruhr-Universität Bochum

CLARA, Cooperación Latino Americana de Redes Avanzadas

QMW, Queen Mary University of London

UL, Universitiet Leiden

INAF, Osservatorio Astronomico di Trieste

GARR, Consortium GARR (Gestione Ampliamento Rete Ricerca)

REUNA, Red Universitaria Nacional

EVALSO: Facts

Beginning: 1st January 2008

Duration: 42 Months

Landmarks

Preliminary Study	Apr. 2009
Infrastructure Selection	Dec. 2009
Infrastructure in Operation	Oct. 2010
Research and development of tools and procedures for scientific activities	2010 – 2011
Test phase, scientific activities	2011
Infrastructure in Use	2011-2020

Total budget: 4,302,036 €

Funding from the EC: 1,700,000 €

EVALSO: Motivations

- Concentration of high value scientific resources in a reduce number of places.

- Reduced number of places providing clear skies for astronomical observation.

- Technological development in Astronomy and changes in procedures.
  - VISTA y VST in one year will generate a bigger amount of data than the VLT since1999
  - VISTA y VTS will left data available for community

- Information Technology can solve these problems

EVALSO: Challenge
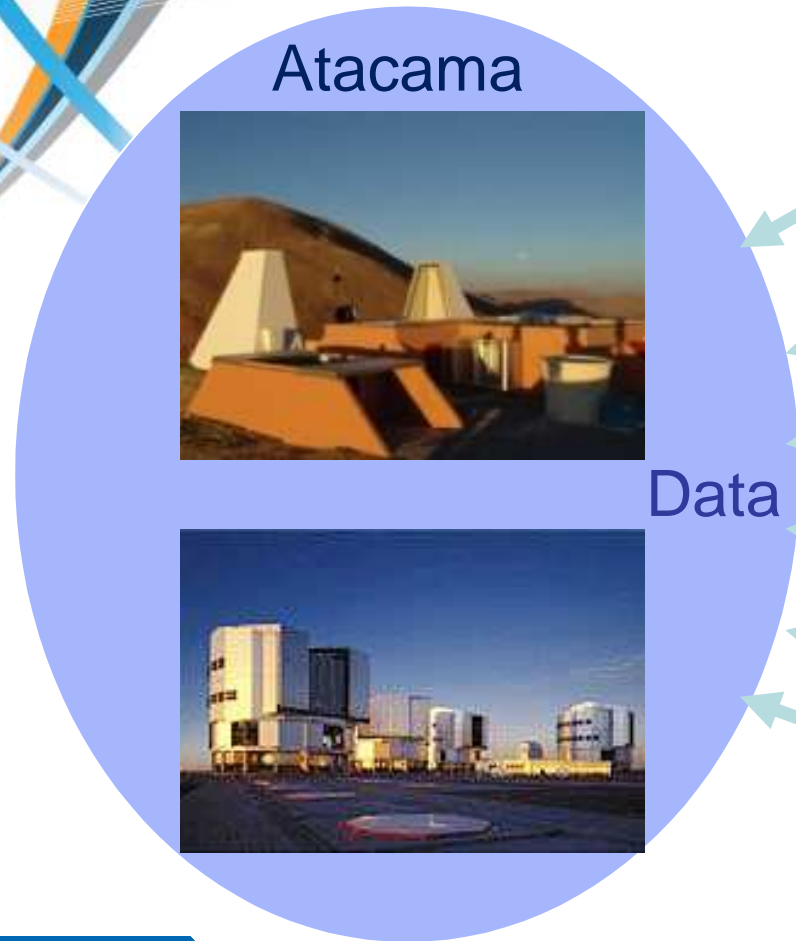
EVALSO: Objectives

- Create High Capacity Telecommunications Infrastructure for the ESO and Cerrro Paranal Observatories located in Antofagasta.

- To allow innovative changes in scientific as well as operational activities developed in the observatories.

EVALSO: Strategy

The EVALSO infrastructure is based on existing facilities, both commercial and academic networks.

