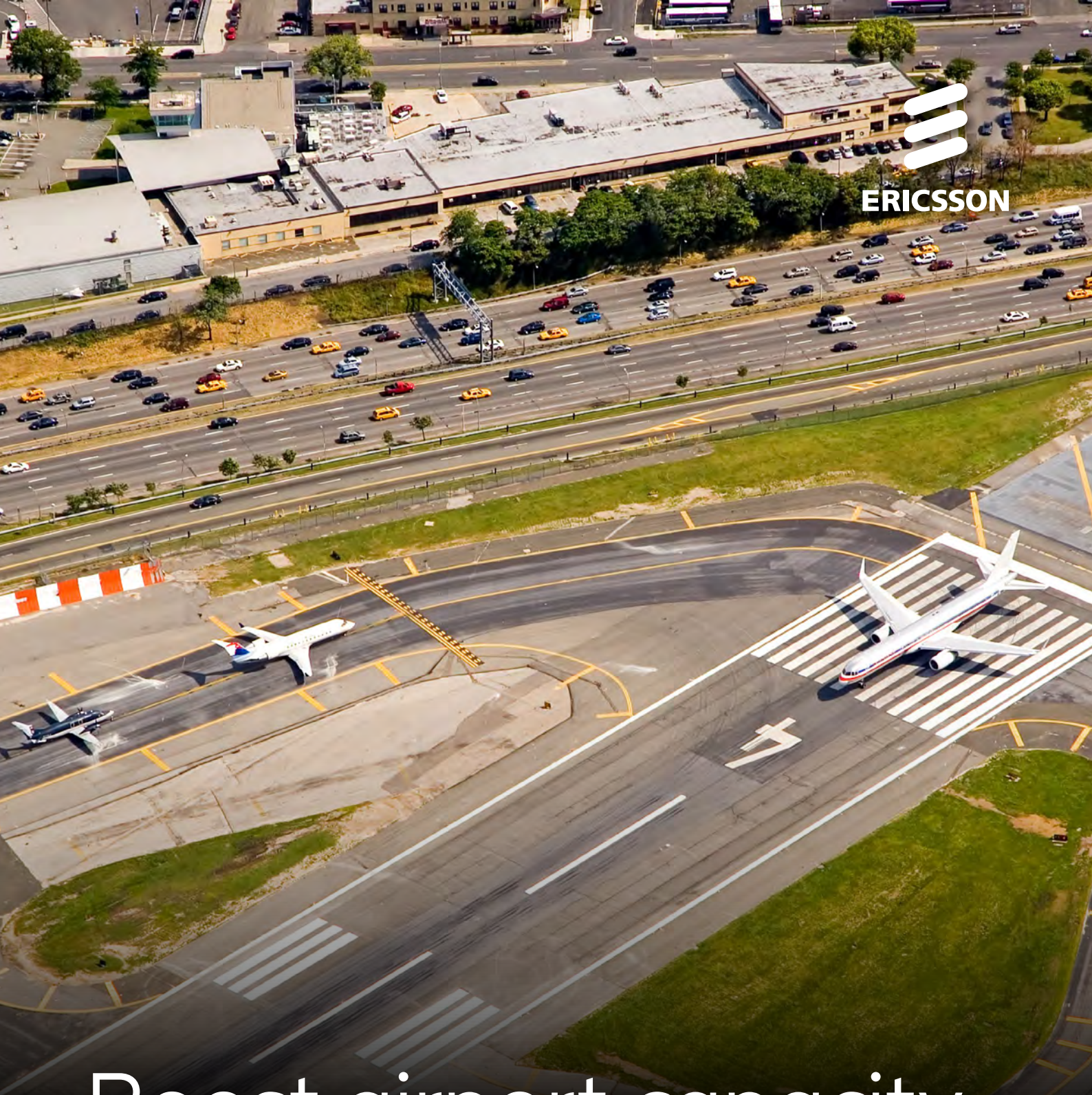



# Boost airport capacity with private 5G

Building the backbone for smarter gates, increased flight capacity, and seamless travel

