



# **AccessNova: A Global Collaboration Framework between Asia (Japan) and South America (Chile)**

**AMPATH  
First International  
Conference**

**Eduardo Vera (University of Chile)  
and Hisao Uose (NTT Labs)**

Valdivia, Chile  
12 Apr 2002

**UNIVERSITY OF CHILE**

# Japan

- Furthest multimedia broadband networks
- Inter-cultural use of Network

NTT  
&  
NAOJ  
Waseda U  
U Tokyo



UChile  
&  
UTFSM  
Codelco  
Telefonica

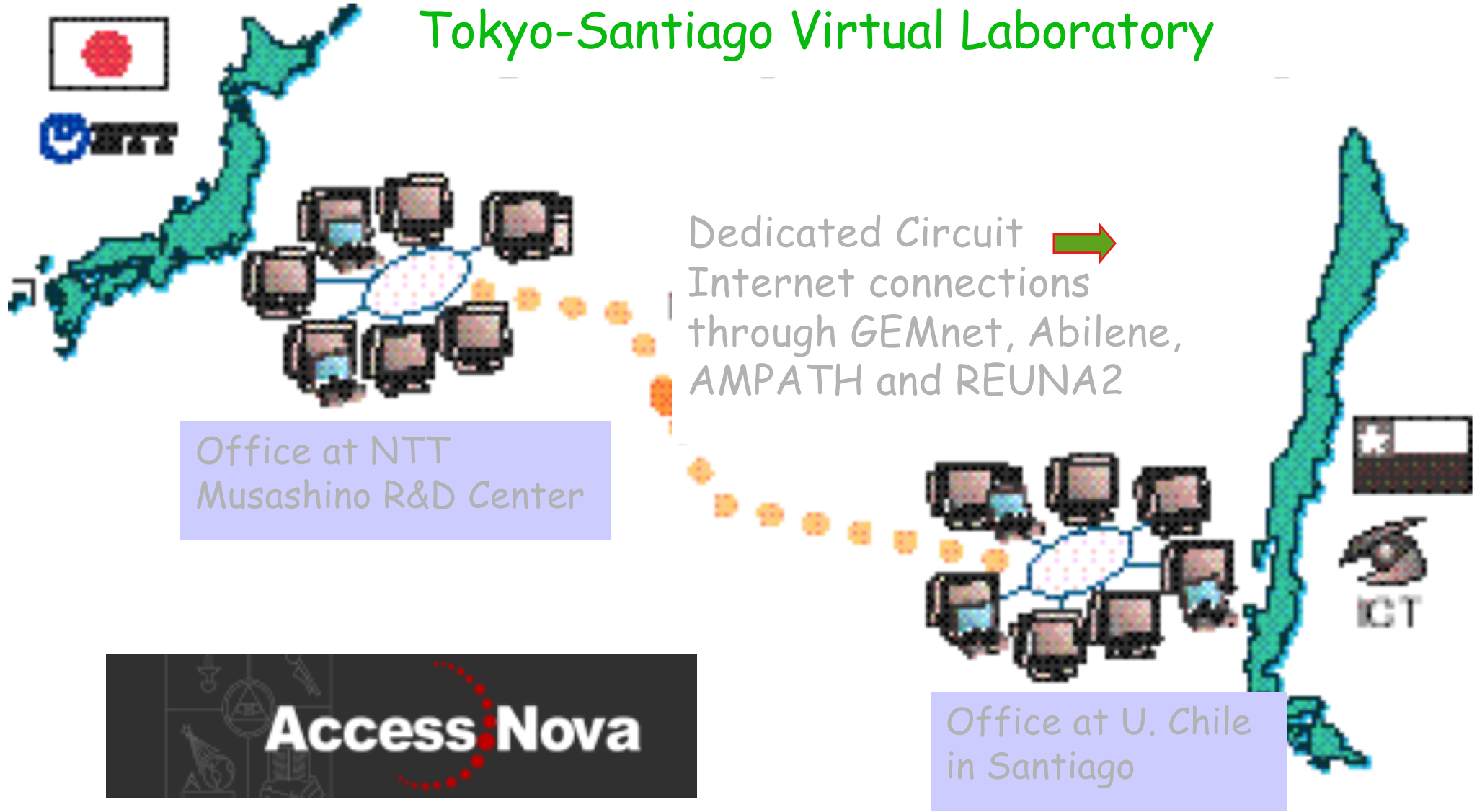


Chile