EVALSO uses the infrastructure of **REUNA** and **RedCLARA** and the transit of data through the European federal research network infrastructure is assumed to be done by **ALICE, GEANT**, and the European **NRENs**.
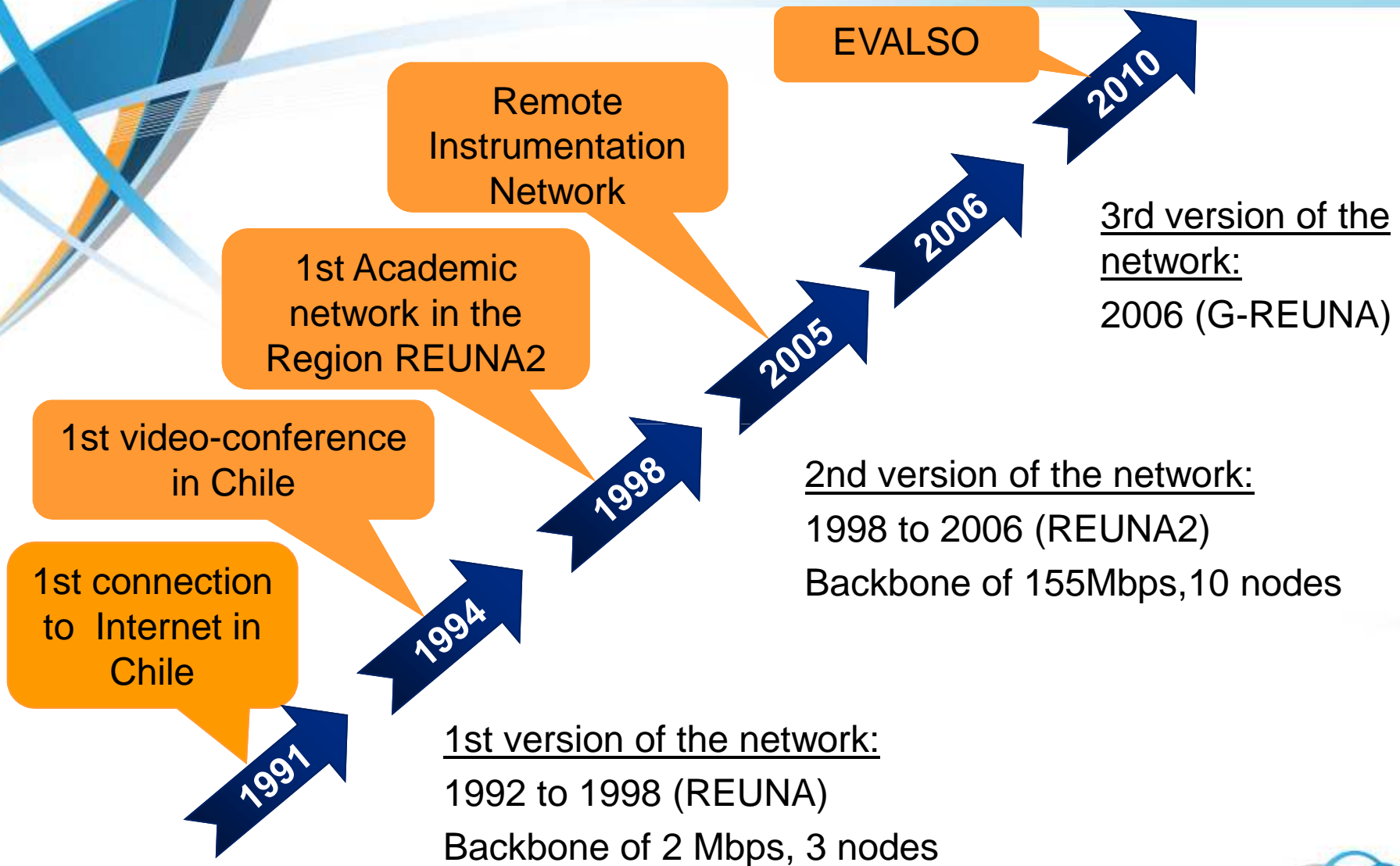
REUNA

REUNA:
The National Research and Education Network of Chile

Private Consortium:

- 16 Universities, Conicyt and AURA Consortium.

- REUNA is globally interconnected with the NRENs of Latin-America (RedCLARA), North America (Internet2 and Canarie), Europe (GÉANT2) and Asia Pacific NRENs.

- Is the e-Infrastructure for the experimentation in advance services and technologies

- Is the platform for the effective collaboration between working groups of investigation and education worldwide distributed.

