



BELLA Team Visits Submarine Cable Factories

Tom Fryer, Head of International Relations at GÉANT, visited the Alcatel Submarine Networks (ASN) factories, where the EllaLink submarine cable will be manufactured. Tom shared with CONNECT his impressions of the visit.

January 2019 saw the start of the construction process of the EllaLink submarine cable system that will carry research and education data between Europe and Latin America for the next quarter of a century, as a result of the BELLA Programme. To mark this significant milestone, the BELLA

team was invited, along with other anchor tenants and stakeholders of the EllaLink system, to visit the factories where the equipment and cable will be manufactured, and to tour one of the ships that lays submarine cables.

I was joined by two BELLA pioneers, Fernando Liello of GARR

(Italy) and Michael Stanton of RNP (Brazil), GÉANT's Head of Procurement, Paul Rouse, the Executive Director of RedCLARA, Luis Eliécer Cadenas, and João Nuno Ferreira, President of FCCN (Portugal). The DG CNECT Project Officer for BELLA, Enrique Gómez, also joined the tour. As we have all been



working on BELLA for a number of years we did not want to miss out on this opportunity.

The first stop was an equipment factory in Greenwich, UK, where the submerged repeaters and electrical power feed equipment for the system are manufactured. We started with a presentation on the construction process and the milestones that will mark progress, followed by a guided tour of the factory floor.

The equipment used must be built to manage pressure levels corresponding to water depths of up to 8,000–9,000 metres for 25 years! Equally, the pressure at the bottom of the ocean (for EllaLink, the maximum depth will be about 5,000 metres), presents a risk of hydrogen seeping through the seals into the equipment. This is managed by adding a catalyst that causes the hydrogen to combine with oxygen in the equipment to form water. Water cannot be allowed in the equipment, however, so an absorbent is used to mop it up.

The second leg of the visit took us to Calais, France, where the cable is manufactured. During our visit we were able to witness the cable loading process onto a ship dock.

In the factory, pairs of fibre that are the heart of the cable are encased in the layers of protection (depending on the depth of deployment and the likelihood of external aggression), as well as the copper tube that carries electricity down the cable to power the repeaters. Once made, the cable is stored in massive drums until the ship is ready for loading. Most of the process is automated, but one manual element has remained unchanged for 150 years: the loading of the cable into the cylindrical cable tanks on board the ship.

The cable reaches the ship along a 1km conveyor belt hidden in a tunnel as it makes its way to the ship's cable tanks. Two individuals stand at the bottom of the tank as the cable is lowered. One person takes the cable, walks backwards around the tank guiding the cable to where it should lay. After one turn of the tank, the operative passes the cable to a colleague, who does another turn, then hands it back to his/her colleague, and so on, working in eight-hour shifts until the cable is loaded.

Copper is used to transmit power down the cable. It is an excellent conductor, but costly. A completely innovative approach using aluminium has recently been developed, which may soon become the norm for submarine cables, as it lowers manufacturing costs. The EllaLink cable will, however, use the industry standard copper conductor.

The ship itself is staffed by a range of teams: from the bridge crew, to the operatives who guide the feeding of the cable into the ocean, to others who guide machinery through the ocean floor to bury the cable in the seabed. There is also the ship's chef, who has to ensure that meals are available 24/7 for all shifts. The crew continuously lay the cable, even in weather up to storm force 6 (gale force). Only when the sea gets too rough and conditions risk crew safety is the cable cut and the ship moved to calmer waters or to port until the weather is good enough to go back, pick up the cable, splice it to the remaining cable onboard and carry on laying it again.

Overall, the visit was an eye-opener for us all, and provided a reminder that the Internet, and everything it enables us to do, is entirely dependent on the unsung women and men who staff ships all year round to lay new cables and to repair the damaged ones.



About BELLA

BELLA (Building the Europe Link with Latin America) provides for the long-term interconnection needs of European and Latin American research and education communities by procuring and deploying a long-term Indefeasible Right of Use (IRU) for spectrum on a direct submarine cable between the two regions, and deploying a 100Gbps-capable research and education network across Latin America.

BELLA is implemented by a Consortium of the Regional Research and Education Networks GÉANT (Europe) and RedCLARA (Latin America), and the National Research and Education Networks of Brazil, Chile, Colombia, Ecuador, France, Germany, Italy, Portugal and Spain.

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Pictures

Top right: (From left to right) Luis Eliécer Cadenas, Paul Rouse, Fernando Liello, João Nuno Ferreira, Michael Stanton, Tom Fryer, Enrique Gomez.

Pictures Courtesy of ASN