

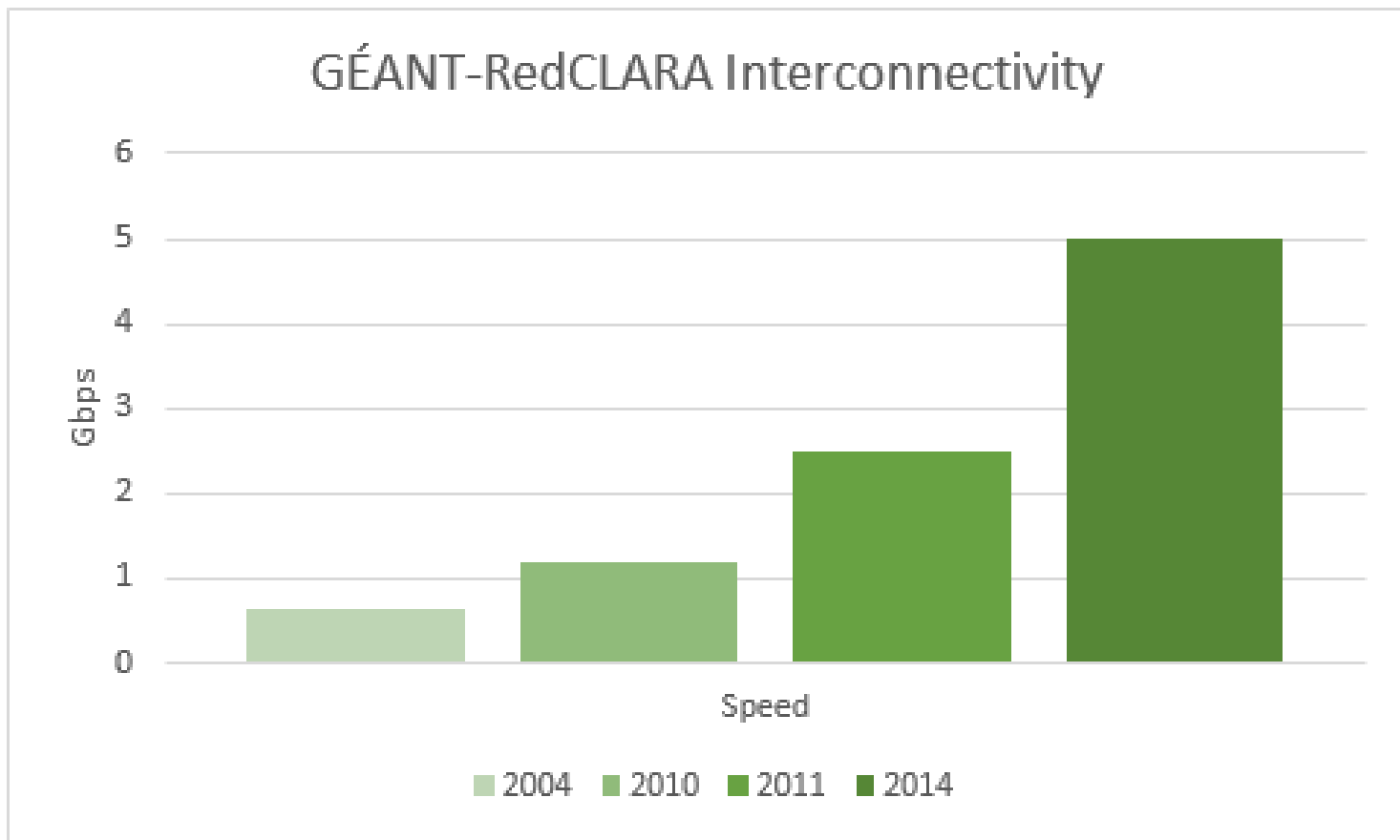


Building Europe Link to Latin America

Fernando Liello and Thomas Fryer | BELLA Consortium | 15 June 2016 | TNC2016

