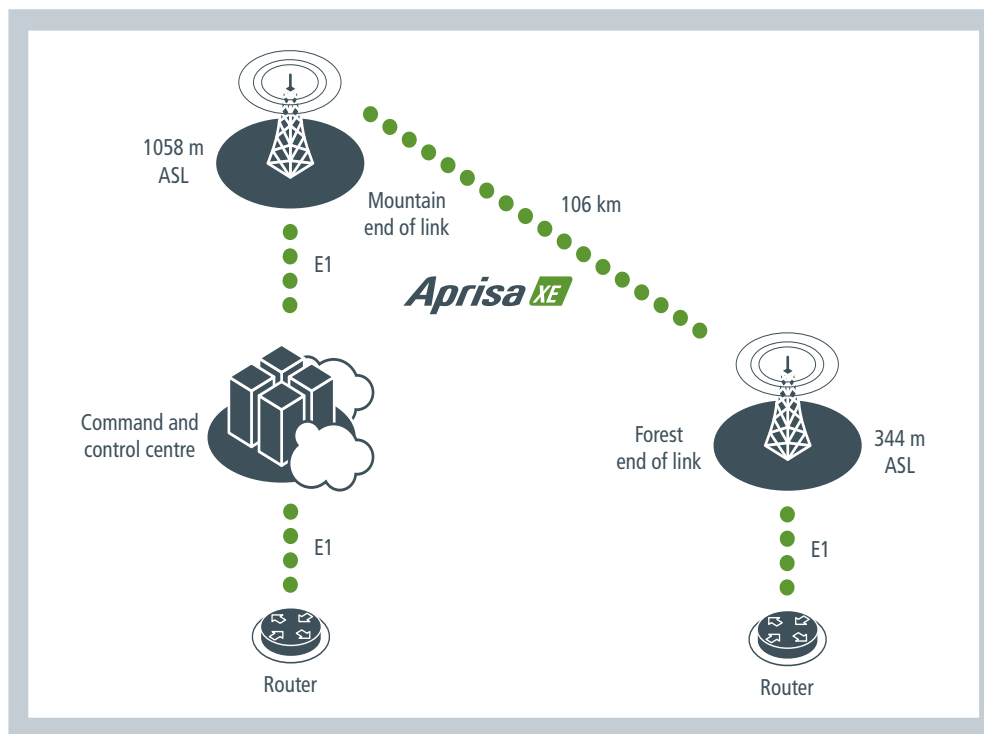


Aprisa XE delivers 106 km cross-equator link between mountain and forest

When oil company Andes Petroleum Ecuador (ANDESPETRO) needed to deliver guaranteed telecommunications connectivity between two points over 100 kilometres apart, they selected 4RF and the Aprisa XE. The use of sub 3 GHz spectrum overcame the propagation problems encountered in areas of forest, mountains and tropical environments, to provide 99.999% availability, with an E1 and Ethernet communications between the two locations.



ANDESPETRO link from mountain range to forest

APPLICATION AND DEPLOYMENT REQUIREMENTS

The main requirement for this application was to deploy a communications solution that would provide a guaranteed E1, G.703 service. Given the mountain and forest terrain and lack of existing communications infrastructure, radio was the clear solution. However, the distance between the mountain location and forest location severely limited the choices available to ANDESPETRO.

Initially a 5.8 GHz Spread Spectrum TDM over IP radio was proposed. As well as needing an external multiplexer to convert between IP and E1, this solution was unable to cope with the signal fading due to distance, forcing constant resynchronisation and degrading overall performance.

Another option considered was higher frequency microwave at 7 GHz. However, this option would not have been able to cover the required linking distance without a complex and expensive space diversity configuration and very large antennas.

ANDESPETRO

Equador



About ANDESPETRO

Andes Petroleum Ecuador Ltd. operates in the Tarapoa Block and the Lago Agrio Storage and Transfer Station in the province of Sucumbios. The hydrocarbons exploited are found in the 'Ecuadorian Oriente Basin', an area depicting the complex history of Ecuador's geological evolution in the stratigraphic and structural traps of the Tena, Napo and Hollin formations.