Access Nova

# Virtual Laboratory Using Networks

## Tokyo-Santiago Virtual Laboratory



# Remote Chilean Cabinet Meeting



Access Nova

Sept 1997, Tokyo

# Japan-Chile Academic TeleForum



Tokyo



Santiago



August 1997



# **ASTE/ALMA Project**

**Scientific Data Transmission,  
Remote Monitoring and Control  
of First Prototype Antenna**

**AMPATH      First  
International  
Conference**

**NAOJ, NTT Labs, UChile**

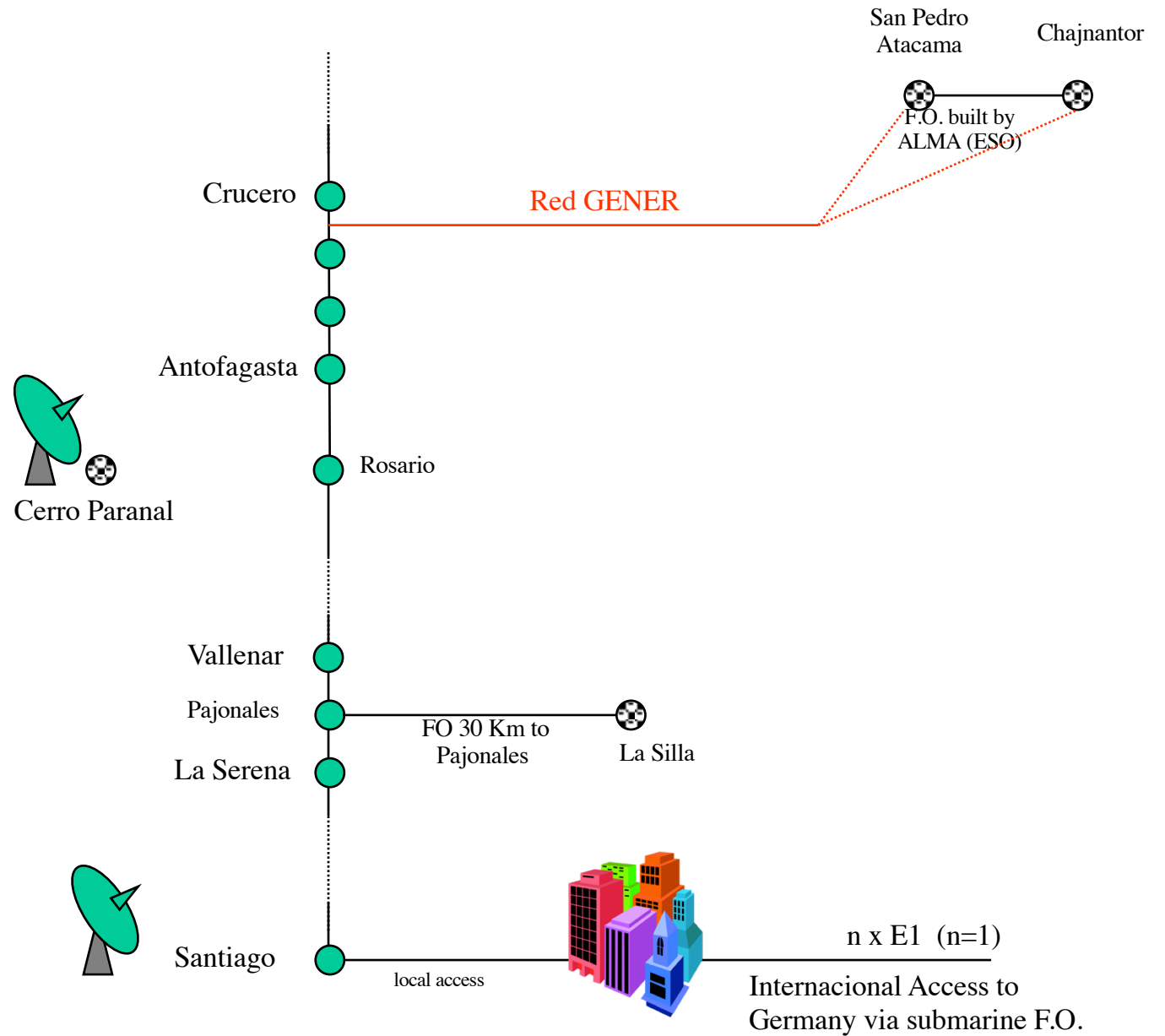
Valdivia, Chile  
12 Abr 2002

