XCOM RAN™ by Globalstar

EBOOK

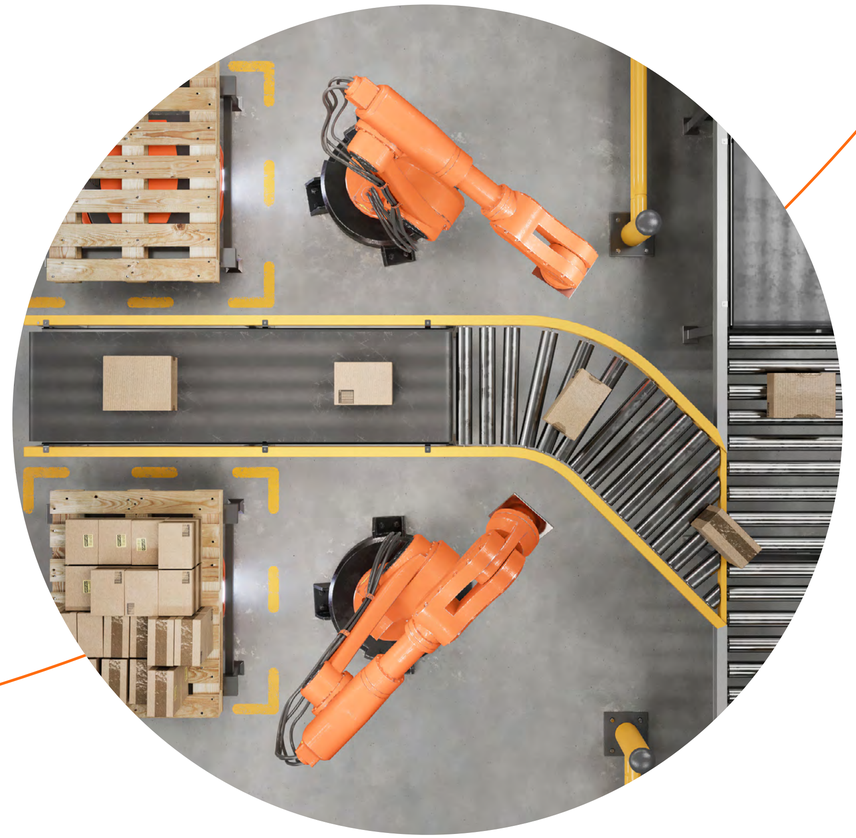
The Rising Demand for Automation and Order Fulfillment

The Automation Imperative in Warehousing and Logistics

Order fulfillment has never been under more pressure. Customers now expect next-day or even same-day delivery; order accuracy approaching 100 percent, and real-time visibility into the status of their shipments. At the same time, global supply chains are becoming more complex, labor markets are tightening, and the cost of errors is climbing. For warehouses and logistics providers, these converging forces have transformed automation from a competitive edge into an operational requirement.

Where once manual processes and traditional workflows could keep up with demand, today's environment is unforgiving of delays, mis-picks, or downtime. Automation offers a path to efficiency, scalability, and resilience, which enables organizations to process higher volumes with greater accuracy, even in the face of labor shortages and supply chain volatility.

However, the rush to automate comes with its own set of challenges. From high upfront investments to integrating new systems with legacy infrastructure, decision-makers face a complex set of trade-offs. Connectivity has emerged as one of the most critical and often underestimated factors in the success of these initiatives.



Drivers of Rising Demand

The acceleration of automation and order fulfillment adoption is fueled by several converging market forces. Each is putting unprecedented strain on traditional warehousing and logistics models, and collectively, they're creating an environment where automation isn't just advantageous, it's essential.

e-Commerce growth and consumer expectations

The rapid expansion of e-Commerce has redefined what fast means in fulfillment. Two-day shipping now is considered standard in many markets, and same-day delivery is becoming increasingly common. Customers also expect precise tracking updates and error-free orders, making speed and accuracy inseparable from the customer experience. Meeting these expectations at scale is nearly impossible without automation.

