

BUSINESSCASE

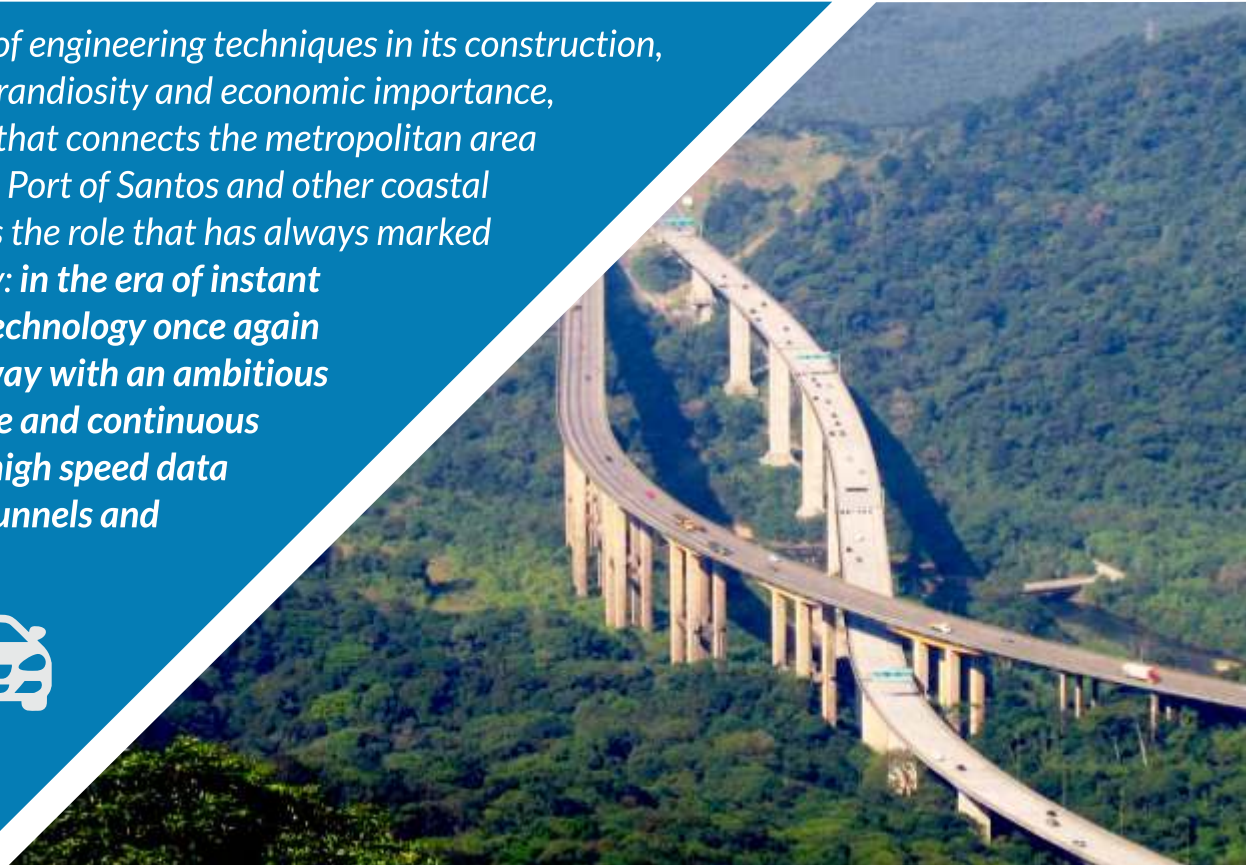
SMART
SOLUTIONS
FOR OUTDOOR
DAS SYSTEM



THE LARGEST HIGHWAY
IN THE COUNTRY RECEIVES
INFRASTRUCTURE FOR VOICE AND
DATA SERVICES, REPRESENTING
CONVENIENCE FOR TOURISTS AND
SECURITY FOR THE RICHES THAT
TRAVEL THROUGH IT.



Pioneer in the use of engineering techniques in its construction, celebrated for its grandiosity and economic importance, the main highway that connects the metropolitan area of São Paulo to the Port of Santos and other coastal regions again plays the role that has always marked its innovative story: **in the era of instant communication, technology once again supplies the highway with an ambitious project of complete and continuous mobile voice and high speed data services through tunnels and outdoor areas.**



With a stunning architectural design embedded in the sea saw, the postcard highway of the state of São Paulo crosses a peculiar region with high rainfall, mist, rough and unstable terrain, which means that every project to be developed in the area becomes a great challenge. Its own construction required differentiated techniques and an innovative project to reduce the environmental impact along its **58.5km extension: 44 viaducts** and **7 bridges** were built on the slopes, and **15 tunnels** were excavated. Two of them are the **longest Brazilian highway tunnels**, measuring **3.146m** and **3.009m** in length, respectively.

