



CASE STUDY

# Global tile manufacturer standardizes on Celona to ensure nonstop manufacturing automation

## CUSTOMER

Del Conca USA

## VERTICAL

Manufacturing

## LOCATION

Loudon, Tennessee

## CUSTOMER SIZE

30-acre indoor/outdoor manufacturing facility

## CHALLENGE

Eliminate wireless network downtime, disruptions and reliability issues slowing down manufacturing, material handling, inventory control and order fulfillment processes



*With Celona, we've overcome the production issues caused by our legacy wireless system and still haven't found the limits of the technology"*

*Luca Chichiarelli  
Head of IT Operations  
Del Conca USA*



## BUSINESS REQUIREMENTS

- Eliminate wireless connectivity issues hampering production and fulfillment processes
- Increase the efficiency and productivity of network-reliant AGVs and forklifts.
- Improve production quality reporting, monitoring and validation
- Streamline order fulfillment processes
- Decrease loading times and reduce errors in locating products
- Lower wireless network CAPEX and OPEX while increasing coverage

## SOLUTION

- 8 indoor Celona AP 12 access points
- 4 outdoor Celona AP 11 access points
- Celona Edge OS for advanced traffic management and core network services
- Celona Orchestrator for cloud-based network administration and SIM management
- Third-party CBRS-to-Ethernet gateways

## OUTCOME

- 2X improvement in wireless coverage with one-third the wireless access points
- Faster and more efficient material handling to avoid production stalls
- Consistent connectivity and throughput in more locations even those far away from AP
- Lower operational, capital network maintenance costs for wireless network
- Faster wireless hand-offs for mobile AGVs and forklifts
- Reduction in packet loss, latency and application disconnects
- Faster picking, packing and shipping to speed order fulfillment

**“Celona’s 5G LAN has allowed us to cost-effectively streamline the automation of our manufacturing operations and dramatically improve operational efficiency”**

**Luca Chichiarelli**

*Head of IT Operations  
Del Conca USA*

A constant battle to keep the wireless network up and running is not an option when your entire production facility depends on reliable wireless connectivity for a myriad of automated systems.

Network downtime and disruption of plant systems essential to the material handling process can result in tens to hundreds of thousands of dollars in lost revenue, lower production productivity and shipment delays.

This was the problem faced by Del Conca USA, a subsidiary of the Del Conca group, at their massive manufacturing plant in Loudon, Tennessee.

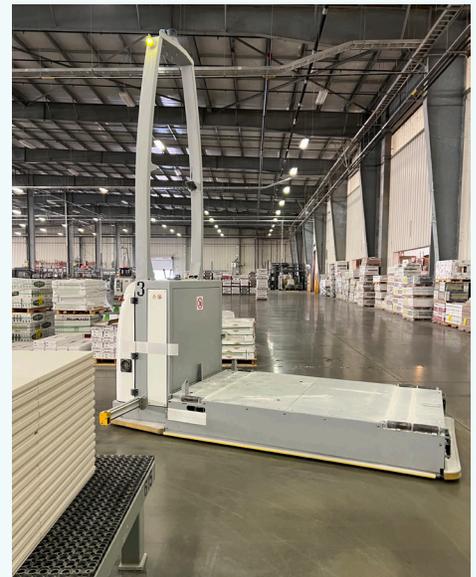
Based in Italy, The Del Conca Group is a global supplier of fine Italian tile and porcelain products. From raw materials to finished product, Del Conca prides itself in having one of the most precise and automated production and fulfillment processes that includes the fabrication, placing, picking and shipping of products to customers around the world from four large manufacturing facilities in Italy and the United States.

“Because we operate within large and challenging manufacturing environments, reliable wireless mobility and connectivity are vital to our operational success,” said Luca Chichiarelli, Head of IT Operations for Del Conca USA.

“Our legacy Wi-Fi system was simply unstable and couldn’t deliver the reliability and uptime necessary to support the critical production processes that are fundamental to our business.”

## MANUFACTURING AUTOMATION COMES WITH WIRELESS CHALLENGES

Within its massive 30-acre manufacturing facility in Tennessee, Del Conca operates dozens of automated guided vehicles (AGVs) as well as manned forklifts roaming around the facility, picking, pushing and placing pallets of fine Italian tile to where it needs to go next. These mobile systems rely on pervasive and reliable wireless connectivity with network traffic for each system traversing its own dedicated VLAN.



Each Del Conca forklift is outfitted with an onboard industrial computer running Windows 10 with wireless adapters for network connectivity.

Meanwhile SACMI AGVs are equipped with a mobile gateway that translates wireless signals to Ethernet.

Both the AGVs and forklifts constantly communicate with their respective data management systems to receive operational instructions and report progress and tracking information. This allows Del Conca's IT staff to precisely track shipment errors, optimize material handling and trace the location of products around the facility as they move through the production process.

But when network connectivity is interrupted or fails, due to a mobility, interference, congestion or signal obstruction, the production process stalls costing Del Conca valuable time and money.

"Our legacy Wi-Fi system was constantly flapping, causing onboard systems to reconnect to both the network and the applications driving them," said Chichiarelli. "This could result in long truck loading times, loading errors, lost time looking for goods, production backlogs."