# ALMA (Atacama Large Millimeter/submillimeter Array)

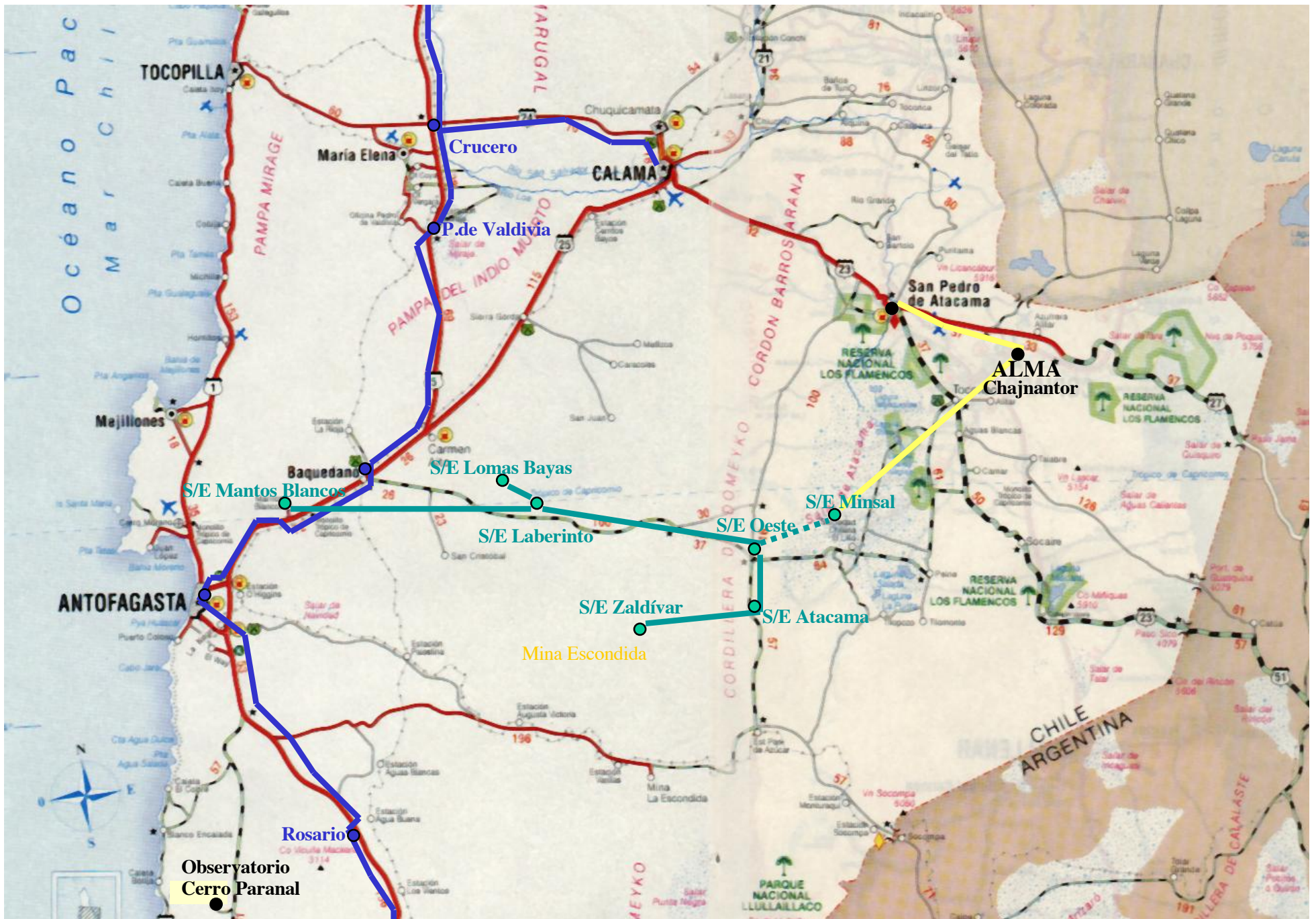


- **ALMA will be the world's most sensitive, highest resolution, millimeter-wavelength telescope. It will combine an angular resolution comparable to that of the Hubble Space Telescope with the sensitivity of a single antenna nearly 100 meters in diameter.**
- **ALMA will consist of no less than 64 12-meter antennas located at an elevation of 5,000 meters in Llano de Chajnantor, Chile.**

