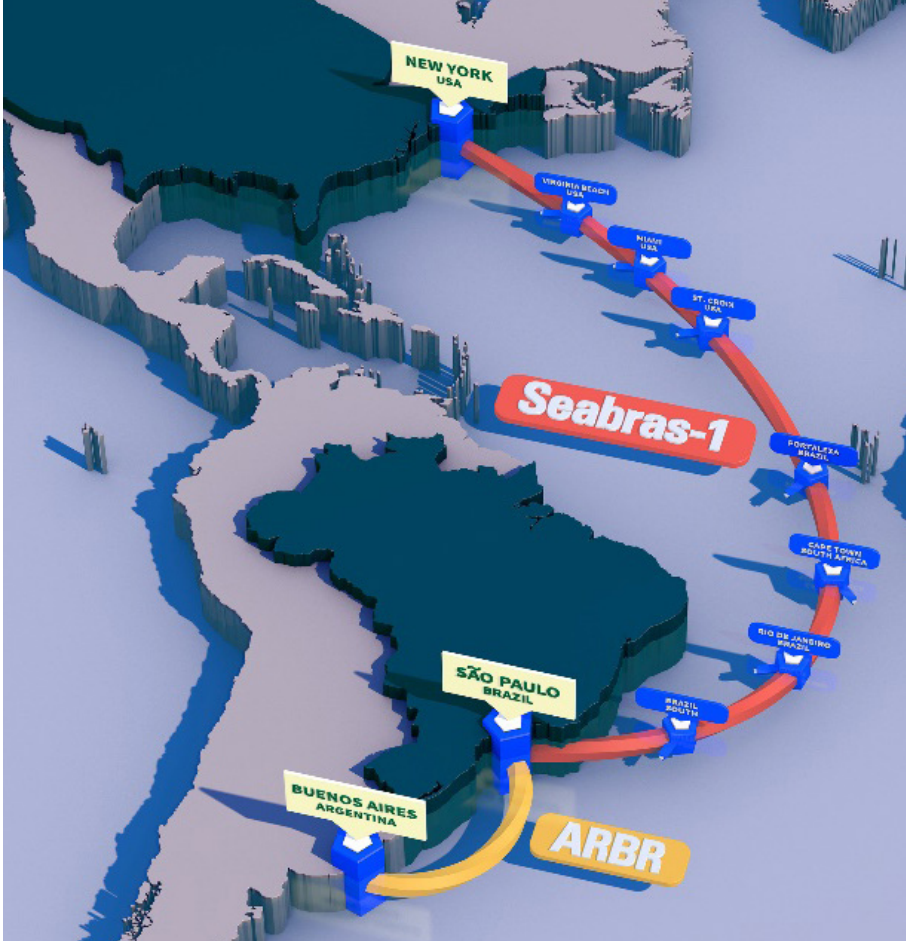
FEATURE

ARBR, THE ARGENTINA TO BRAZIL SUBMARINE CABLE SYSTEM

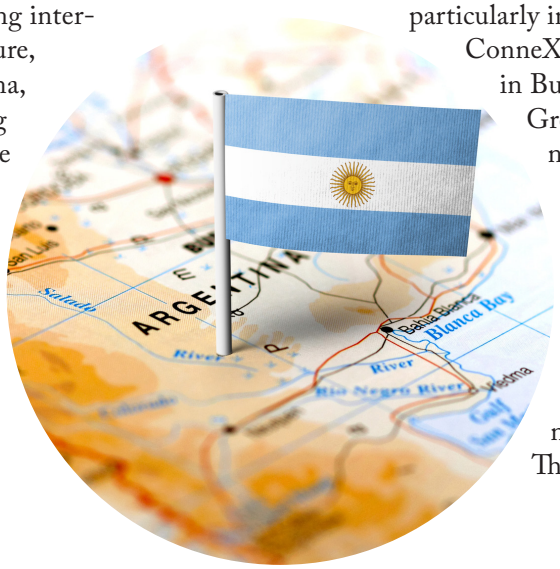


Completing the Regional Puzzle for Argentina

BY LARRY SCHWARTZ AND LEIGH FRAME

Despite the huge increase in the number of new subsea cable systems installed and planned in recent years, regional customers across the globe still face many of the same issues today that they always have; a lack of affordable and available inter-regional connectivity, the great expense of creating new systems to feed onward connectivity, and the fact that large local incumbent operators often control both the regional telecoms markets and access to the international infrastructure.

In Argentina these issues are prevalent and compounded still further by the ageing of the existing international submarine system infrastructure, with the primary routes from Argentina, SAC, SAM-1 and Atlantis-2, all being installed almost two decades ago. These and other issues are being addressed by Seaborn Networks' Argentina to Brazil Submarine Cable System (ARBR), which not only provides regional interconnectivity but also onward routes to the USA and beyond via Seaborn's new Seabras-1 Submarine Cable System.



