

ALMA Communication Infrastructure (OTN / EVALSO2.0)

Update for the SA3CC meeting 2024

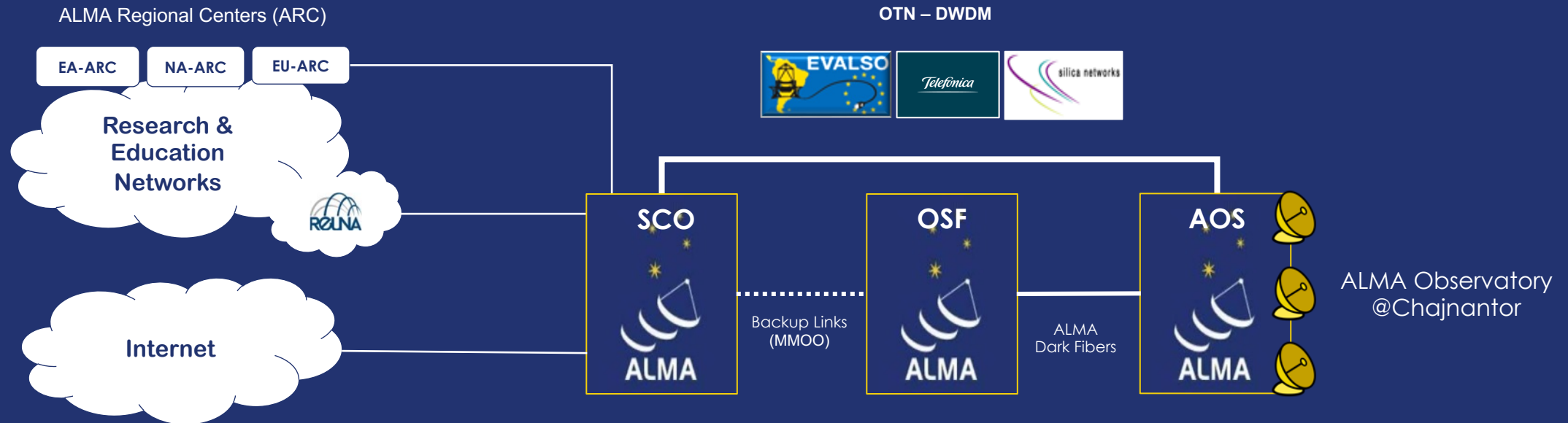
**Presented by Jorge Ibsen
Prepared by Nicolás Ovando**



Agenda

- ALMA Communication Infrastructure
- ALMA Network Today
- ALMA Network Upgrade (OTN) by the end of 2024
- Supporting other observatories @ Chajnantor Status

ALMA Global Network (today)