# ESO Facilities in Chile





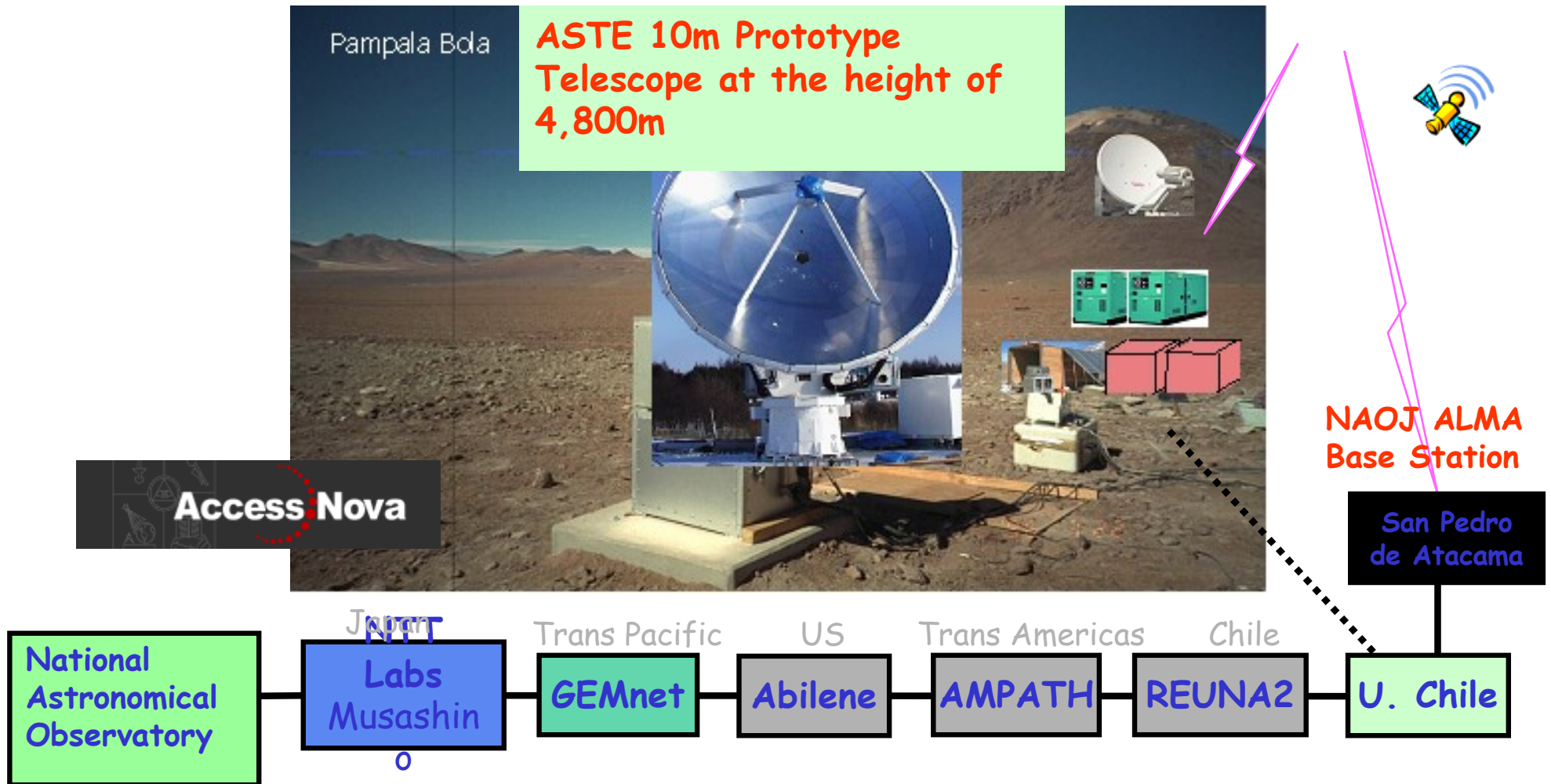


## **ALMA Project (possible solutions)**

- **Array of 64 radiotelescope 12 m diameter antennas located at 5000 m high flat land 60 km southeast of San Pedro de Atacama in northern Chile.**
- **Infrastructure (facilities, communications, energy, etc. ) by ESO in Chile**
- **Data Processing Center located at OSF (Operation Support Facility) near San Pedro (approx 3000 m high)**
- **Fiber Optic transmission line between OSF and Chajnantor installation planned for 2005**
- **Electric energy supply via internal generation (own turbines) or commercial distribution lines (Gener-Norgener)**
- **Data Communications via Fiber Optic**
- **Agreement between ESO-Norgener and Telefónica Mundo**
- **Analysis and Evaluation stage: Energy + Fiber Optic Line**

# Cooperation with NAO and U. Chile

Remote monitoring/control of ASTE/ALMA telescope will start soon with the cooperation of Internet2(Abilene), AMPATH and REUNA2



## **State of development**

### **1. Pampa La Bola**

- **First prototype of antenna is installed**
  - **Satellite link with Santiago**