AVIATIONPROS

# Contents

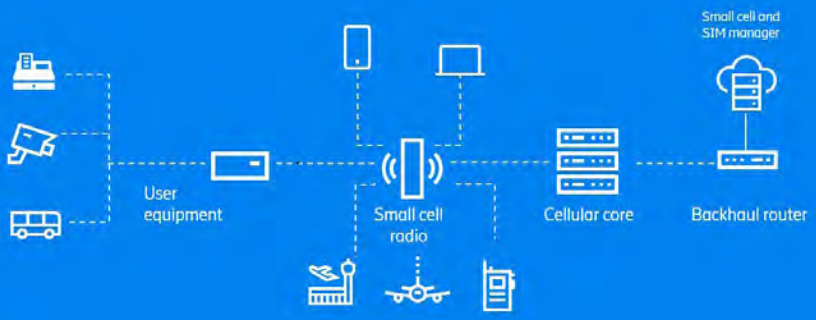


Passenger traffic has surpassed pre-pandemic levels and continues to rise exponentially. While this growth boosts airport revenue, it also presents mounting challenges. Airports face physical limits—constrained real estate and finite gate capacity—making it increasingly difficult to keep pace with rising traffic demand.

To keep pace, airports are implementing new airside solutions that maximize space and operational efficiency. Connected vehicles, real-time optimizations, and next-generation communication tools are helping reduce aircraft turnaround times and increase capacity. However, many of these solutions depend on a level of dedicated wireless connectivity that Wi-Fi and public cellular networks alone cannot deliver. That's why leading airports are turning to private 5G networks, which provide the secure, high-performance connectivity backbone needed to fully leverage airside technologies.

# What is a private 5G network?

Private 5G networks are purpose-built to deliver superior performance, security, and cost-effective scalability. By design, they use cellular access points and a dedicated network core to manage traffic locally, giving airports full control, security, and coverage. Unlike Wi-Fi and public 5G, these networks provide wireless connectivity coverage across an airport. They also offer an airport and on-site, secure cellular infrastructure that enables full coverage, control, and customizable traffic prioritization.




# How private 5G networks power airside solutions of the future

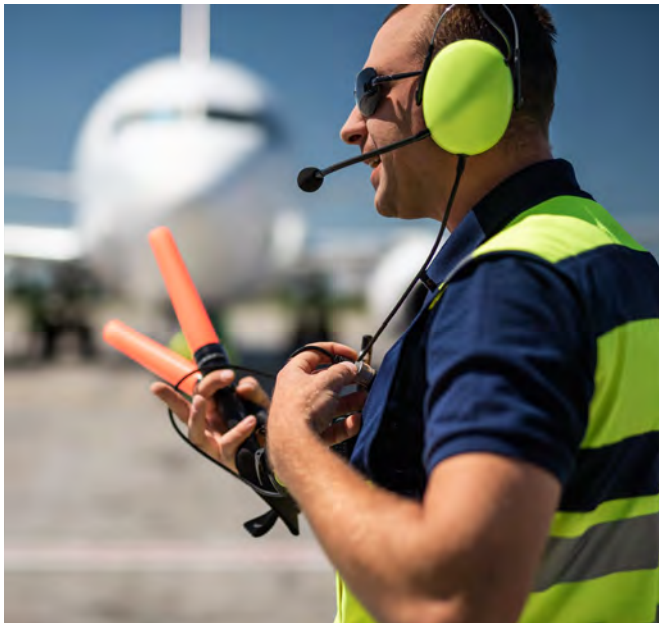
Private 5G unlocks the full potential of modern airside technology. From connected vehicles to predictive maintenance and more, it enables tools to work without delays or dropped connections.

## Connected vehicle implementation

In an effort to increase efficiency, airports have been adopting connected data-driven airport technologies—from autonomous snowplows, buses, baggage movers, robots, and more. These tools improve efficiency at gates and enhance passenger throughput.

On Wi-Fi or public 5G networks, bandwidth limitations or latency can disrupt these operations, causing costly delays.

Private 5G eliminates these challenges, allowing airports to prioritize certain critical connected vehicles and ensure seamless performance. With ultra-low latency and enhanced security through private 5G, airports benefit from faster turnaround times and protect against interference or security threats.