The GÉANT-RedCLARA Interconnection: 2004-2016

GÉANT-RedCLARA Interconnection Speed Growth



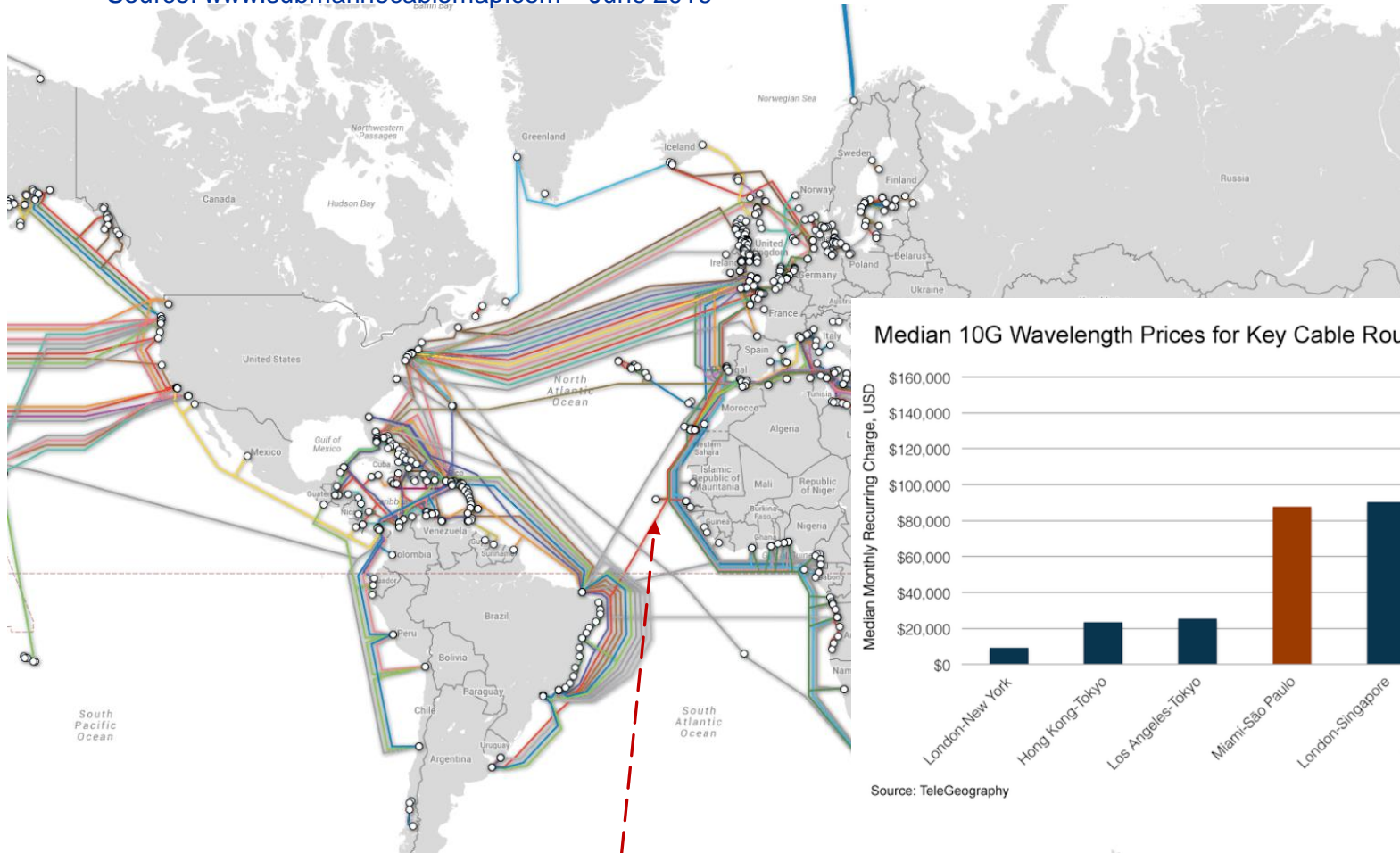
The GÉANT-RedCLARA Interconnection: Today