Labor shortages and rising wages

Warehousing and logistics face persistent labor gaps, intensified by seasonal surges and high turnover. Recruiting and retaining skilled workers is costly, and wage inflation adds to operational pressure. Automation (particularly in repetitive, labor-intensive tasks like picking, packing, and sorting) helps organizations do more with fewer human resources, while allowing existing staff to focus on higher-value work.

Global supply chain complexity

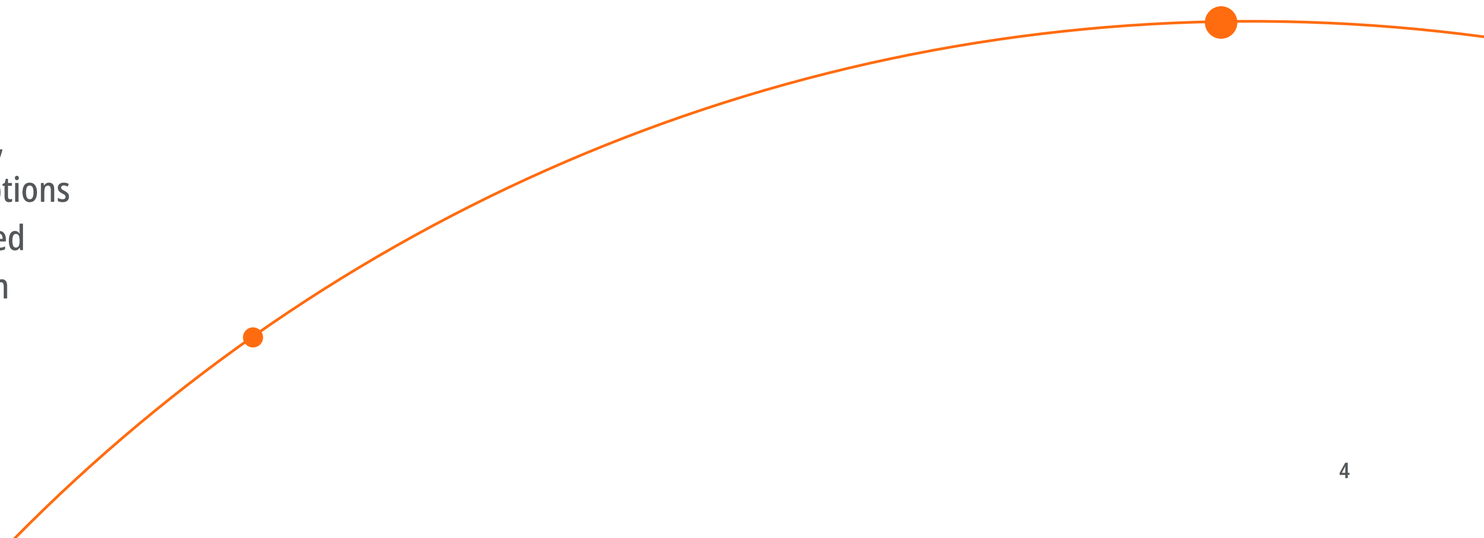
Supply chains now span continents, involve multiple transport modes, and depend on tight coordination among partners. Even minor disruptions can cascade into significant delays. Automated systems bring the speed and precision needed to handle complex routing, manage inventory in multiple locations, and keep goods moving efficiently across borders.

Competitive pressure and scalability demands

Faster, more efficient competitors are raising the bar across industries. For organizations to remain competitive, they must be able to scale operations up or down quickly in response to demand shifts. Automation provides the flexibility to handle volume spikes without proportionally increasing costs or headcount.

Technology convergence and affordability

Advancements in robotics, IoT sensors, and AI-driven analytics are making automation systems more powerful and cost-effective than ever. The falling cost of key components, coupled with more flexible deployment models, is lowering the barrier to entry for small and mid-sized operations – broadening adoption beyond the largest enterprises.