This modern road to the sea also receives an immense traffic throughout the summer and other extended holidays, such as Carnival, Easter, and New Year celebrations. The number of vehicles is so huge that the metropolitan city of São Paulo, one of the top 10 most populous in the world with more than 12 million inhabitants, seems empty. Thousands of people who leave from different regions of the country in search of the beaches of the southern coast of the state, as well as tourists who come and go from the Port of Santos to board or land from the transatlantic of the big cruise ship companies, also join this conglomerate.



The audacious project naturally placed **COMBA** on the front line for the design and installation of the entire infrastructure needed for a complete mobile voice and high speed data system, and the company responded with its expertise from those who know the greatness of this challenge. After all, in addition to its own natural challenges, the highway receives estimated traffic of more than **40 million vehicles per year**, and was built to serve as an export corridor between the largest industrial complex in the country and the largest port in Latin America that serves **27% of the Brazilian trade balance**, according to the São Paulo Docks Company (CODESP) - responsible for managing the port. And according to projections of CODESP, by the end of 2017, the forecast is that this traffic exceeds **123 million tons of products exported and imported by Brazil**.

From the Port of Santos, the most diverse Brazilian products, such as soy, sugar, coffee, corn, wheat, alcohol and other liquid bulk are exported to different countries around the world. And it is also by Santos that some of the important items for the Brazilian economy enter the country, like inputs and electronic products, including the ones used by **COMBA** to offer mobile voice and data services along the highway.

WHAT'S NEXT

This technology highway now receives an efficient cellular communication voice and high speed data system from **COMBA**. The **five mobile companies** operating in São Paulo are also considered in this project, providing **2G, 3G, 4G/LTE coverage**, with **high signal quality** so that highway users have access to all kinds of **entertainment and online services**.

The equipment and technology used are the same as in the **Hong Kong subway (MTR)**. But **COMBA's** experience **with indoor applications in large areas** also includes projects in stadiums and sports arenas, such as those used in the **Brazil's Confederations Cup in 2013**, the **Winter Games in Moscow, Rio 2016** and other public areas such as **airports and malls around the world**.



"Since its arrival in Brazil in 2006 Comba has always been a pioneer on providing smart and customized solutions for major engineering projects. So it was for the 2014 Soccer Tournament in Brazil, Rio de Janeiro and São Paulo's metro stations, and others important projects that totalize more than 1.000 deployed projects over these past 10 years. In this particular case won't be different, Comba will provide to this important highway the latest in technology existent for telecommunications in order to guarantee mobile voice and high speed data services. We are very proud to have been chosen for this challenge."

Johnny Brito
CEO
Comba Brazil



SOLUTION | DAS SYSTEM

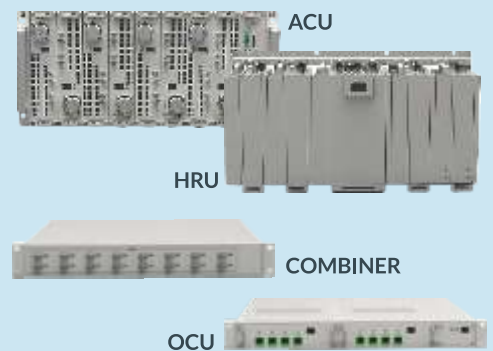
The solution developed by **COMBA** considers the use of a high power **active DAS system**, with **modular remote units** installed across the highway and tunnels, along with distributed antennas. The modularity of this system allows the solution to stay current for years if a new frequency band and technology need to be added.

With this intent, **COMBA** will provide **high performance infrastructure** so that the millions of vehicles that travel on the highway, and all the people that pass through it for a wide variety of reasons, **have access to quality cellular voice and data communication**. The idea is to offer cellular communication to trucks and loads trackers and monitoring systems, as well as online services to those who use the highway for leisure or work, and even communication for the highway support personnel.

It is also important to highlight that this cellular coverage project **contributes to highway safety**, bringing security not only to the millions of tourists who seek the beaches of the coast, but also to the business people responsible for the transportation of essential loads for the Brazilian economy.

DAS ComFlex PLUS

- ▶ Integrated POI and Master
- ▶ Modular system: 8 bands
- ▶ MIMO 2X2 | 4X4
- ▶ PIM < -160dBc
- ▶ Dynamic range 105dB



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