## Push-to-talk (PTT) communications enhancement

Push-to-talk (PTT) provides instant voice communications crucial for coordination among gate agents and ground operations workers. This might include employees who are managing fueling, catering, and baggage loading/unloading. Since airport PTT solutions must deliver immediate, real-time communication for ground crews across gates, aprons, hangars, and fueling zones, wide area coverage across expansive terminal footprints is essential.

Modern PTT systems have evolved far beyond the traditional "walkie-talkie" capabilities. Today's solutions offer multimedia capabilities that enhance coordination across airport operations. With push-to-video, file sharing, and location tracking, workers can instantly share live feeds, images, and annotated updates. This improves situational awareness and decision-making in real-time, especially during irregular operations (IROPs).

These advanced PTT capabilities depend on a reliable, low-latency network. Wi-Fi and public 5G networks can struggle with congestion, limited coverage, and unpredictable latency. Private 5G eliminates these issues and ensures consistent, secure, and high-quality connectivity. Airports will experience dedicated coverage with guaranteed bandwidth to support uninterrupted voice and video streams.

## Air traffic turnaround improvement

Turnarounds have a great impact on on-time performance (OTP). In fact, delays in air traffic turnaround have resulted in annual losses of approximately $33 billion for the U.S. aviation industry. That represents nearly 10% of its revenue.

With private 5G networks and the autonomous vehicles, AI-driven video analytics, and real-time intelligence solutions they enable, airports can improve OTP, recoup some of that lost revenue, and achieve opportunities to accommodate more flights per day.

Modern airports typically operate thousands of cameras and install them outside to monitor aircraft as well as inside passenger terminals. Today's cameras are no longer just recording devices—they're sophisticated computers with lenses, connected to the network. With the right connectivity and AI-driven analytics, these smart cameras function as computer vision systems that can run applications that turn raw footage into real-time insights. Used with connected, AI-driven applications, airport video feeds can improve real-time information around turnaround events such as:

- When passengers have embarked/disembarked
- When fueling is complete
- When baggage/cargo loading is finished

These insights allow for more accurate forecasts, which in turn, allow terminal operators to reduce delays and manage more efficient turnarounds and optimize daily flight capacity.

Private 5G networks enable the simplified installation and operation of smart cameras across the terminal without needing to incur the costs or disruptions of running fiber or network cabling to new locations.

Additionally, the high-capacity wireless connectivity offered by private 5G technology also enables rapid, secure, and reliable aircraft data offload during turnarounds without having to manually plug in or remove drives. That's something that legacy networks with interference, congestion, or insufficient operational control cannot deliver. With private 5G networks and the solutions they enable, airports can minimize delays and handle more aircraft movements per day, even before adding new gates or runways.

## Predictive and remote maintenance optimization

With real-time data exchange capabilities, private 5G networks facilitate better predictive and remote maintenance to identify and address maintenance issues before they interrupt operations. In fact, predictive maintenance programs, which utilize the constant connectivity ensured by private 5G networks, have been shown to minimize equipment downtime, optimize asset utilization, and drive productivity improvements of up to 30%.

These predictive maintenance solutions depend heavily on the use of sensors and the ability to keep these sensor devices connected. A private 5G network supports airport investments in predictive maintenance as 5G networks are designed with the capacity to support a very high density of devices without congestion or interference, whereas most Wi-Fi networks function best with a limited quantity (typically within a few hundred) of simultaneously connected devices.

## Tablet and laptop facilitation

Private 5G also offers an advantage for airports when connecting tablets, scanners and laptops. When working with Wi-Fi, these portable devices sometimes run into problem spots as they are used by ground crew on the go. They tend to experience the issue of "Wi-Fi stickiness"—when a device tries to stay connected to one Wi-Fi network even when it's beyond the network's coverage. As a result, airport employees experience problematic handoffs that can slow down operations.

Private 5G networks eliminate this challenge by using prioritization and preemption orchestration. Meaning, airports maintain control over the connections between access points (APs) and devices. With this solution, airports get enhanced coverage flexibility and improved overall reliability.

