



Wireless Connectivity Solutions for Rail

RAIL OPERATORS ARE INCREASING SAFETY AND OPERATIONAL EFFICIENCY THROUGH WIRELESS TECHNOLOGY.

Safety on the railroads continues to be a top priority as rail operators seek ways to maximize efficiencies and performance of their fleet. Operators are able to leverage wireless technology to increase on time performance, provide better video security at facilities across their network, and increase worker productivity.

Rail operators invest in modernizing their infrastructure by connecting previously unconnected devices via wireless technology.

Applications:

Multiple wireless solutions to support many applications.

Rail applications include:

- Core licensed backhaul
- Crossing monitoring
- Infrastructure monitoring and control
- PTC and CTC IP transport
- Remote switch detection
- Video surveillance in yards and intermodals
- Wayside messaging server backhaul
- Wi-Fi in rail yards and intermodals
- Wi-Fi at refueling stations

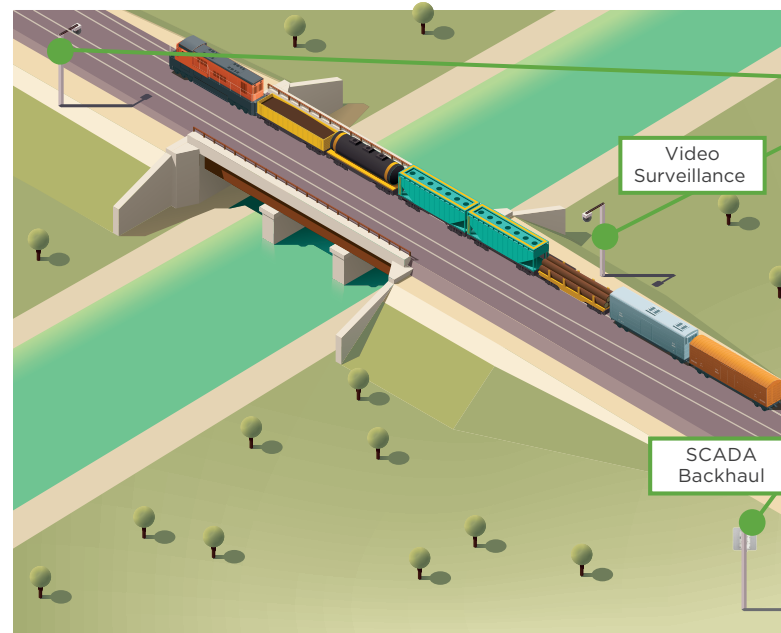
Benefits:

Complete Coverage – Connect the entire operations and remote locations with long range backhaul, wide area distribution, and Wi-Fi. Complete coverage from NOC to wayside or trackside node.

High Capacity – Deploy narrowband solutions to connect yard sensors and controls, aggregate data with broadband, connect control facilities and transport over long distance main line backhaul.

Secure – 128/256 AES encryption allows highly secure networks.

Reliable – Wireless solutions designed for the harshest environments in rail.



Cambium Networks Technology Ensures Highly Reliable and Higher Capacity Connections in Harsh Environments

Reduce Wi-Fi Total Cost of Ownership by up to 30%:

- Adaptive Wi-Fi Architecture – lets you decide on the controller implementation
- Zero Touch Wi-Fi Provisioning – improves the speed and accuracy of provisioning access points

Stronger RF performance of mainline backhaul network:

- 3-4x Ethernet capacity increase using existing tower infrastructure
- Improved overall RF system gain by 2-3 dB
- Higher network uptime