### **2. San Pedro**

- **Satellite link with Santiago**

### **3. Santiago**

- **Connection with AccessNova-Uchile over Telefonica Mundo's Network**

### **4. Tokyo**

- **Connection with NTT Labs over Internet2 via USA (GEMNET-Abiline-Ampath-REUNA)**



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## **Future Challenges**

### **Networking**

**To Connect 4 points like they were on the same local network with at least 10 Mbps**

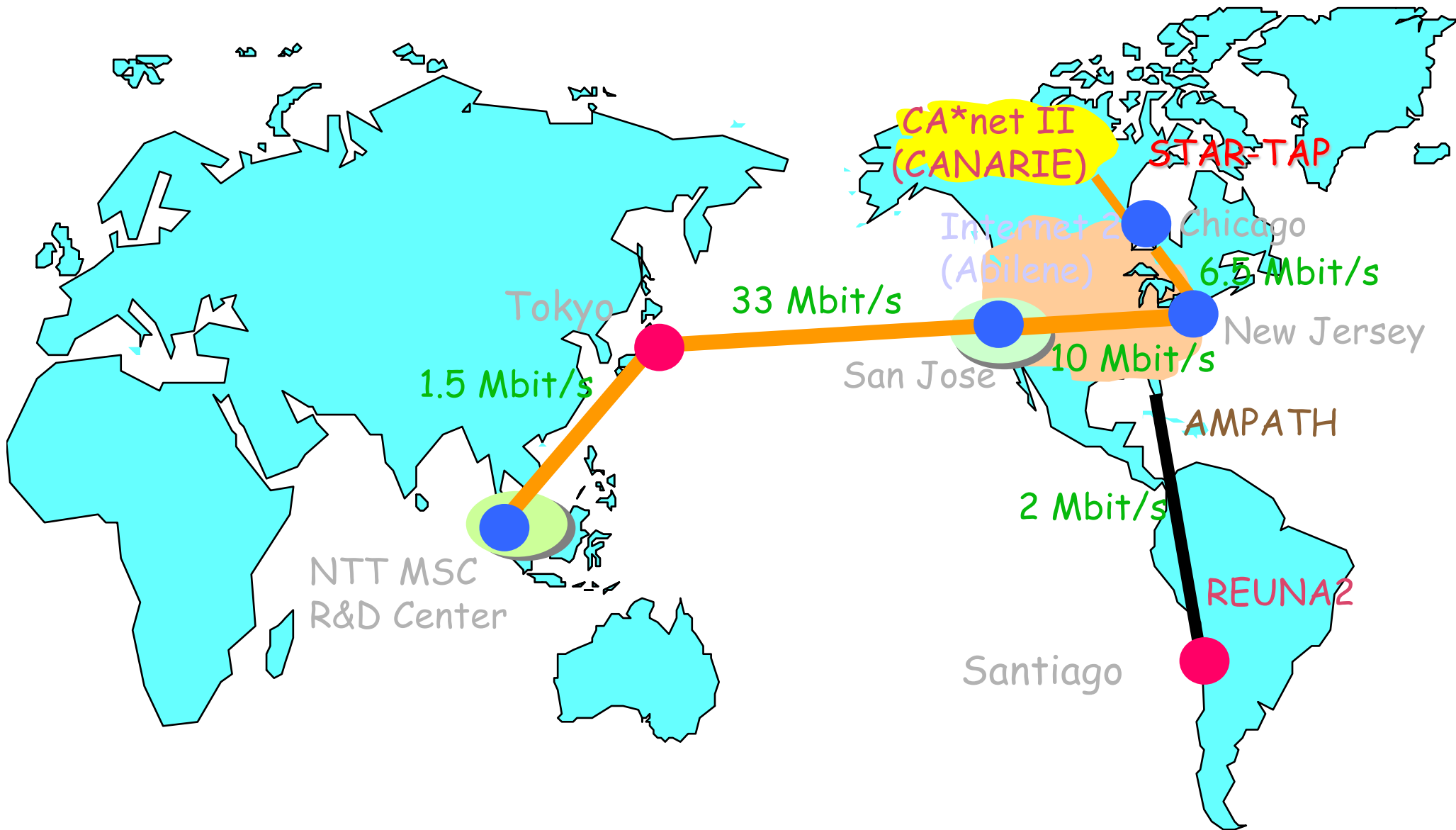
### **Computing**

**To develop the software to control the telescope array and to handle the data collection, storage and remote access**

### **Communications**

**High-speed data transmission and switching (fully optical network)**

# Broadband Connection between Tokyo and Santiago



# Network Topology between Tokyo and Santiago

