

How Miami International Airport is Using a CBRS Private Network to Transform into a Smart, Connected Aviation Hub



As one of the world's premier aviation hubs, Miami International Airport (MIA) holds the prestigious distinction of being America's busiest airport for international freight and the second busiest for international passenger traffic. MIA shines as an example of the region's economic prowess, boasting six concourses, 131 gates, and a staggering number of over 90 air carriers operating on its runways – requiring high performance along with uninterrupted and ubiquitous connectivity.

To solve vital communications and security challenges, improve passenger safety, and create new revenue opportunities, MIA has successfully deployed a CBRS-based private cellular network, enabling innovative digital applications for passengers, tenants, and operations.

Challenge

MIA faces several operational and connectivity challenges in meeting its digitalization goals. The primary issue is the need for reliable, high-bandwidth connectivity across the airport's vast premises spanning over 3,300 acres and supporting more than 35,000 airport employees and other workers who operate at the airport regularly, including concessionaires, airlines, fuel handlers, ground handlers, and more. Areas that need coverage include indoor terminals, restaurants, gift shops, outdoor ramp areas, cargo facilities, and other support infrastructure.

With more than 52 million passengers passing through annually, seamless mobile coverage is critical for streamlining operations and enhancing the passenger experience. However, MIA's existing Wi-Fi and public cellular networks often struggle with capacity constraints and dead zones, leading to poor service quality.

“MIA's CBRS-based private network is the latest way that our County's largest economic engine is leveraging technology to improve the travel experience and its overall operations. With a dedicated private cellular network and high-bandwidth connectivity, MIA can now provide enhanced wireless service quality across its 3,300-acre campus, from its passenger concourses to its cargo facilities.”

Daniella Levine Cava
Mayor, Miami-Dade County

After a thorough evaluation, MIA concluded that enhancing its connectivity could achieve the following objectives:



Improve the customer experience



Increase employee and tenant satisfaction



Reduce operation costs



Generate new revenue streams

Solution

After investigating several connectivity technologies, MIA opted to implement a CBRS-based private cellular network. A few of the key reasons MIA opted to use a CBRS network were the ease of deployment and scalability, as well as its high level of security. Unlike alternative wireless networks that require extensive planning, construction, and infrastructure investments, the CBRS ecosystem allowed for a rapid and cost-effective rollout of the private cellular network. This agility has been instrumental in accelerating MIA's digital roadmap and swiftly adapting to evolving demands.

During the initial trial, two tests were conducted to determine if a private cellular network could help MIA achieve its vision. Using the CBRS 3.5 GHz band, the first test involved the strategic placement of video cameras to expand its visual surveillance capabilities and enhance airport security. The use of wireless cameras allowed them to be placed in strategic locations around the airport perimeter without the need for expensive fiber to be laid to carry the video signal. The second test involved the introduction of Google phones to airport staff, allowing them to test Push-to-Talk (PTT) functionality with greater coverage and signal reliability than walkie-talkies. The tests were an unqualified success.

MIA is also embracing the latest communication technologies to enhance the travel experience and streamline staff operations. The airport is developing an innovative omni-channel chatbot tool that can be accessed via smartphones, allowing seamless text, voice, and video communication. Passengers can get real-time updates, ask questions, and receive personalized directions by simply sending a text message or initiating a voice or video call. IoT sensors and other devices via the CBRS network will supply much of the chatbot's data. This convenient communication channel minimizes confusion and reduces passengers' need to navigate multiple information sources.

The emergence of the Citizens Broadband Radio Service (CBRS) shared spectrum band has made cellular network viable for private use, separate from public cellular networks. With CBRS-based private networks, organizations gain all the powerful advantages of cellular technology and the security and control required to achieve their business outcomes.

“As a longtime advocate of Private Wireless Networks, we recognized their potential to transform our airport operations. The CBRS platform proved to be the perfect fit for our Smart Airport initiatives.”

Ralph Cutié, Director and CEO, Miami-Dade Aviation Department

A number of other applications are either fully functional or successfully operating in trial mode.



Escalators and elevators generate automatic trouble tickets when malfunctioning and send notifications to airport maintenance for faster response times, as well as people on the omni-channel chatbot, which shows pedestrians the best way to get around the airport.



People counter on the airport's people mover SkyTrain alerts airport operations on congestion issues and provides estimated wait times for passengers.



Bathrooms that relay stall availability to guests and soap dispenser levels to maintenance crews.



For capacity monitoring of a 13-gallon bin that holds liquid that passengers need to pour out when going through security, an alert is sent when the bin reaches 10-gallons and needs to be emptied.

At MIA, the airport will also provide private cellular and Wi-Fi services to their tenants, generating additional revenue. This innovative business model is a game-changing ROI model, turning MIA's cost center into a revenue center.

Since the trials, MIA's plan has expanded, with the design now to include 335 indoor and 26 outdoor access points.

The provision of services for the various applications has expanded to encompass a wide range of vendors, each specializing in a specific aspect: radio access network and integration, wireless gateways, indoor mapping tools, omni-channel chatbots, and integration of sensor data and video analytics for passenger movement and situational awareness.

Conclusion

MIA is successfully implementing a cutting-edge private cellular network using the CBRS spectrum. This solution is enabling the airport to improve the customer experience, enhance employee and tenant satisfaction, reduce costs, and generate new revenue streams. By leveraging applications like video surveillance, asset tracking, and an innovative omni-channel chatbot, MIA has streamlined operations and provided an enhanced travel experience for passengers. With its robust and flexible CBRS-based network, MIA has solidified its position as an innovative, connected, and future-ready aviation hub, setting a new standard for airport digitalization and passenger-centric operations.

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