REGIONAL GROWTH IN ARGENTINA

Over the last twelve months Argentina has recovered strongly from its 2016 recession and expanded at an estimated 2.7 percent annual rate, driven by a strong rebound in investment and rising private consumption. It is forecast to grow even more strongly over the coming two to three years1. The increased economic stability since the change in government at the end of 2015 and the return to the international debt markets means that Argentina has also been successful in attracting significant foreign investment particularly in the telecoms industry. EdgeConneX are building a new Data Center in Buenos Aires, and the Blackstone Group with Riverwood Capital Partners have invested $190 Million to acquire MetroTel. Telecommunications is seen as a strong development driver for the economy in Argentina and, in support of this strategy, one of the first actions of the Macri Administration in November 2015 was to form a new telecom regulator, ENACOM. This positive landscape heightens the

need for a new regional build, and when you consider that the price for international connectivity between Argentina and US remains more than 2.5 times higher than the price for connectivity between Brazil and the US, the drivers for the ARBR system are obvious. In addition, much of the traffic between Chile and the rest of the world transits through Argentina, and there is continued compound annual growth of traffic between Argentina and the rest of the world. Argentina is a hotspot and Seaborn is ready with the touch-paper to help facilitate regional growth.

ARBR is being developed by Seaborn, with The Werthein Group of Argentina, as a four-fibre pair system connecting Buenos Aires (Argentina) and São Paulo (Brazil). A direct subsea link will provide more than 50 Tbps of capacity between PoP's in Argentina and Brazil, with the option for an additional branch to Rio de Janeiro. Onward interconnection with Seabras-1 enables ARBR to offer the newest and most direct route between Argentina and the U.S. With latency and diversity being key to customers, this system design, integrated with Seabras-1, makes ARBR an excellent example of a new build which tackles many of the regional issues.

ARBR DESIGNED TO ADDRESS REGIONAL DRIVERS

ARBR will utilise Xtera's technology which can be optimised for regional systems. As with many aggregated systems with numerous landing points, traffic demands vary across the system. As an example in this case, the connection between Praia Grande and Rio de Janeiro is likely to require more capacity than on the other links. To Xtera, this suggested a design option where different fibre pairs could be equipped with optical amplifiers of different bandwidth, using different transmission formats. While most of the system could use C-band repeaters, the fibre pairs linking Praia Grande and Rio de Janeiro, however, can be equipped to use C+L amplifiers offering bandwidth sufficient for over 220 wavelengths and an OSNR that would permit 200 Gbit/s or more per wavelength. This gives a capacity that in fact can only be achieved with a wideband amplifier like Xtera's, as using a higher order modulation would require between 128 and 256 constellation points and a much higher OSNR.

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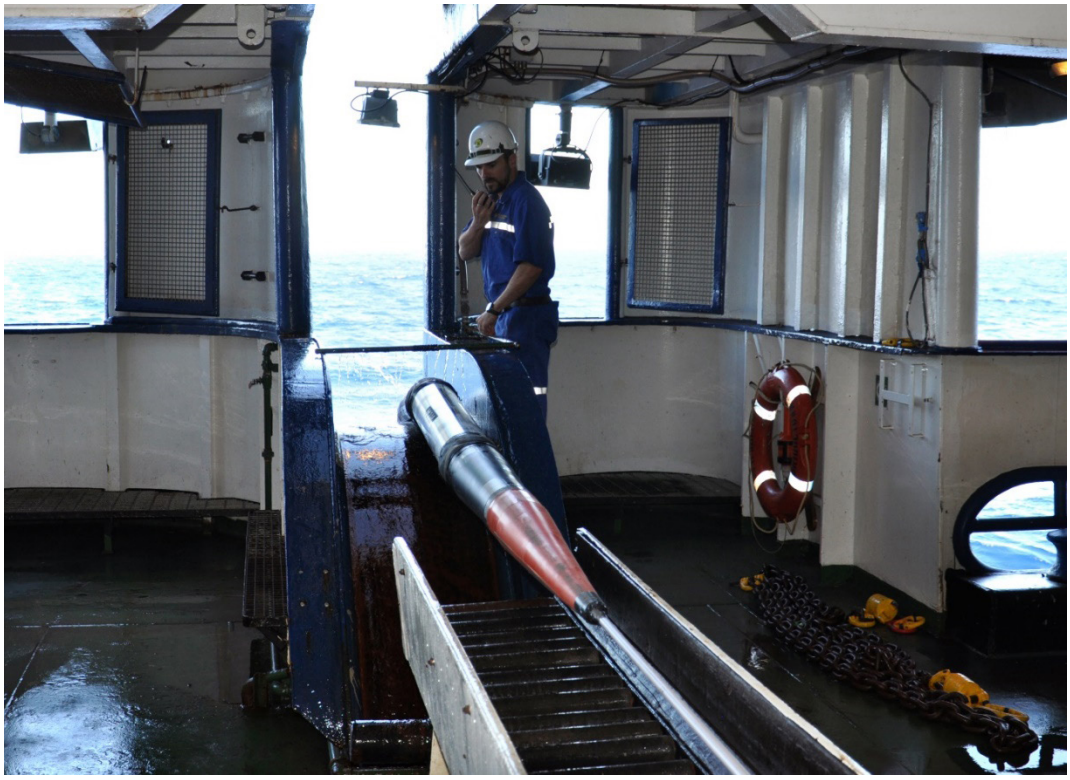
Repeater spacing changes according to the length of the Digital Line Section (DLS) and the desired capacity, the distance between repeaters becoming smaller as the length and capacity are increased. In this case a solution with some repeaters having both types of amplifier and others with just a single type was found – as a consequence, in a few repeaters, the lower bandwidth fibres are designed to pass-through without amplification.