Key Automation Technologies in Order Fulfillment

As warehouses and logistics operations push to meet rising order volumes and tighter delivery expectations, automation has become a critical component of modern fulfillment strategies. A growing variety of technologies now work together to streamline movement, storage, picking, and packing. Each of these helps address specific challenges in speed, accuracy, and cost control.

Autonomous Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs)

AGVs follow fixed paths, often using magnetic tape or embedded tacks, to move goods between workstations. AMRs take this further, using sensors and mapping to navigate dynamic environments without human intervention. Both technologies reduce manual handling, speed up transport, and help keep workers focused on higher-value tasks.

Automated Storage and Retrieval Systems (AS/RS)

AS/RS use cranes, shuttles, or carousels to quickly move goods in and out of storage locations. By maximizing vertical space and reducing manual travel time, these systems improve throughput and accuracy while minimizing labor costs. They're especially valuable for high-density environments where real estate is at a premium.

Conveyor and Sortation Systems

Conveyors provide a continuous flow of goods through key processing stages, while sortation systems direct packages or items to the right locations for shipping or further handling. These systems are critical for high-volume operations, reducing bottlenecks and improving accuracy in order routing.

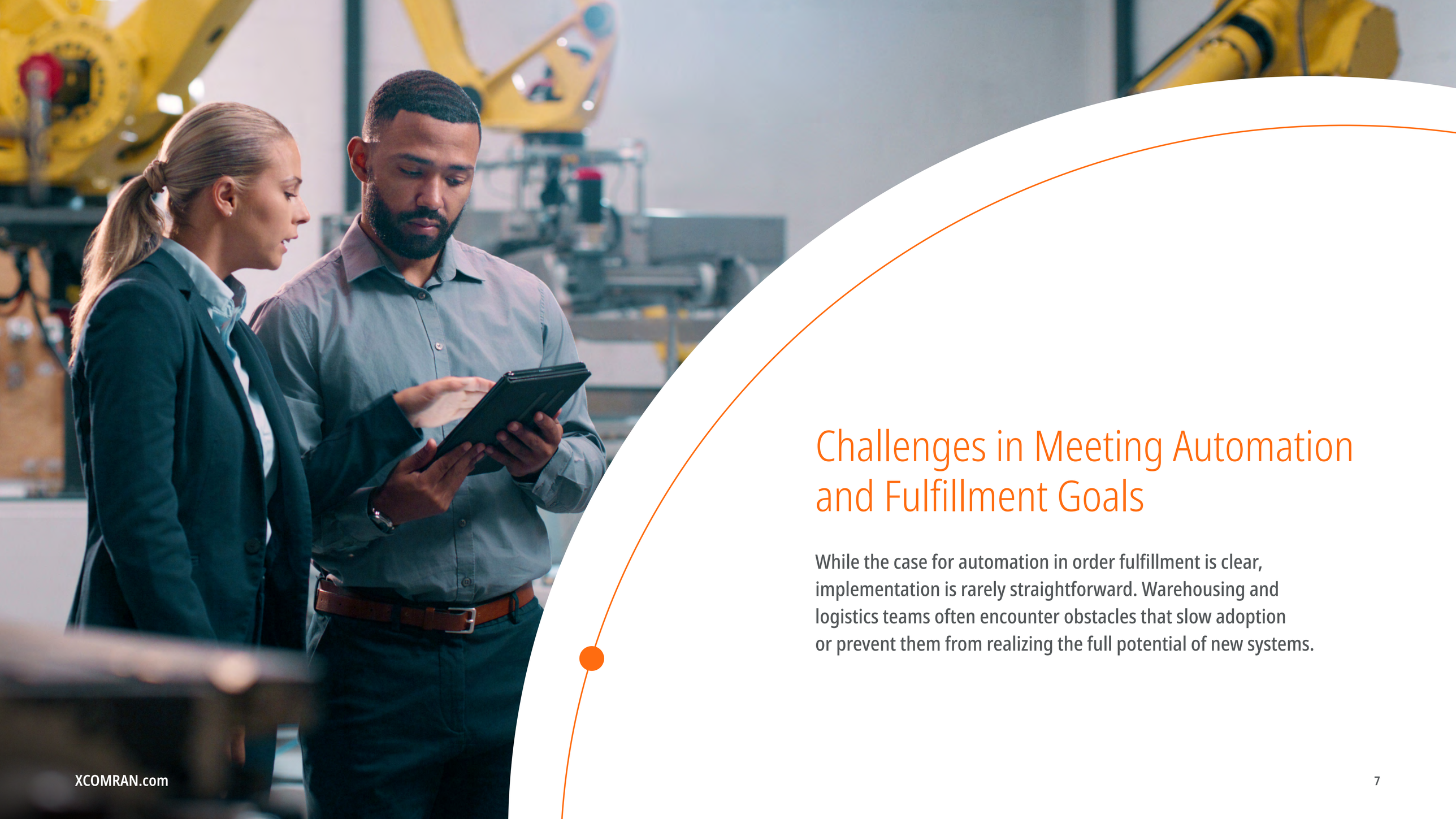
Robotics for Picking and Packing

Robotic arms and AI-powered picking solutions are increasingly capable of handling a wide range of SKUs, from fragile items to irregularly shaped goods. When paired with vision systems and advanced grippers, these robots can boost speed and consistency in both picking and packaging, even in environments with high product variability.

IoT-Enabled Asset Tracking and Environmental Monitoring