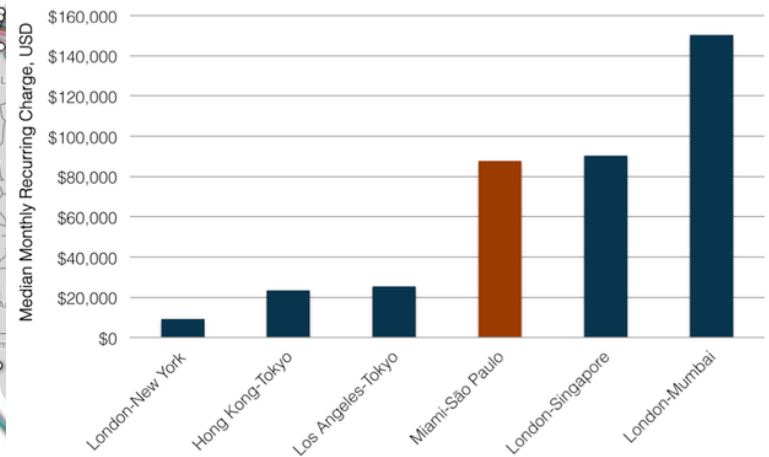
Europe – Latin America

Where are the Direct Cables?

Source: www.submarinecablemap.com – June 2016



Median 10G Wavelength Prices for Key Cable Routes, Q4 2012



Source: TeleGeography

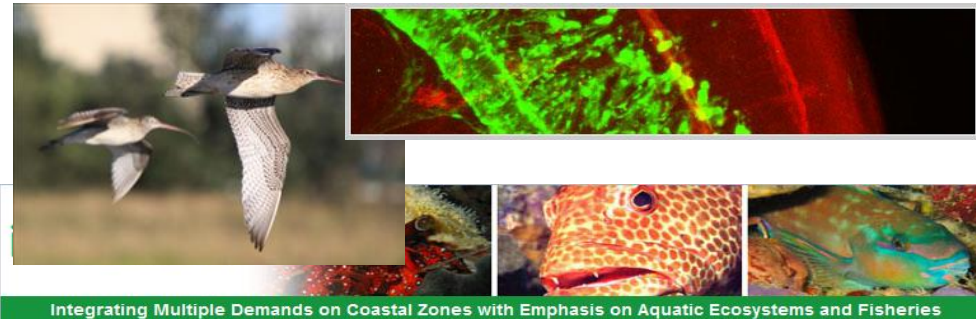
© 2013 PriMetrica, Inc.

Atlantis-2 cable – limited capacity, used mainly for telephony

Europe Latin America - Growing Collaboration

- Significant growth in collaboration:
 - Basic sciences (CRIA, Max Planck, etc.)
 - Applied sciences (CGIAR)
 - Social Sciences
 - Industrial R&D
 - Open Access

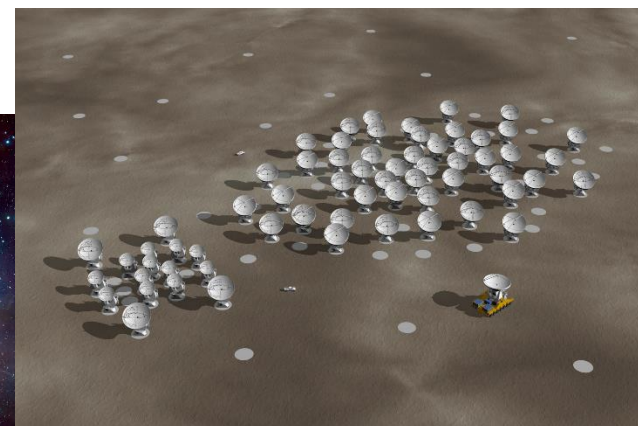
- European facilities of interest to Latin American R&E community:
 - Structure of matter (CERN, ...)
 - Plasma energy generation (ITER, ...)
 - Molecular Biology (EMBL, ...)
 - Instrumentation (NOVA, ...)
 - Application-oriented R&D (Fraunhofer Gesellschaft, ...)