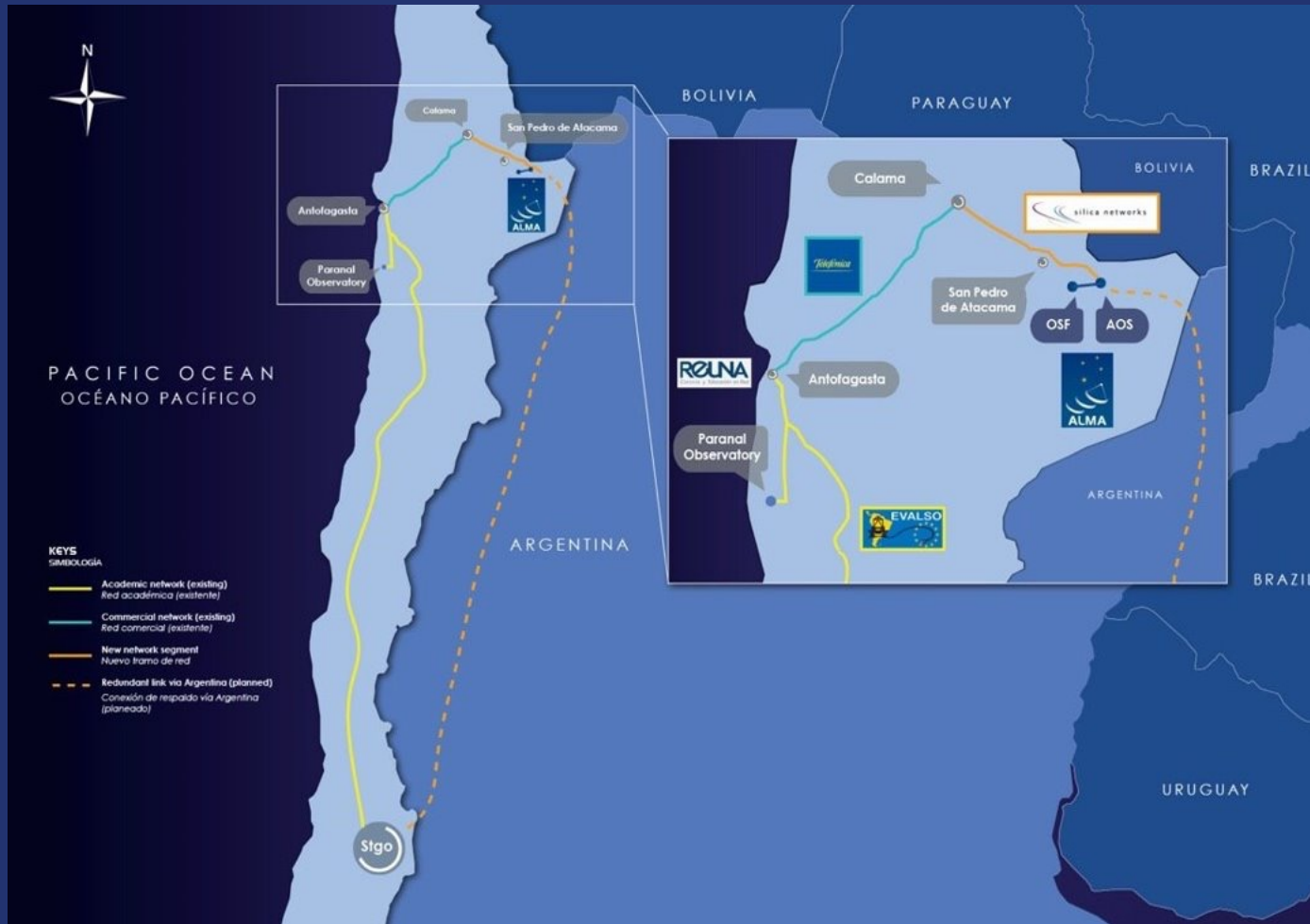


Acronyms

- **OTN:** Optical Transport Network
- **OTU:** Optical Transport Unit (in OTN) - Channel
- **DWDM:** Dense Wavelength Division Multiplexing
- **GE:** GigaEthernet
- **MMOO:** Microwave Link
- **EA-ARC:** Eastern Asia ARC
- **NA-ARC:** North American ARC
- **EU-ARC:** European ARC
- **OTU-2:** 10M
- **OTU-4:** 100M
- **SCO:** Santiago Central Office
- **OSF:** Operation Site Facilities
- **AOS:** Array Operation Site



ALMA Communication Infrastructure



- A dark fiber pair between AOS and CALAMA (about 150km)
- A dedicated LAMBDA between CALAMA and the REUNA PoP in ANTOFAGASTA (about 200 km).
- A dedicated sub-LAMBDA between the REUNA PoP in ANTOFAGASTA and the SCO at the ESO Campus in Santiago (EVALSO)
- REUNA operates ALMA's DWDM

EVALSO - Background

EVALSO Project

- Enabling **V**irtual **A**ccess to Latin-America **S**outhern **O**bservatories
- Fibre between Antofagasta and ESO campus in Santiago
- Allows access for ALMA, ESO, OCA, etc.