Sensors embedded in equipment, vehicles, and storage areas provide real-time visibility into the location, condition, and movement of goods. Environmental monitoring, such as temperature and humidity sensing, is particularly important for perishable or sensitive inventory. This IoT data helps reduce loss, improve compliance, and support predictive maintenance of critical equipment.

Collectively, these automation technologies lay the groundwork for more responsive, efficient, and data-driven fulfillment operations. The challenge for many organizations is determining which combination of solutions best meets their operational needs and how to integrate them effectively.



Challenges in Meeting Automation and Fulfillment Goals

While the case for automation in order fulfillment is clear, implementation is rarely straightforward. Warehousing and logistics teams often encounter obstacles that slow adoption or prevent them from realizing the full potential of new systems.

Integration with existing systems

Many warehouses rely on legacy infrastructure for inventory management, order processing, and transport coordination. Integrating modern automation tools, especially those powered by robotics or advanced analytics, into these older systems can be complex and resource-intensive. Without seamless integration, automation may create more bottlenecks than it removes.

Connectivity limitations in industrial environments

Automated operations depend on constant data exchange between devices, systems, and operators. In large, high-traffic industrial spaces, Wi-Fi can struggle with interference and coverage gaps, while public cellular networks may not deliver the reliability, low latency, or security required for critical operations. These connectivity shortfalls can limit the effectiveness of even the most advanced automation systems.

Workforce readiness and change management

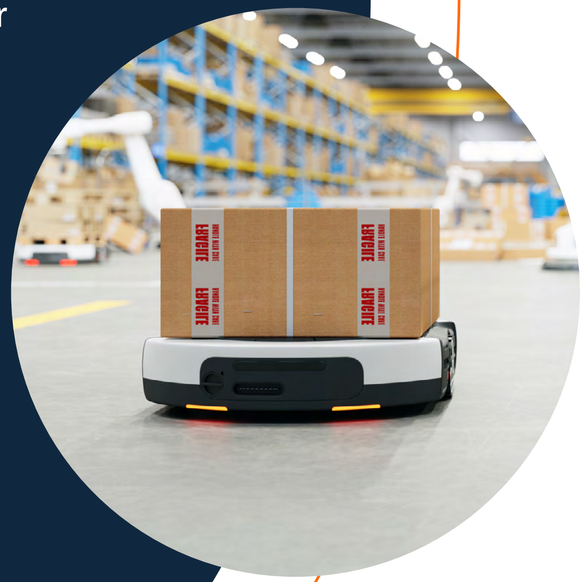
Shifting from manual to automated workflows changes the role of the human workforce. Employees may need new skills, from supervising robotic systems to interpreting machine-generated insights. Without effective change management and training, resistance or a skills gap can delay the realization of automation benefits.