# What airport leaders need to know about switching to private 5G

Switching to private 5G comes with advantages that go beyond faster speeds. Before making the change, leaders should understand the benefits in three main areas: security, cost, and reliability.

## Better reliability

Wi-Fi often provides adequate internet access for airport passengers, but not the same level of dedicated connectivity private 5G offers—which is necessary for critical, autonomous, or data- intensive applications. Wi-Fi is simply not designed for large-scale mobility across outdoor areas. At the same time, public 5G service quality may have coverage gaps in certain areas of airport terminals, and can be impacted by the activities of non-airport users on the network. Conversely, private 5G supports ruggedized wearables, radios, and IoT devices with ensured connectivity. This enables the use of connected solutions that result in better turnaround times and passenger throughputs.

## Enhanced security

Private 5G networks are notably more secure than Wi-Fi solutions. Wi-Fi, with its standard username and password protection, is more prone to interference and cyber vulnerabilities. Additionally, public 5G data leaves airport control and travels over carrier infrastructure, which can introduce compliance and sovereignty issues.

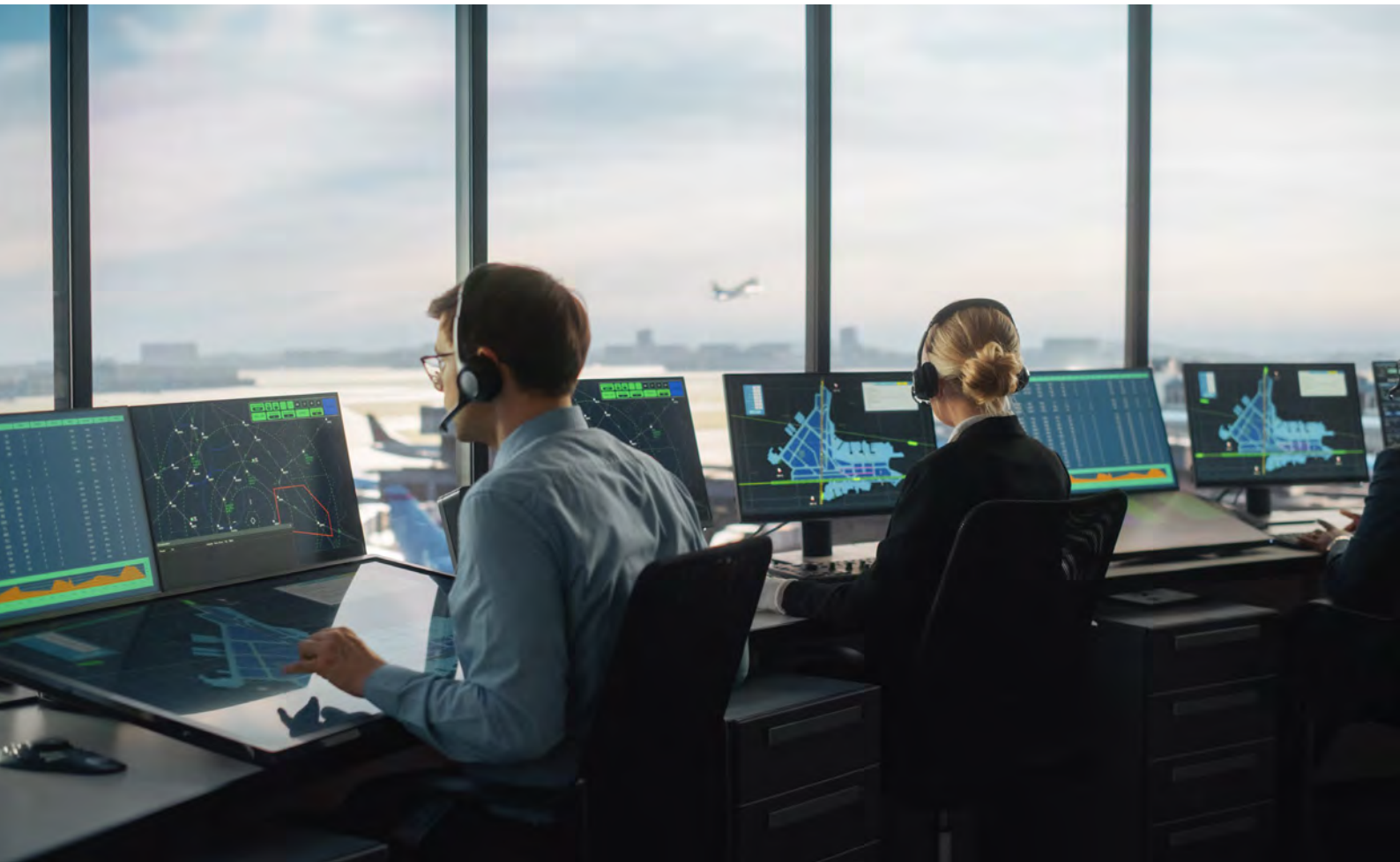
Private networks go beyond Wi-Fi and public 5G's security limitations. Instead, they feature built-in enterprise-grade encryption, SIM/eSIM authentication, and on-site traffic management for enhanced security. They also integrate encrypted communication, localized traffic control, and a zero-trust approach. With a private cellular network, airports can keep critical operations, IoT, and corporate data within their own network, and can even choose to keep it on-premises only. Sensitive instructions like fueling sequences or safety-critical alerts are protected and can comply with aviation security mandates.

