Case Study

Enhancing Airport Operations with 5G-Based Sensing Technology

Gerald R. Ford International Airport Collaboration

The Gerald R. Ford International Airport (GRR) in Grand Rapids, Michigan, collaborated with Tiami Networks to explore cutting-edge sensing solutions for improving operational efficiency and safety. Through FLITE, the Airport's innovation program that provides grants and pilot-testing opportunities to companies focused on bringing emerging air travel technology solutions to market, Tiami's PolyEdge Multifunction Sensor was installed to demonstrate camera-free passenger monitoring and drone detection in no-fly zones, showcasing the versatility and innovative capabilities of Tiami's Integrated Sensing and Communications (ISAC) technology.

The Challenge

Airports face a unique set of challenges when it comes to monitoring passenger flow and ensuring airspace safety. Traditional systems such as cameras and standalone radar sensors can be limited by blind spots, high installation costs, and privacy concerns. At GRR, the objectives were to:

- Monitor passenger activity in busy areas without capturing Personally Identifiable Information (PII).
- Detect unauthorized drones near the West Michigan Aviation Academy (WMAA), a charter high school located on the Airport's campus.
- Leverage existing infrastructure to reduce costs and maximize efficiency.

The Solution

Tiami Networks deployed the PolyEdge Multifunction Sensor for validation and testing within GRR's terminal and at WMAA. This innovative solution uses 5G broadcast signals as a passive radar source, enabling:

- Passenger Monitoring: Camera-free detection of passenger movement with over 91% accuracy (mean average precision). PolyEdge processed data in real-time without compromising passenger privacy, making it ideal for areas where cameras may not be suitable.
- Drone Detection: Identification and localization of drones up to and beyond 100 feet, achieving impressive detection accuracy even in challenging no-fly zones near WMAA. This performance is competitive with traditional radar and computer vision solutions.

PolyEdge leverages existing cellular infrastructure including Distributed Antenna Systems (DAS) and is compatible with major providers such as Verizon, AT&T, and T-Mobile, making it a cost-effective and scalable solution for airports.

"Tiami Networks' PolyEdge solution has proven to be a viable technological approach to gathering passenger statistics while protecting the privacy of our guests."

– Tom Cizauskas, Business Administration Manager for the Gerald R. Ford International Airport Authority

The Results

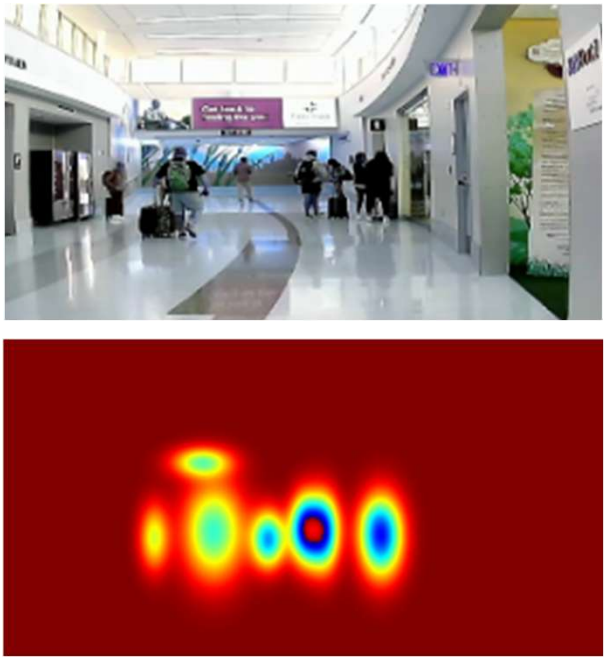
Passenger Monitoring Success
The PolyEdge system monitored passenger activity at Gate A8 and the business lounge area in Concourse A without blind spots or reliance on cameras, providing actionable insights into passenger flow.

Drone Detection in No-Fly Zones
Near the WMAA, PolyEdge demonstrated reliable drone detection, offering a critical layer of airspace security for GRR.

Cost Efficiency
By utilizing existing 5G infrastructure, PolyEdge significantly reduced installation and operational costs compared to traditional camera or radar-based systems.

What They're Saying

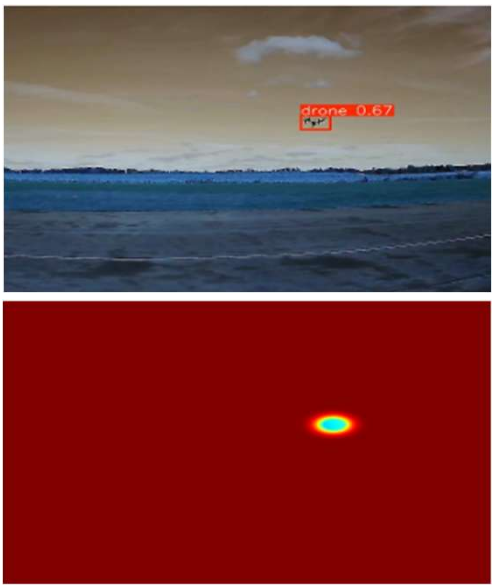
Tom Cizauskas, Business Administration Manager at GRR, shared his thoughts: "Tiami Networks' PolyEdge solution has proven to be a viable technological approach to gathering passenger statistics while protecting the privacy of our guests."



Top: Camera View of Airport Travelers
Bottom: Corresponding PolyEdge Output

Why PolyEdge?

- Privacy-First: Unlike cameras, PolyEdge does not capture PII, addressing privacy concerns head-on.
- Cost-Effective: By utilizing existing 5G infrastructure, PolyEdge demonstrated its ability to significantly reduce installation and operational costs compared to traditional camera or radar-based systems.
- Scalable: PolyEdge is vendor-agnostic, working seamlessly across multiple cellular networks and frequency bands.



Top: Camera View of Flying Drone in Airspace
Bottom: Corresponding PolyEdge Output

Conclusion

The successful collaboration between GRR and Tiami Networks highlights the transformative potential of 5G-based sensing technology. By addressing privacy concerns, reducing costs, and delivering reliable performance, PolyEdge sets a new standard for airport operations and safety.

To learn more about how Tiami Networks can support your organization's sensing and communications needs, visit www.tiaminetworks.com.

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