This deals with a common dilemma in system design. On a long span in particular,



choosing the optimum capacity is a trade-off between reducing the cost and having the right capacity per fibre-pair. On a purely economic basis one would maximise the capacity per pair and have fewer fibre pairs, implying C+L. A dark pair sold to a single user, however, has a certain commercial value, so it may be better to optimise the system economics by engineering each DLS individually with more fibre pairs in some cases, rather than concentrating the investment into the highest possible capacity on the lowest number of fibre pairs. Xtera and Seaborn have taken advantage of the inherent product flexibility, to maximise the value and interest of the system to the region.

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MEETING THE REQUIREMENTS OF REGIONAL CUSTOMERS

Regional systems often have a diverse and competing selection of customers with very different needs. Dark fibre, spectrum and capacity products are all in demand and while some customers favour low latency others are more focused on security or resilience of backhaul routes. It is clear that modern systems need to be open, in order to address the changing technology demands of internet content providers for example, whilst remaining able to offer equipped capacity products to suit the requirements of smaller players within the region. Xtera's technology is suited well to this mixed market. For short hop regional interlinks Xtera can offer very high capacity unrepeatered solutions using a mixture of pre and post amplification and Remote Optically Pumped Amplifiers (ROPA). For longer regional systems of 500km to 3,500km the benefit of having a configurable repeater product can be combined with an open product set which manages the wet plant entirely independently of the selected terminal. For dark fibre pair sales the Open System Gateway is a one stop shop for operating the repeaters, managing the Power Feed Equipment and controlling the line. For spectrum sales, which may end up being more prevalent for regional systems providing onward connectivity, the Virtual Fibre Gateway (VFG) allows for multiple customers with varying spectrum requirements to co-exist in a safe independent environment on the same fibre pair. It is this independence that allows the VFG to be truly open - making a fibre pair user friendly for multiple customers with different preferred terminal equipment suppliers.

And on the topic of 'openness', today's new regional systems need to offer an independent operator model in order to open up local telecom markets and make capacity available to all parties. Regions benefit holistically when the opportunity for business growth is offered to all instead of primarily to the large incumbent operators. Similarly, local engagement and investment during a regional system build helps to ensure good relationships with communities and the organisations who will live with a new subsea system throughout its 25-year design life and perhaps beyond. Both Seaborn Networks and Xtera have a deep understanding of working in South America and, combined with the fact that the ARBR system is being co-developed with The Werthein Group of Argentina, ARBR is very much a locally-owned project.

With construction scheduled to commence this year and a Ready for Service date of H1 2019, ARBR will fill the missing piece of the puzzle by creating Terabits of accessible and cost-effective capacity providing regional and onward global connectivity for Argentina. STF

LARRY SCHWARTZ *is the Chairman & Chief Executive Officer of Seaborn. He has led the company from startup through its ECA-backed project financing of Seabras-1 and is responsible for leading the company's growth. Larry previously served as CEO, board member and one of the owners of the parent company of Global Marine Systems Ltd., one of the world's largest fleets of cable ships and a leading installer of submarine fiber optic cable systems. Larry led the acquisition of Global Marine from Global Crossing in 2004 as well as the asset acquisition of Red Sky Systems, a developer of subsea network technology. He also previously served as a board member of International Cableship Pte Ltd, a JV with Singapore Telecom that provides subsea cable maintenance in South East Asia.*

In 2017, Larry was named as one of the 100 most powerful people in the telecoms industry by Global Telecoms Business. He also serves on the board of directors of the Brazil-U.S. Business Council and has been a co-founder, board member, investor and/or officer of numerous other telecom, data center, software and marine companies.

LEIGH FRAME *joined Xtera in early 2018 and serves as the Chief Operating Officer and key architect of the company's strategy. Leigh brings with him a wealth of senior level and hands-on experience, backed up by a network of strong industry relationships at all levels in the customer, supplier and finance communities.*

Previously Leigh had an extensive career with Alcatel Submarine Networks, which includes positions as COO, VP Projects and Customer Support, and Director Marketing and Business Development. In addition, he served as an active Board member of the Apollo Submarine Cable System for ten years. His broad experience in the subsea industry over three decades covers corporate strategy, a track record of sales success, marketing, M&A work, operations management, and high risk/high value turnkey project delivery.

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