

# Colombia's airports move up to satellites for reliable, secure, cost-effective communications

Colombia Civil Aviation Authority and Hughes Network Systems implement a digital, full-mesh satellite communication network that integrates traffic control voice and data, weather data, air-to-ground radio transmissions and more in one highly reliable, highly economical system.



With millions of lives and billions of dollars worth of equipment at stake every day, it's difficult to imagine more important job responsibilities than those related to air traffic control. Or, of a more "mission critical" communication application than the systems that give air navigation professionals the information they need to ensure safe and timely takeoffs, landings and over flights within their purviews.

Not surprisingly, air traffic control systems tend to rely upon more than one communications solution, with a second system in place and always ready in the background to take over vital voice and data links in the case of a failure in the primary system.

Colombia, like many countries, used terrestrial links as one of its communications solutions, with wired connections between dozens of airports and control centers forming its back-up communications strategy. For primary voice and data communications, the Colombian Civil Aviation Authority relied upon microwave transmissions.

For years, this microwave/copper combination provided Colombia with safe air traffic control capabilities — but at a high cost.

"For microwave, we needed to install equipment in many dense jungle and remote mountainous regions, which are very expensive to access and to maintain," explained Alberto Muñoz, Aeronautical Secretary for the Civil Aviation Authority. In addition, he noted, any equipment "out there long enough" could be vulnerable to weather- or sabotage-related damage.

According to Muñoz, relying upon "third party" wired networks as a back up could be even more vexing, with PTT fees high and physical maintenance of the intermediate infrastructure similarly challenging. In addition, network congestion





could lead to slow data rates, and new lines, when required, could take months to get installed.

#### **Satellite solution boosts reliability, security, value**

By the late 1990s, the Colombian government was seeking a better alternative to its costly microwave/copper air navigation communications infrastructure.

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“We wanted to have a more reliable and cost-effective network for these critical communications, where accessibility and vulnerability of remote equipment and infrastructure would not be an issue,” said Muñoz.

The Civil Aviation Authority looked at a number of technologies and vendors, and, in conjunction with the International Civil Aviation Organization (ICAO), soon selected a satellite-based system featuring Hughes Network System’s TES *Quantum™* product line.

“I know that many organizations in many countries are thinking about deploying optical fiber for these applications; for us, that would be just as difficult to deploy and challenging to maintain as the incumbent technologies,” Muñoz explained. “With a satellite system, you just place the dish at the airport or control center where you want it, and there’s really no infrastructure in between to worry about.”

HUGHES designed and manufactured the digital satellite network to meet the unique challenges of Colombia’s busy air navigation system, providing full turnkey installation at nearly three dozen sites to date, including airports, Colombia’s primary air traffic control center in Bogota, and four regional centers around the country. The system’s full mesh connectivity allows direct communication between any points on the network without hub intervention, providing a high degree of security and reliability.

The robust and flexible system has allowed Colombia’s Civil Aviation Authority to integrate a wide variety of traffic on the network. The system enables voice communications, both dialed and “hotline,” between points. It transmits clear channel flight planning, route maps, radar, meteorological and other pertinent data. And, perhaps most interestingly, HUGHES has created the capability to extend the reach of air-to-ground VHF communications through satellite thereby eliminating the range and clarity issues often caused by mountainous terrain.

“Integrating our communications on the satellite network saves us money,” said Muñoz. “The satellite system is less expensive than our old systems, especially compared to maintaining the wired solutions, and, of course, it is immune to failure of the public telephone network.”

In addition, the Civil Aviation Authority is also saving money and improving its capabilities by using excess capacity for a number of related functions, including planning, administration and financial applications that, among other things, keep the organization’s accounts more accurate and up-to-date than ever before. The system is even used to monitor and control some types of remote equipment.

The outstanding reliability of its satellite system has allowed the Civil Aviation Authority to reduce system downtime, with the network typically offering 99.7% availability. Of course, a back-up network is still maintained, with an intelligent switch used to provide automatic switchover to Colombia’s old microwave network in the rare event of a brief outage.

### Seeking to include neighboring countries on the network

Demonstrating the importance of the new satellite network to the future of his country, Colombian President Andres Pastrana Arango himself was on hand at its inauguration. “This network places Colombia at the vanguard of air navigation,” he said.



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— *Colombian President*  
*Andres Pastrana Arango*

Indeed, after less than a year of operation, Colombia has so much confidence in its HUGHES satellite communications system that it is looking to expand the network to several Adjacent Flight Information Regions — countries, such as Ecuador, Jamaica, Curacao, Venezuela, and Panama, with whom it shares hundreds of flight routes a day.

“HUGHES satellite communications technology has made things much easier for us, and we are very eager to expand the network to some nearby countries,” said Muñoz. “Many of our current connections to these countries are through local PTT carriers. Adding them onto the satellite network would save us all a lot of money and effort, and give us many more voice and data channels for better communication as we coordinate flights and ‘pass off’ control responsibility.”

Plans to expand the network are in the works, and one station has already been established in neighboring Ecuador — with assistance, of course, from HUGHES.

“We really like the technology, as well as the people and service HUGHES delivers,” said Muñoz. “Their technical support is excellent, not only in fixing technical problems, but also in accommodating new requirements and helping us decide which is the best way to carry certain information through the network. Their extensive experience helps us achieve greater results while consuming minimal network capacity.”

Overall, says Muñoz, the HUGHES solution has been highly successful for Colombia.

“We now have more reliability, more speed, more capacity, more services — but not more cost. The up-front investment quickly pays for itself, and the ongoing savings are substantial,” he said. “We highly recommend this solution.”

## Hughes Network Systems

Hughes Network Systems, a unit of Hughes Electronics Corporation, is the world's leading provider of broadband satellite network solutions for businesses and consumers, with over 400,000 systems installed in more than 85 countries. HNS pioneered the development of high-speed satellite Internet access services, which it markets globally under the DirecPC® and DIRECWAY™ brands. For terrestrial access, it offers the comprehensive AIReach® family of broadband wireless point-to-multi-point products. In addition, HNS is a leading manufacturer of DIRECTV® satellite television receivers. Headquartered in Germantown, Maryland, USA, HNS maintains sales and support offices worldwide. The earnings of HUGHES, a unit of General Motors Corporation, are used to calculate the earnings per share attributable to the General Motors Class H common stock (NYSE:GMH).



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