Scalability and flexibility concerns

Automation systems must adapt as demand fluctuates or as product lines change. Choosing solutions that scale without extensive downtime, reconfiguration, or cost spikes is a challenge, particularly for businesses with seasonal surges or unpredictable market conditions.

Connectivity as a Critical Enabler

Automation depends on constant machine-to-machine communication. AMRs and AGVs need timely control updates and clean handoffs as they move between zones. Vision systems push steady uplink video for inspection and safety. WMS and orchestration platforms coordinate picks, replenishment, and exception handling. If links drop or jitter rises, robots pause, conveyors back up, and tasks get requeued. The net result is missed SLAs and a higher cost per order. A workable rule of thumb is to design for consistent latency, predictable throughput, and seamless mobility first, then add capacity.



Limits of Wi-Fi in dynamic warehouses

Wi-Fi is familiar and quick to deploy, but it struggles with the realities of high movement and dense metal infrastructure.

Roaming and handoffs

Clients decide when to roam. That can introduce brief stalls that stop AMRs or delay scans.

Channel contention

Unlicensed spectrum invites interference from neighbors, test equipment, and building systems. Busy airtime slows everything.

Coverage variability

Tall racks, pallets, and seasonal configurations create shadows and multipath that change week to week.

Uplink pressure

Vision analytics and scan bursts are uplink-heavy. Wi-Fi scheduling favors downlink, which can starve cameras and edge apps.

Operational drift

Adding access points (APs) to “fix” dead spots often increases overlap and co-channel interference, creating new problems.

Why private cellular changes the operating baseline

Private 5G brings scheduled access, stronger mobility, and better uplink performance.

Deterministic scheduling

The network, not the client, controls air-time. Time-sensitive traffic gets consistent service even at peak load.

Seamless mobility

Standardized handovers keep AMRs and AGVs moving without application-level retries.

Stronger uplink

Camera streams and scanner bursts maintain quality under load.

Security and control

On-prem authentication, traffic isolation, and policy control align with warehouse IT and compliance needs.

Spectrum choices

Operate in CBRS or licensed mid-band to reduce interference and keep performance predictable.

Optimize private networks with XCOM RAN

Even private cellular needs tuning in RF-noisy spaces with shifting layouts. An optimization layer helps maintain steady performance without constant manual retuning.

Interference-free management

Coordinated multipoint and real-time radio optimization limits collisions and smooths the edges of cell performance.

Throughput-per-radio

Higher spectral efficiency means fewer radios, simpler site plans, and lower total cost to cover aisles and docks.

Adaptive QoS

Policy-driven prioritization keeps control traffic ahead of noncritical flows when the floor gets busy.

Software-defined operations

Centralized orchestration speeds up deployments, supports seasonal reconfigurations, and shortens recovery after layout changes.

Scale with confidence

As robotics, cameras, and hard drives grow in number, the network preserves latency targets and job completion times.

Optimization for Warehouse Automation

Automation is becoming the baseline expectation in modern warehouse operations, but achieving consistent, high-performance automation depends on one non-negotiable factor: the network. Without reliable, low-latency connectivity, even the most advanced robotics, AI, and machine-driven workflows can falter.

Warehouses face an environment in constant motion: shifting layouts, moving equipment, fluctuating workloads, and evolving demands. Wi-Fi alone can struggle to keep pace with this level of variability, creating blind spots or inconsistent coverage that undermines operational goals. Private cellular networks, built on enhanced and advanced systems like XCOM RAN, bridge this gap. They provide the scalability, adaptability, and resiliency required for automation to deliver on its promise.

The path forward is clear – treat connectivity as the foundation, not the afterthought. With the right network strategy in place, automation can operate at full potential: streamlined, predictable, and ready to evolve as your business does.

Reach out to take a live tour of XCOM RAN.

XCOM RAN™ by Globalstar

© 2025 All rights reserved.