## Cost-effectiveness

With proper planning, airports can expect to achieve significant cost savings. Private 5G networks help airports save on infrastructure and wiring expenses, increase efficiency gains through critical use cases, and attain new innovative commercial opportunities.

Usually, private 5G requires less infrastructure than other network solutions. Airport leaders can expect one radio per 30 access points and eliminate the need for cabling. Side-by-side, private 5G networks are often less costly, especially in large outdoor areas.

Additionally, private 5G networks can also cut recurring fees tied to public cellular service for large-scale IoT deployments. For example, when Dallas-Fort Worth International Airport outfitted restrooms with IoT sensors to monitor trash bins and other supplies, each device carried an individual cost. With a private cellular network, all those sensors connect without per-device charges, making large-scale IoT deployments far more cost-effective.



# Private 5G considerations: Choosing the right spectrum requirements

Spectrum is an important factor that will determine how a private 5G system will work, and it's important to work with a trusted partner to evaluate the advantages and limitations of your spectrum choices against the context of an airport's geography, operational requirements, and existing IT resources.

All private 5G networks utilize designated ranges of frequencies, also known as spectrum bands or channels. There are three categories of spectrum bands that a private 5G system can use (low-band, mid-band, and high-band), and spectrum is available in both licensed and unlicensed forms:

**Licensed spectrum** is controlled and auctioned by regulatory bodies such as the FCC and priced in accordance with a high market. This spectrum is reliable as it is dedicated to use by a single provider. Most licensed 5G spectrum has been purchased by major mobile carriers or is in use by defense organizations.

**Shared spectrum**, which is provided for use by the commercial industry in countries such as the U.S. and Germany. Shared industry spectrum may be a cost-effective option to use for deploying private cellular networks in some cases; however, it may be preempted for real-time use by the military and government entities, or simultaneously used by other industry applications. However, access to shared spectrum is not guaranteed and varies by country. Mid-band CBRS (3.5 GHz Band 48), for example, is an example of shared spectrum only within the U.S.

Learn more about spectrum categories here.

# Private 5G: The backbone of tomorrow's airports

As airports face surging passenger demand and finite physical capacity, private 5G networks and the connected solutions they enable offer a practical path forward. They deliver the speed, reliability, and security that other wireless networks can't match. With it, airports can achieve faster operations, higher capacity, and smoother passenger flow—without facilities construction or expansion. Private 5G builds the backbone for smarter, more efficient airports of the future.

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**Additional Resources**

Ericsson Solution Brief: Smart Airports Take Flight With Private 5G

Ericsson Report: Connected Aviation

Ericsson Paper: 5G—A Key Enabler for Air Traffic Control

5G Connected Vehicles

Buyer's Guide to Private Cellular Networks for Airports

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