Some Landmarks in Reuna´s life time

EVALSO

Remote Instrumentation Network

1st Academic network in the Region REUNA2

1st video-conference in Chile

1st connection to Internet in Chile

2010

2006

2005

1998

1994

1991

3rd version of the network:
2006 (G-REUNA)

2nd version of the network:
1998 to 2006 (REUNA2)
Backbone of 155Mbps,10 nodes

1st version of the network:
1992 to 1998 (REUNA)
Backbone of 2 Mbps, 3 nodes

EVALSO

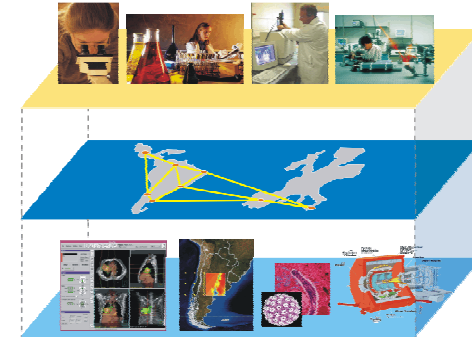REUNA Ciencia y Educación en Red

Reuna: collaboration

Remote Instrumentation
UCRAV and RINGrid

Chile in international GRID initiative:
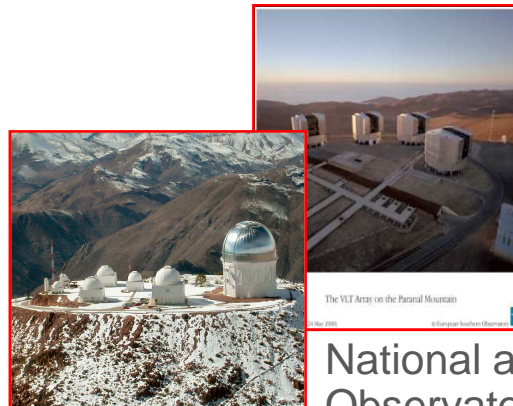
EELA project

Network for Scientific and Academic Collaboration

Collaborative environments

Collaboration in Arts

National and International Observatories connections

The **RedCLARA** is an infrastructure created in the last years with EC support to provide a framework for collaboration and communication in Latin-America:

- 13 countries connected.

- More than 1,000 institutions.

- Supported by the European Commission – ALICE2.

- REUNA is also part of this space.