Research Facilities in Latin America



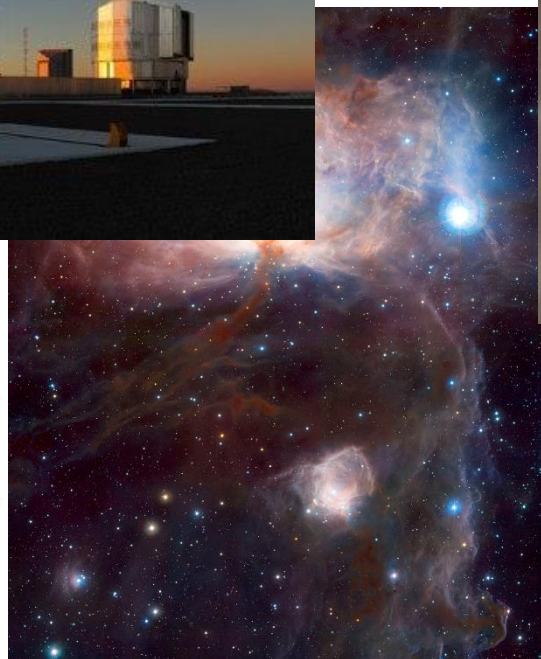
ALMA



Cerro Paranal



E-ELT



Pierre Auger Observatory

Laying the Foundations for BELLA (I)



2003-2008



2008-2013

Auger-Access

2005-2009



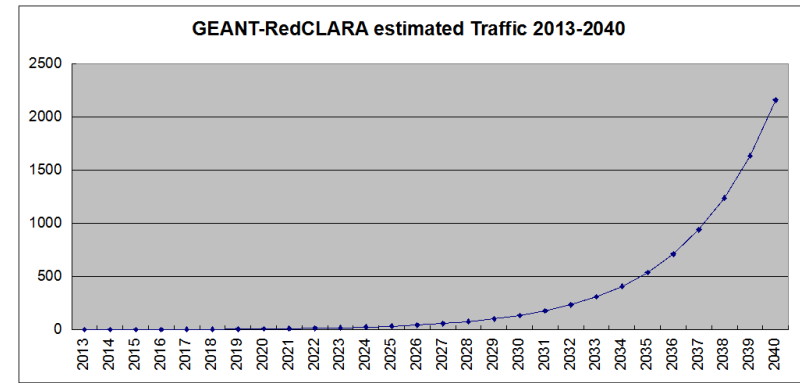
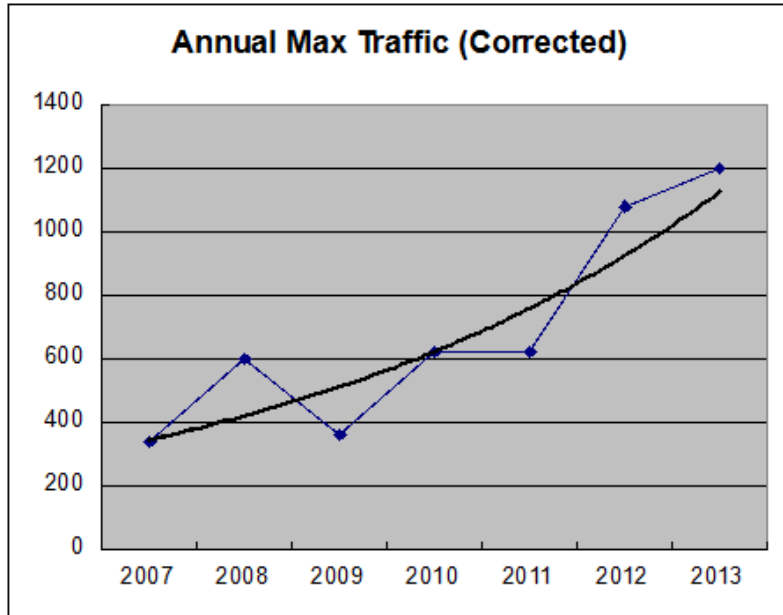
2008-2011