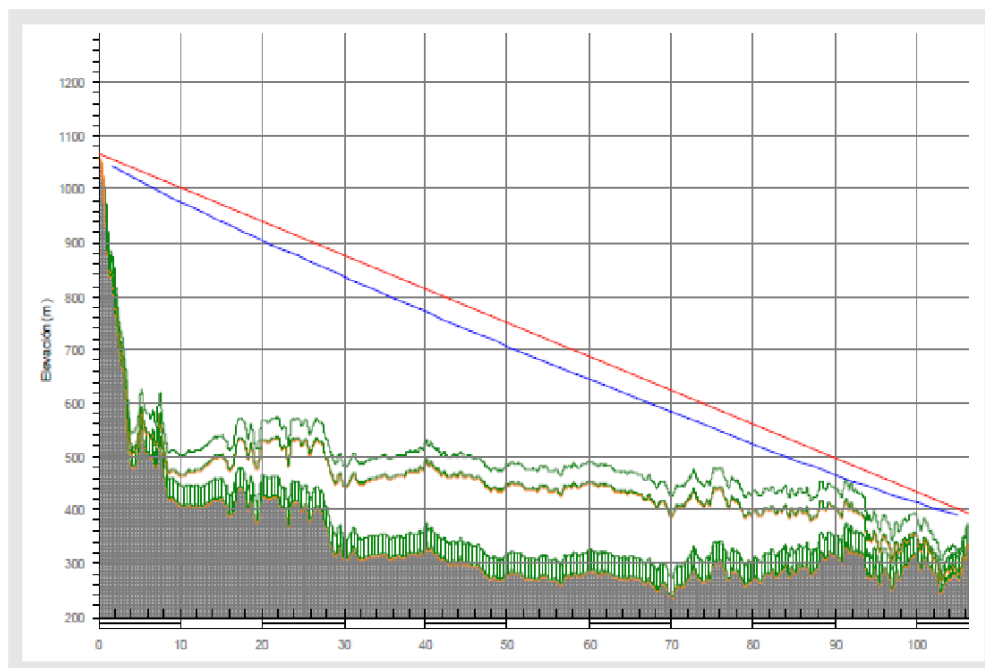
NETWORK DEPLOYMENT

The Aprisa XE in the 1.5 GHz licensed spectrum band was chosen for the challenging long distance link: the use of the low frequency band meant reduced path loss and immunity to the environmental effects that impact higher frequency bands. Lower frequency bands also meant that small, lightweight grid-style antennas can be used. 4RF and its local partner, DIT Telecomunicaciones, carried out the required path planning to demonstrate that the link could meet both the distance and quality of service requirements.

The link was deployed in a 1.75 MHz channel using QPSK modulation, with a QJET interface card to support the E1 requirement. The link reflected the path planning activities that had been carried out, with a received signal of -59 dBm, with a very healthy fade margin.



Aprisa XE



The 106.69 km link from mountain range to tropical rain forest

ANDESPETRO Link Details

Frequency (MHz) = 1500.0, K = 1.33, %F1 = 60.00

Mountain RS end of link		Forest RS end of link	
Latitude	00 00 30.40 N	Latitude	00 42 24.00 S
Azimuth	137.83 degrees	Azimuth	317.83 degrees
Elevation	1058 metres ASL	Elevation	344 metres ASL
Antenna CL	8.1 metres AGL	Antenna CL	48.3 metres AGL

RESULTS

The 106 km link provides ANDESPETRO with a total capacity of 2872 kbit/s, allocated to an E1 and 784 kbit/s Ethernet. The quality of service has remained at 99.999% availability. Perhaps most importantly, using the Aprisa XE provided ANDESPETRO with a cost-effective solution to their communications problems.

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The use of sub 3 GHz spectrum overcame the propagation problems encountered in areas of forest, mountains and tropical environments, to provide a 99.999% quality of service link providing an E1 and Ethernet communications between the two locations.

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ABOUT 4RF

Operating in more than 130 countries, 4RF provides radio communications equipment for critical infrastructure applications. Customers include utilities, oil and gas companies, transport companies, telecommunications operators, international aid organisations, public safety, military and security organisations. 4RF point-to-point and point-to-multipoint products are optimized for performance in harsh climates and difficult terrain, supporting IP, legacy analog, serial data and PDH applications.

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