EVALSO: Communication Infrastructure

Localization

Construction of the new fibre
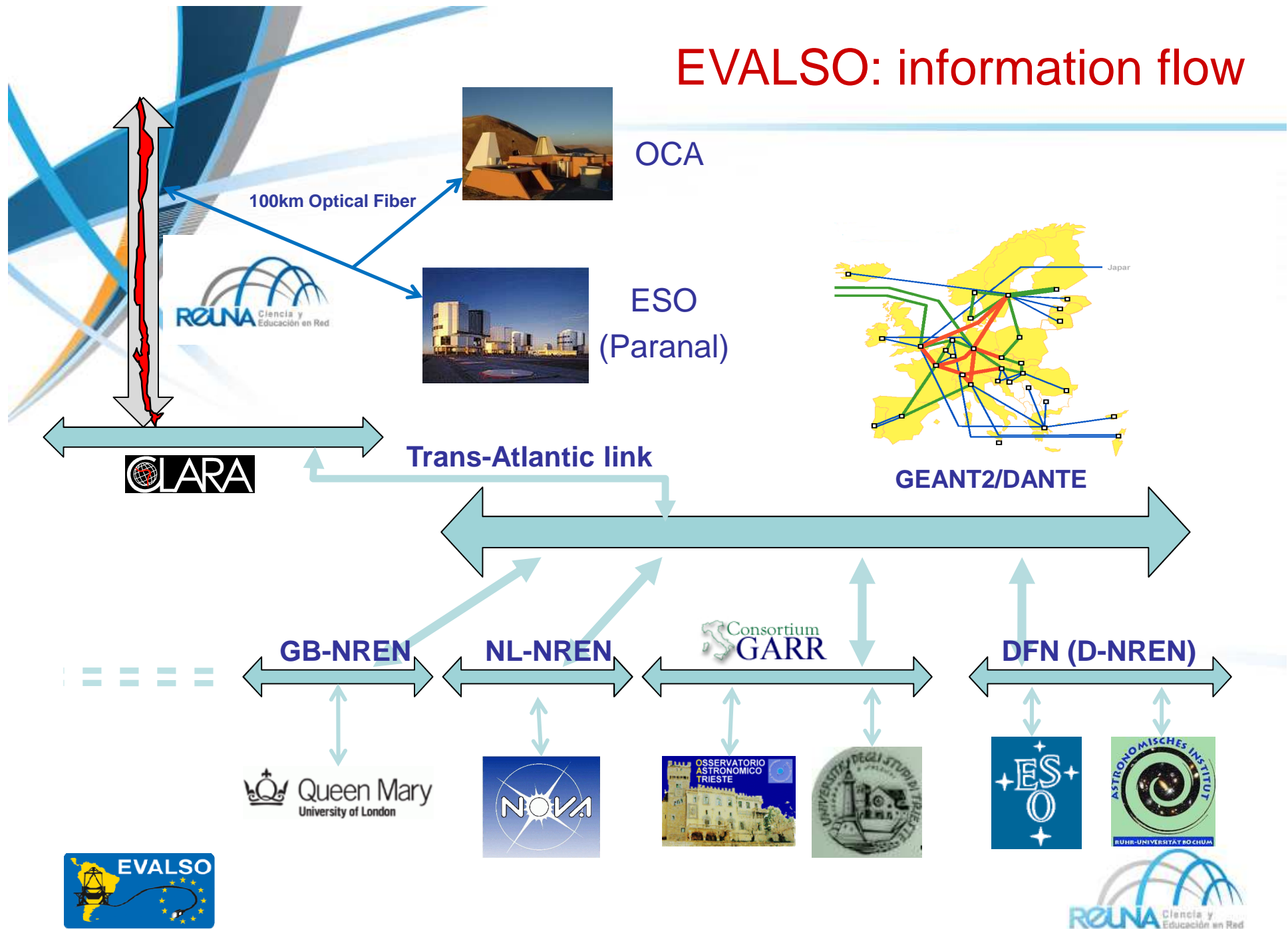
Construction of 100 Km of fibre-optic cable Providing:

- High speed
- High capacity

Atacama Desert

video

EVALSO: information flow

OCA

100km Optical Fiber

ESO
(Paranal)

GEANT2/DANTE

CLARA

Trans-Atlantic link

GB-NREN   NL-NREN   Consortium GARR   DFN (D-NREN)

EVALSO

EVALSO: opportunities

- ## Builders (Engineering)

  – Experts can´t be in field waiting for a failure to happened in an instrument or in the telescope.

  – EVALSO will allow to test advanced techniques of remote support

- ## Operators (Service Model)

  – Current observation model involve high complexity and management of data and telecommunications.

  – System main node it is located in ESO Headquarters (Garching - Germany)

  – EVALSO will help to optimize this procedure, allowing the detection and execution of maintenance activities in on a timescale dramatically shorter than possible today.

- ## Users
  - VISTA y VST will revolutionize this area because of the amount of data that will be available for the astronomer community.
  - Currently the information get to the astronomer between 10 to 15 days after the observation.
    - Data is stored in disc, sent to Germany, calibrated, archived and then sent to the end user.
  - Being able to have the information almost instantaneously will allow to generate advanced observations models:
    - Remote monitoring
    - Remote operation
    - Remote observing

EVALSO: Scientific outcomes

- **Fast Data Access**: Dramatically improvement of the period of time the data is available to the end users.

- **Virtual Presence**: EVALSO will allow virtual presence in the observatory for the Scientifics, engineers and experts remotely located and even EVALSO will explore the option of remote observing.