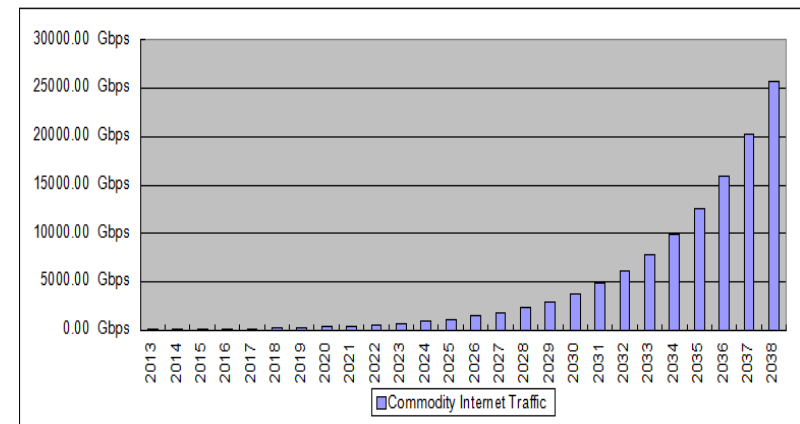
FP7: “Feasibility Study for a direct Europe Link with Latin America”

- Led by GARR with FCCN, RedCLARA, RedIRIS, RNP
- 2011-2012

Projecting Average Traffic Growth



- Projected growth of at least 4.5 Tbps over 25 years
 - Average and commodity traffic

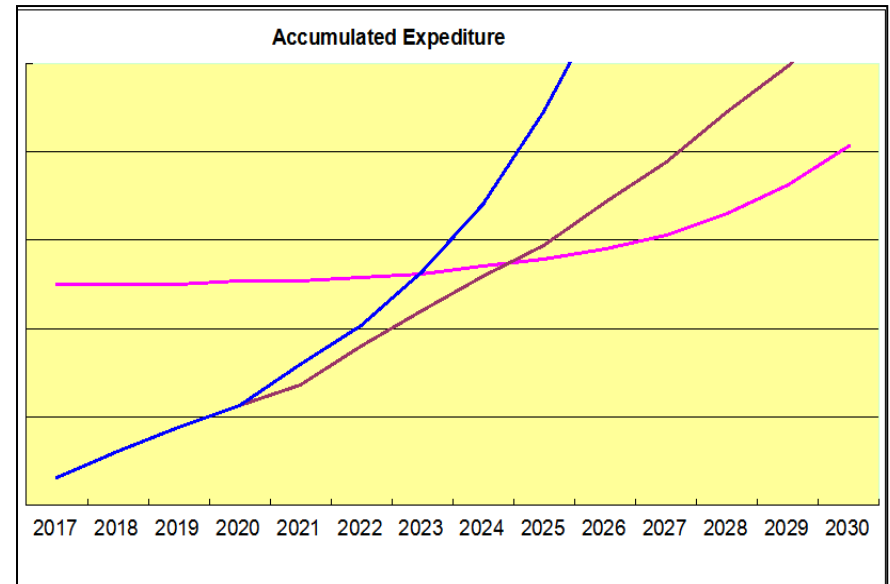
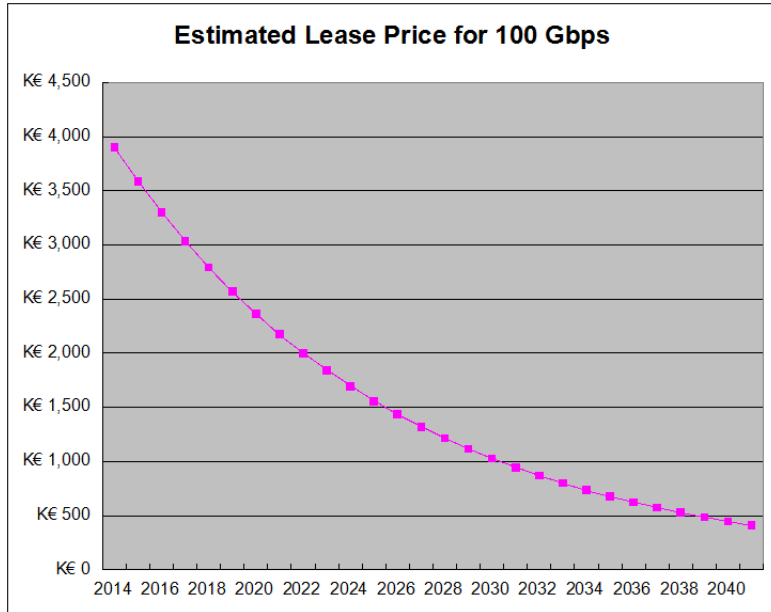