EVALSO Project details

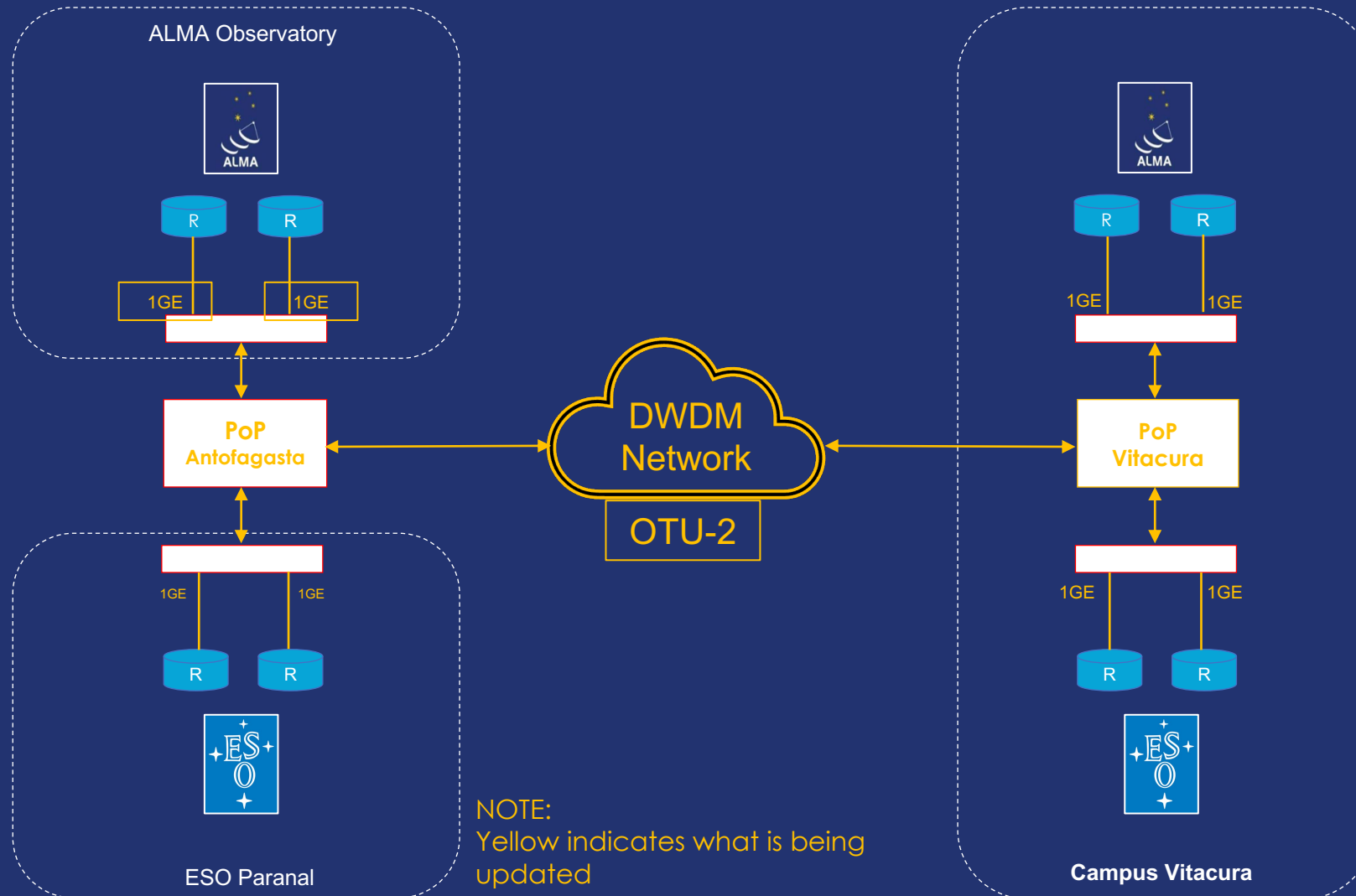
- Lambdas between Antofagasta and ESO Santiago (IRU)
- 10Gbps shared with between the project members