- **New observation models**: The telecommunication infrastructure and tools being developed will allow to research new observing models.
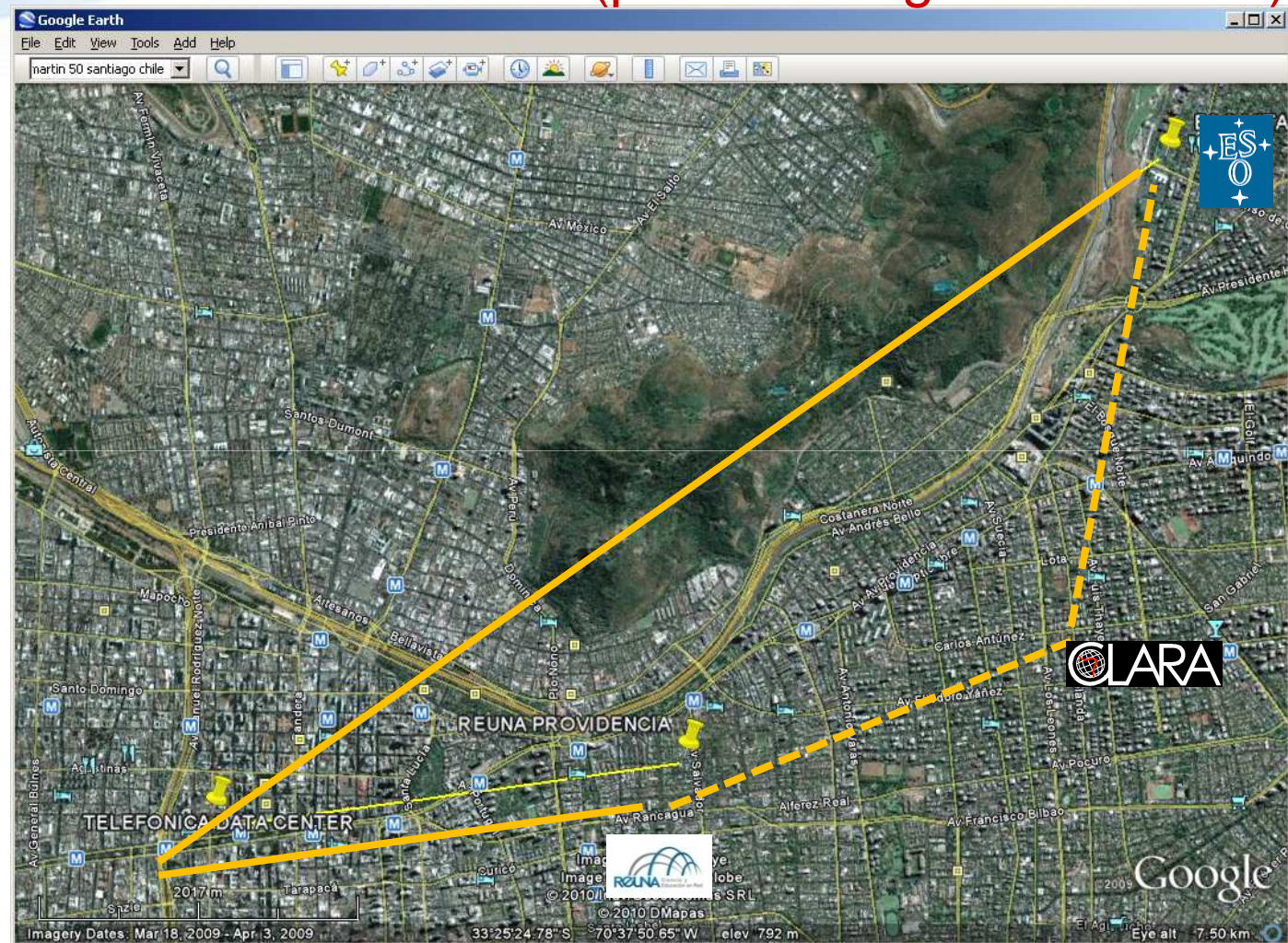
EVALSO: connections to ESO and REUNA
(planned ring with CLARA)

Communication

AXYS

TELEFONICA

ADEXUS - CIENA

Final Remarks

- EVALSO initiative is unique in Chile, which connects astronomical observatories in Paranal and Armazones to Europe and to the national academic community through a high-speed network.

- EVALSO is a milestone in both technology and collaboration ways:
  - Provides the highest speed network for scientific purposes in Chile.
  - It is the result of the articulation of institutions from different countries.
  - Has also impact on Latin America encouraging the countries efforts for developing high-capacity networks scientific collaboration among them and through RedCLARA with the rest of the world.

Final Remarks

- EVALSO represents a benefit for astronomy and also encourages collaboration in various scientific areas at national and international academic level.

- EVALSO places Chile in a better technological condition to face the challenge of installing large astronomical facilities.

- **EVALSO is a good example of how to address mayor issues of collaborative R&E needs and exposed REUNA as an efficient communication facility for supporting R&E network development.**

Thank for your kind attention !