Laying the Foundations for BELLA ELLA Conclusions



- Conclusions:
 - Average increase in Latin American traffic of nearly 32% per year - market for the deployment of new submarine cables exists
 - At least 20% of Latin American traffic has Europe as final destination
 - A new direct cable between the two continents is:
 - Technically and economically feasible
 - Desirable from political and strategic point of view
- Strategic reasons:
 - Data privacy
 - Science infrastructure in Latin America of interest to European scientists
 - Development of Latin America, reduction of digital divide through reduced costs, etc.

ELLA: The Results



Investment to obtain spectrum for R&E purposes on a submarine cable makes sense, not only technically but also economically

BELLA: The Objectives



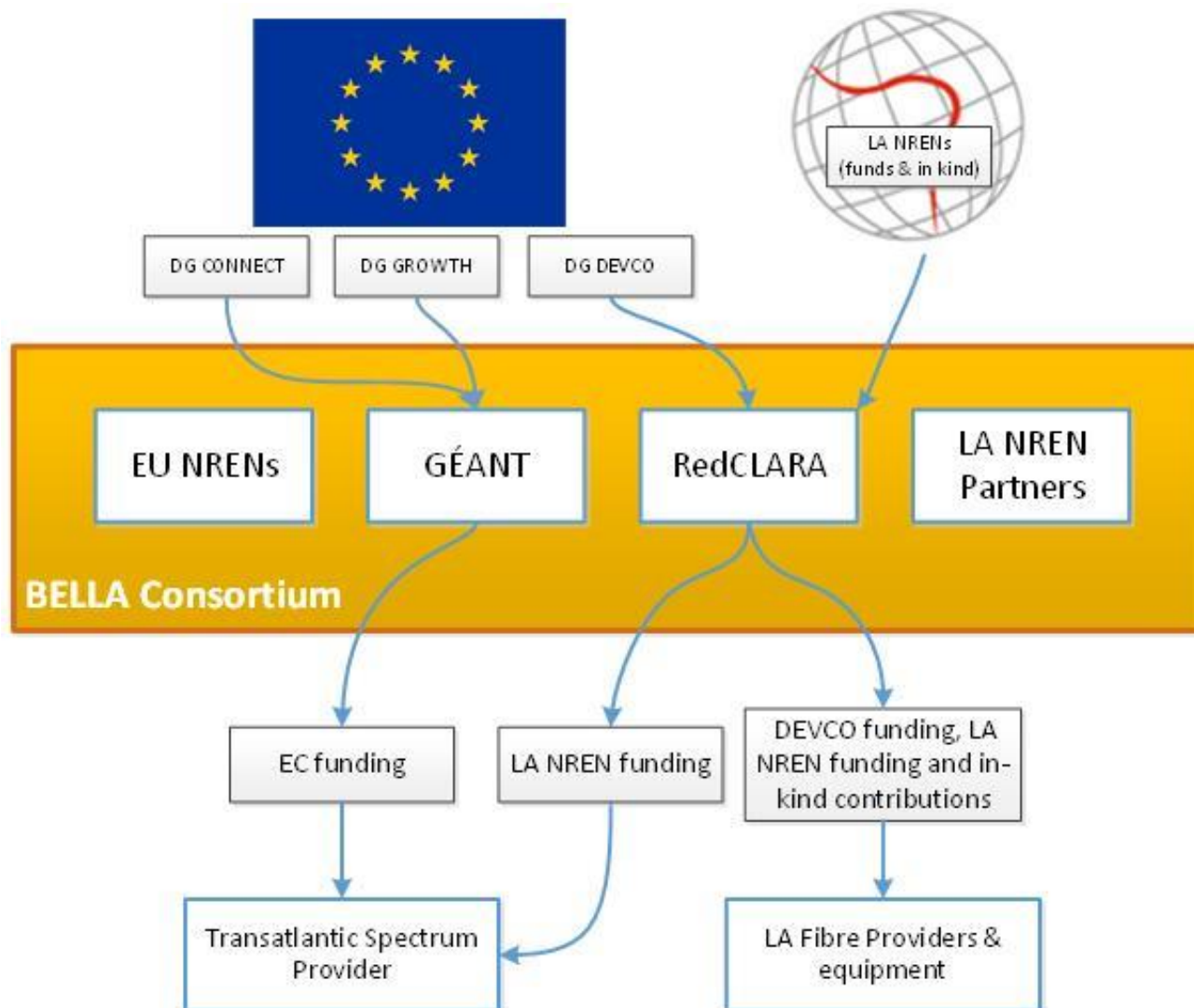
- To obtain IRU of 40 optical channels on direct submarine cable between Europe and Brazil.
- To deploy two upgradeable 100Gbps links for:
 - GÉANT-RedCLARA interconnection
 - Copernicus traffic
- To complete RedCLARA dark fibre network and deploy a 100Gbps upgradeable network from Brazil to Colombia