Del Conca had previously deployed a vast Wi-Fi wireless LAN to cover its indoor/outdoor facility.

With its existing Wi-Fi network, Del Conca would often see weak signal strength below -70dBm that wouldn't allow its AGVs or forklifts to maintain or even establish a reliable connection to vital systems.

But with private cellular technology this wasn't the case.

Areas with poor Wi-Fi signal strength still maintain a reliable connection because private cellular networks use a wider frequency band and have a more efficient signal processing mechanism. Cellular networks can adjust their transmission power and dynamically allocate resources to maintain a stable connection even when the signal is as low as -110 dBm.



Because manufacturing environments are littered with machines, congested areas, metal structures and other wireless obstacles that impede signals, maintaining reliable wireless connectivity has become a major challenge for manufacturers.

Additionally, the frequent concentration of AGV's and forklifts in the same area - all trying to access the same Wi-Fi APs causes network contention and packet loss. For Del Conca, this often resulted in network service disruptions and production delays.

"With private wireless, we believed we could completely blanket the facility with fewer radios while gaining a stronger and more stable signal that would behave much better in our environment. And this turned out to be the case," Chichiarelli said.

"The promise of a private cellular service that we could own, operate, and control ourselves was a compelling proposition. But we wanted a complete end-to-end system that was highly optimized and would directly integrate with our existing IT network systems, IP domains and VLAN structure already in place. This quickly led us to Celona," commented Chichiarelli.

## OUT WITH OLD IN WITH THE NEW

After evaluating various private wireless solutions and public carrier services, the Del Conca IT team conclusively chose Celona's private wireless LTE system utilizing the Citizen's Broadband Radio service (CBRS) that operates within the 3.55 to 3.7 GHz frequency (band 48).

Beyond AGVs and forklifts for material handling tasks, Del Conca has targeted the Celona infrastructure to support production line workers using handheld devices with native CBRS support to confirm production yields, report progress metrics and track production details as well as streaming video to monitor critical production activities.

Today, Del Conca production line workers use a discrete Motorola push-to-talk system to communicate amongst themselves. With its own private cellular infrastructure now in place, this use case can now be migrated to the Celona infrastructure allowing workers to use their own devices with private eSIMs to communicate collectively.

According to Del Conca, unlike more expensive and complex alternatives, Celona's architecture could be easily "cookie cut" across multiple sites using either 4G LTE or 5G NR radio technology.

What's more, Celona's private wireless system provided a consistent, unified and IT-friendly framework that could be easily installed across its various global operations using different shared spectrum options available in country.

## DEPLOYMENT DETAILS

For the entire wireless deployment in its Tennessee facility, Celona performed a complete RF study and recommended Del Conca install eight indoor Celona AP 12 LTE units and four Celona AP 11 LTE outdoor units.

Each AP operates using two 20 MHz channels (one for each radio). In the plant area of use, all 150 MHz of available CBRS spectrum is available to Del Conca.

Housed within NEMA enclosures and ceiling mounted 45 feet high, Celona indoor APs were connected via Cat 6 PoE+ (802.3 at) cabling, obviating the need to pull separate power to the APs.

For coverage outdoors Celona APs were mounted 20 feet high on all four corners of the building. Outdoor APs are equipped with either 90° or 120° high gain (16.5 DBi) directional antennas. This effectively eliminated the need for digging trenches and run cabling for backhaul.

As systems and devices access the Celona private wireless network, all data plane and management traffic is securely tunneled to Celona's Edge node that runs within an appliance on Del Conca's enterprise LAN.

Cloud-based orchestration, administration and management of network elements, traffic flows and SIMs is performed by Del Conca's staff using the Celona Orchestrator.

A big benefit for Del Conca's IT staff, the Celona Orchestrator provides the ability to easily optimize the network from end to end. Through an intuitive browser-based GUI, IT staff gains full visibility into and control over the network with the ability to define and automatically enforce granular QoS requirements for each connected system. Traffic from each application is then mapped to a predefined Del VLAN and QoS policy.

On the manufacturing floor, the AGVs are connected via Ethernet to a gateway equipped with a Celona SIM card that provides CBRS connectivity to the private wireless network. For each forklift, an onboard computer provides native CBRS connectivity to the Celona private wireless network.

## LOOKING FORWARD

With Celona's private wireless system deployed and fully operational in its Tennessee facility, Del Conca now has a unified architecture that can be easily duplicated and extended to other global locations.

"Celona's unique approach to private wireless allowed us to quickly overcome many of the wireless issues we've been facing for a while now," said Chichiarelli. "With it we've been able to reduce latency, improve mobility, expand coverage and, most importantly, increase the reliability of the wireless services that have become the foundation for automating our manufacturing operations."

For Del Conca, the Celona private wireless network has already delivered proven ROI by increasing the productivity of its material handling processes, eliminating production errors and stalls due to network disruptions, and lowering the capital and operational costs associated with maintaining its legacy Wi-Fi network.

Looking forward Del Conca is interested in leveraging its Celona private wireless network to deliver neutral host networking services that will extend public carrier cellular services across its facilities.



***"Celona's private wireless infrastructure now gives us the ability to enable a range of new video monitoring and push-to-talk communication services never before feasible on our wireless network."***

*Luca Chichiarelli  
Head of IT Operations  
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