Original EVALSO partners

- ESO
- REUNA – Operations and DWDM
- Telefónica – Fibre, Lambdas and Housing



ALMA Network – Today



NOTE:
Yellow indicates what is being updated



New Backbone – Scope of Work

- **EVALSO** -> OTN based in DWDM between Santiago and Antofagasta to serve ESO and ALMA
- Network between Antofagasta Y Santaigo with a connection point in Antofagasta (PoP)
- Hosting/Housing of the components
- OTU-4 100Gbps (8x10Gbps OTU-2) between Antofagasta and Santiago
- Two networks are integrated in Antofagasta:
 - ESO Paranal
 - ALMA
- Network Operations Centre (REUNA)
- For ALMA, DWDM equipment compatible with the rest of the network
 - To replace the current equipment used by ALMA (obsolescence)
 - To implement 4 or more 10Gbps channels

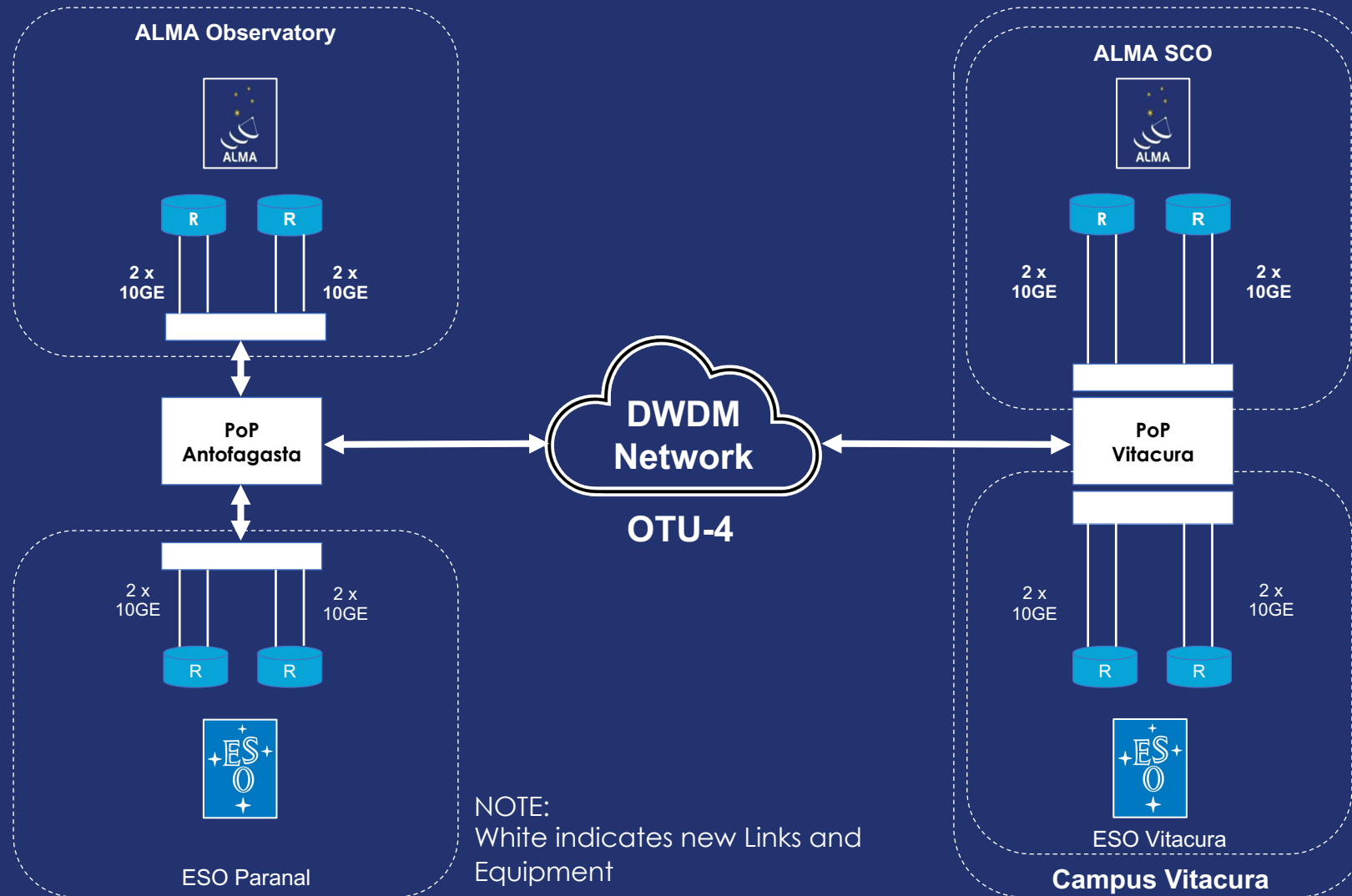


New ALMA DWDWM - Scope of work

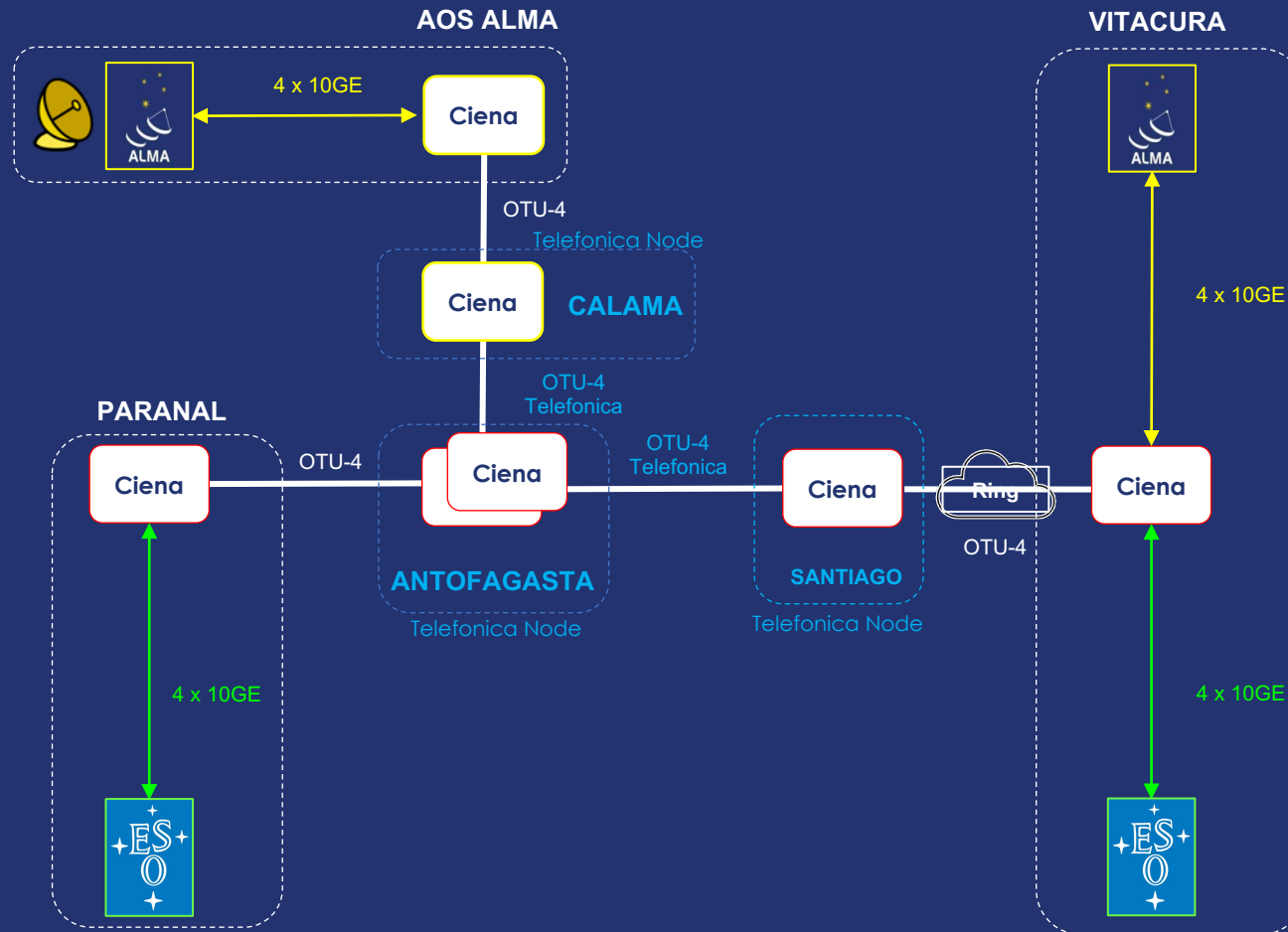
- Part1: ALMA-AOS and Calama (SILICA/REUNA)
 - Upgrade link and equipment between AOS and Calama (from OTU-2 to OTU-4)
- Part2: Calama and Antofagasta (by TELEFONICA/REUNA)
 - Upgrade link and equipment between Calama and Antofagasta (IRU with Telefónica from OTU-2 to OTU-4)
- Part3: Antofagasta and Santiago (by ESO/REUNA)
 - Upgrade link and equipment between Antofagasta and Santiago (EVALSO - IRU with Telefónica from OTU-2 to OTU-4)
- Part4: Santiago and ALMA-SCO (by ESO/REUNA)
 - Upgrade local-ring and equipment between Santiago-Telefónica-REUNA and SCO (EVALSO Ring with REUNA go from OTU-2 to OTU-4)