Building BELLA: The BELLA Consortium

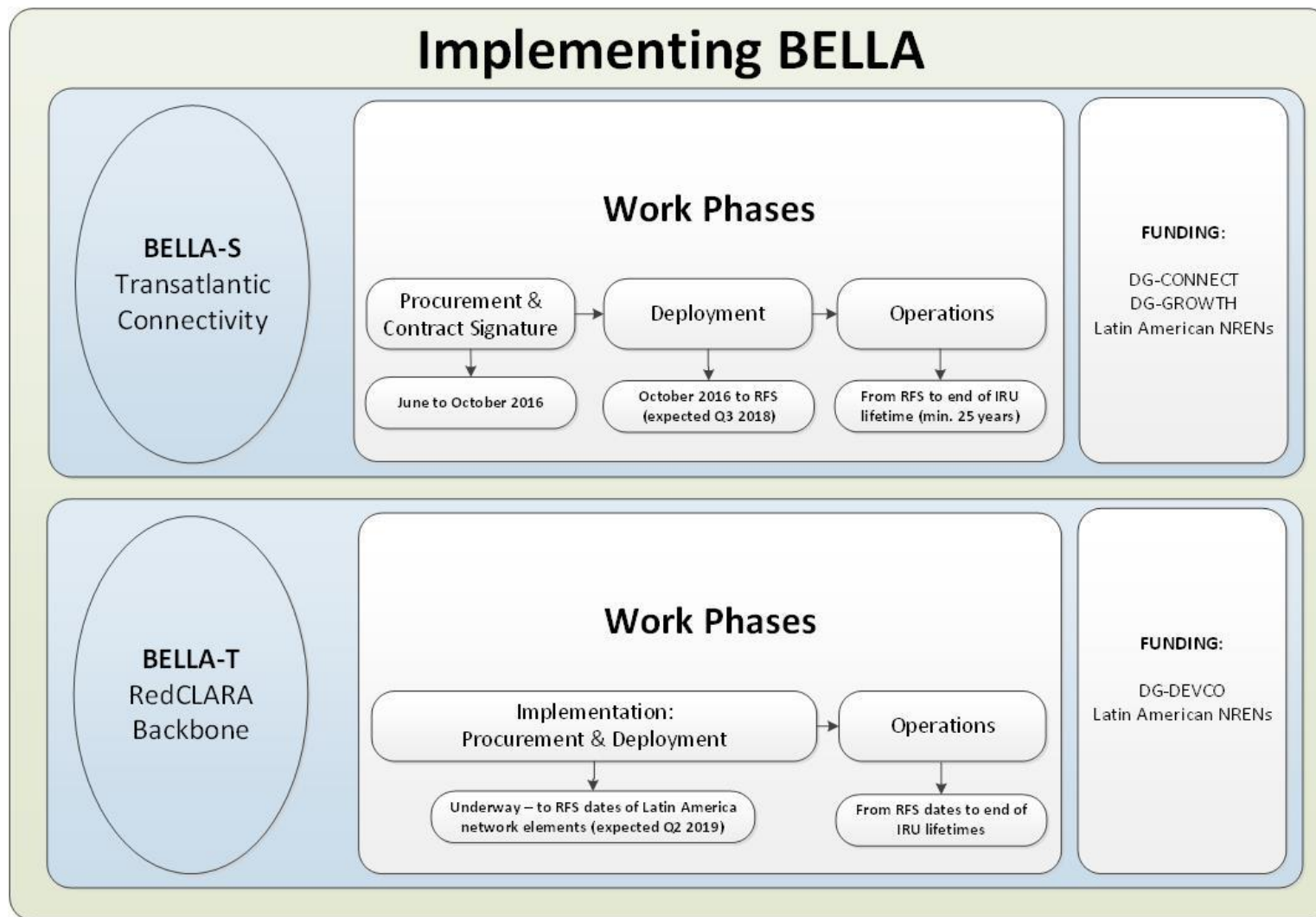


- Purpose:
 - To coordinate among partners and projects to ensure overall success of BELLA implementation work
 - To coordinate responsibilities for BELLA Operations (specifically transatlantic) and incremental costs
- Participants:
 - Europe: DFN, FCT|FCCN, GARR, GÉANT, RedIRIS, RENATER
 - Latin America: CEDIA (Ecuador), RENATA (Colombia), REUNA (Chile), RedCLARA, RNP (Brazil)
- Duration:
 - Lifetime of IRU

Funding BELLA



Implementing BELLA



BELLA: Procurements Underway



- Transatlantic spectrum procurement published on 10/06/2016:
 - IRU for spectrum on one fibre pair of a direct submarine cable
 - IRU to last for lifetime of the cable, minimum of 25 years
 - O&M costs for duration of IRU to be included in price
 - To implement two initial 100Gbps wavelengths: one for use by GÉANT-RedCLARA; one for use by Copernicus.
 - Backhaul in Europe of initial wavelengths from landing station to Lisbon or Madrid
 - Backhaul of additional wavelengths in Europe at cost price
 - Cards for additional wavelengths to be paid by GÉANT, RedCLARA, and/or NRENs as appropriate.
- Latin American procurements for national infrastructure to support BELLA underway.

BELLA: In the Global Context

- Global initiatives to maximise benefits of R&E networking infrastructure around the world:
 - GÉANT-ORIENTplus-CERNET-TRANSPAC3-Internet2 back-up agreement
 - ANA-300G
 - CEO Forum developing global architecture coordination (GNA)
- BELLA Connectivity will add strength to global infrastructure, providing opportunities for collaborations among multiple regions (Latin America, Europe, Africa, North America)
- Opportunities and aims to be analysed by BELLA Consortium

BELLA



Thank you!

Any Questions?