ALMA Network – New Layout 2024



DWDM Equipment



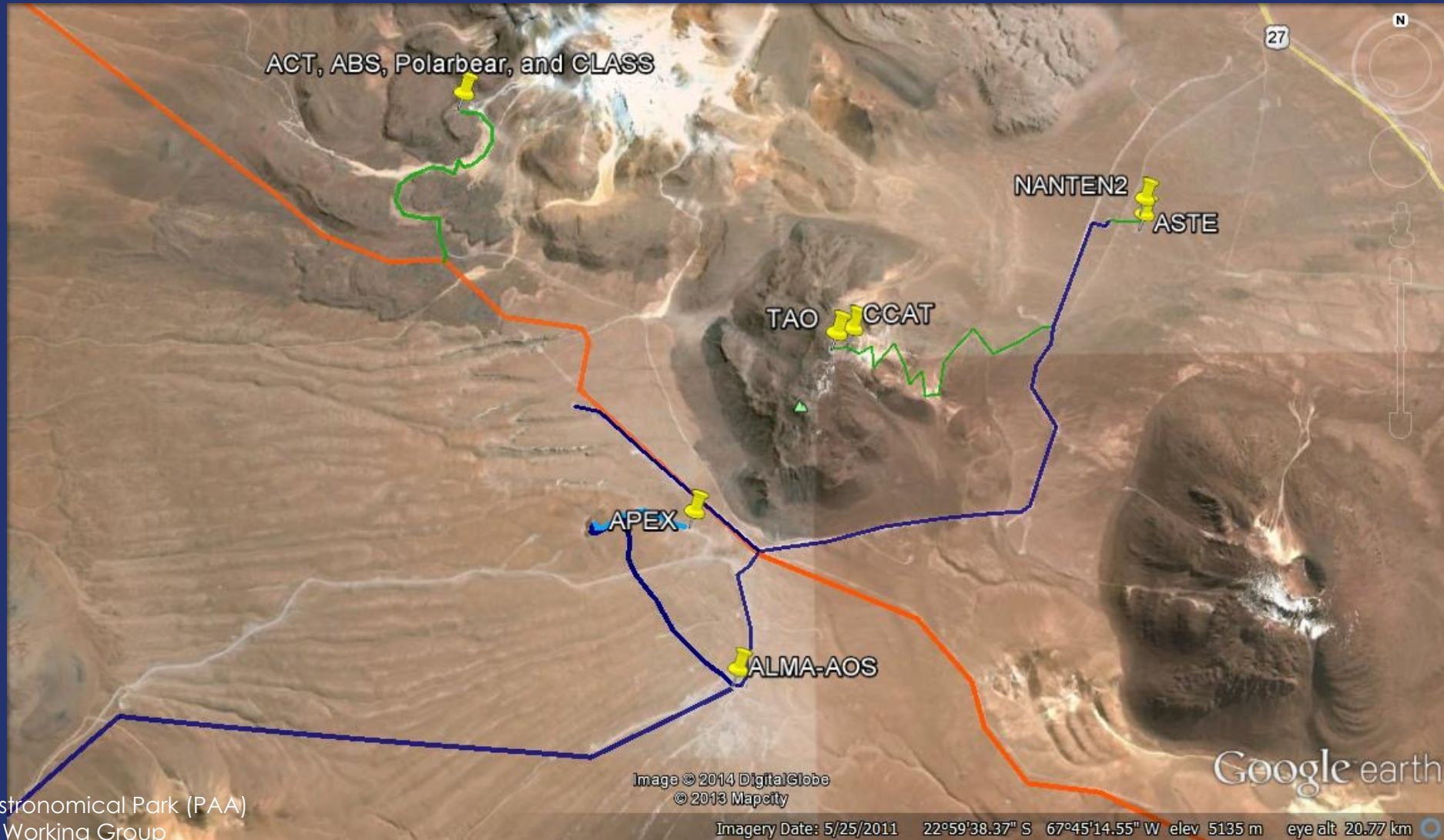
Communication channels ANF-SCO



Helping other observatories @Chajnantor Status



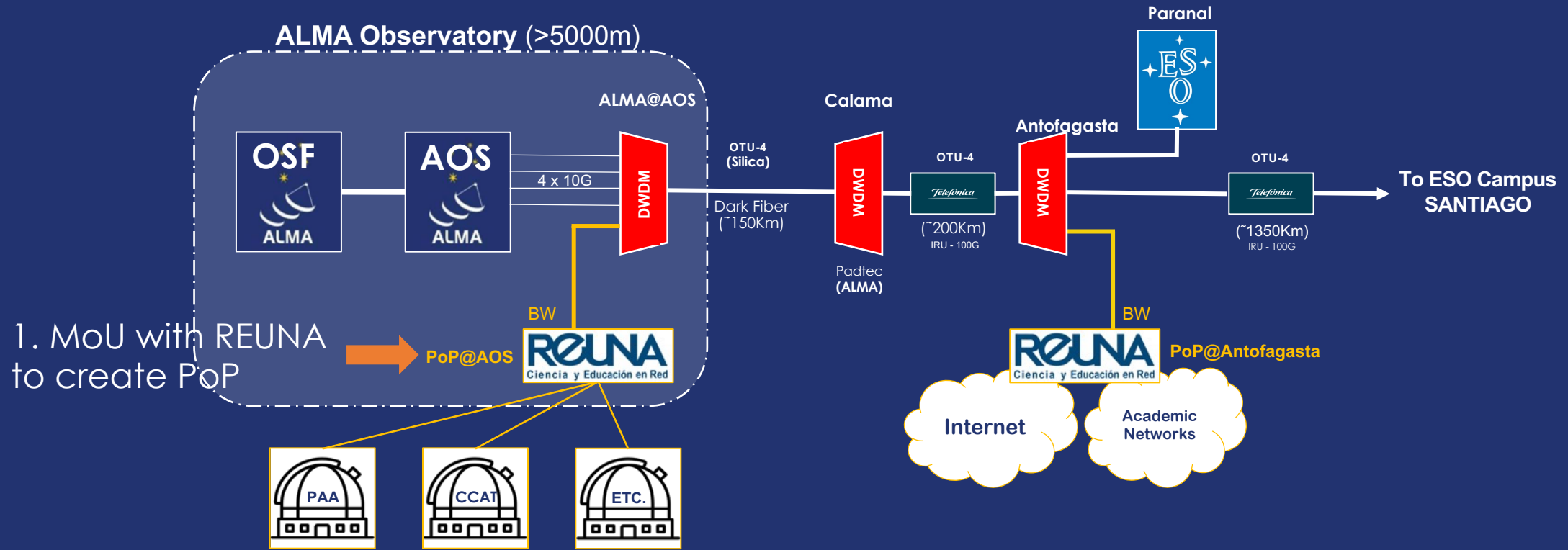
Observatories in the Chajnantor Plateau



AAP: ATACAMA Astronomical Park (PAA)
CWG: Chajnantor Working Group



REUNA PoP @Chajnantor – Optical Path



1. MoU with REUNA to create PoP

2. Specific site user agreements to support last mile to REUNA PoP



Thank very much!

Q&A