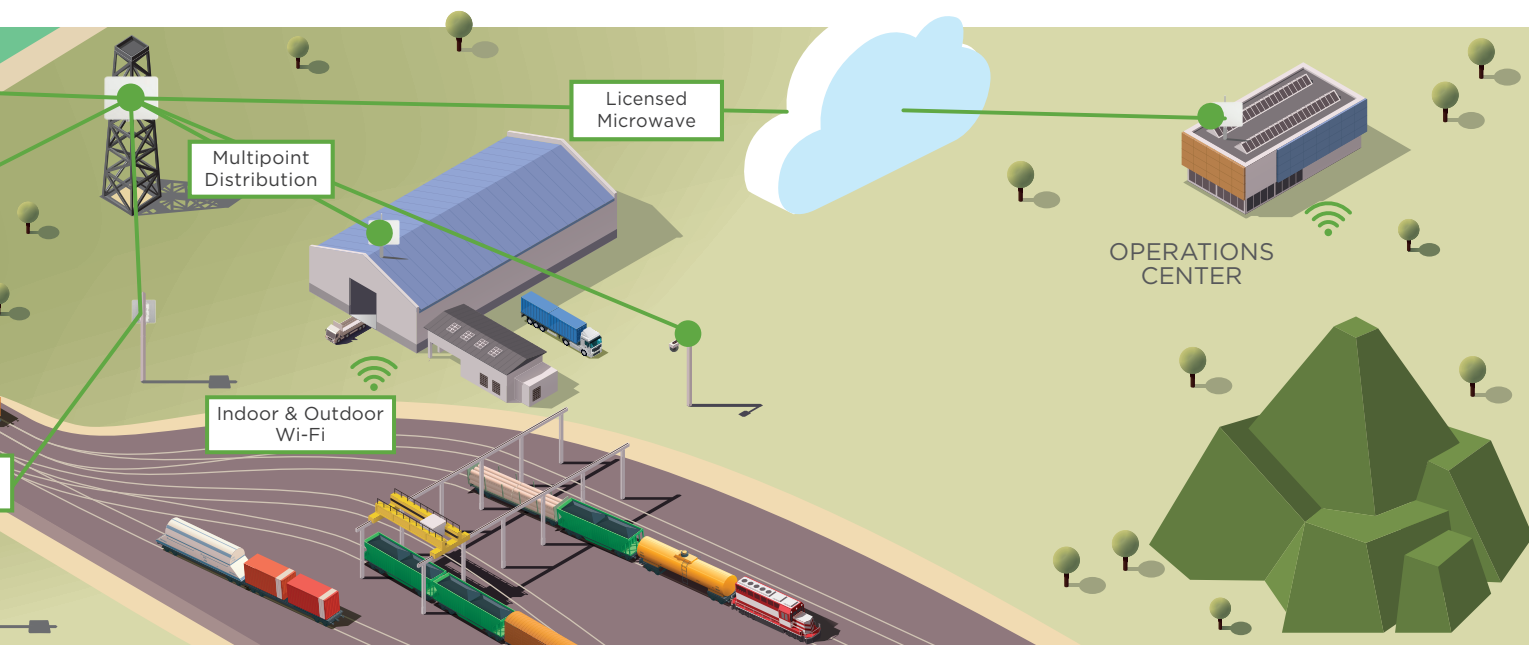
Increase reliability of remote sensors in yards previously connected by legacy copper circuits

- Native serial or native Ethernet connections available to support legacy devices in the field.

Improved reliability and capacity of video surveillance systems in yards and intermodal facilities

- 2-10 MB per camera with high resolution





Proven Solutions

Ruggedized Wi-Fi access for field connectivity

- Outdoor hotspot and 802.11ac wave 2 Wi-Fi networks

Wide-Area licensed and unlicensed narrowband connectivity for control and monitoring

- Wide-area process control and monitoring of IIoT critical infrastructure
- SCADA/Serial/IP/General Purpose I/O
- Multiple frequencies (220/450/700/900 MHz)

Wide-Area Point-to-Multipoint for video surveillance and backhaul

- Video surveillance for physical security
- SCADA master aggregation and backhaul

High capacity long range Point-to-Point backhaul

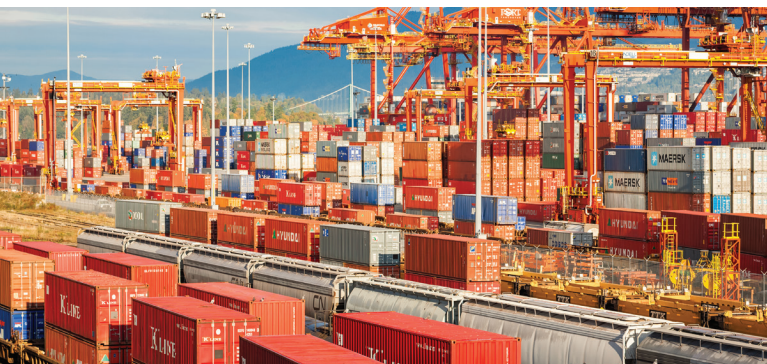
- Licensed microwave and unlicensed backhaul

Single pane of glass network management

- Bird's eye view of field network
- Rapid on-boarding and provisioning of new nodes
- End-to-end performance and fault management
- Centralized password management and firmware updates

The Cambium Difference

- **Reliability** – Deploy wireless broadband with confidence that it will work right the first time and continue to work 24/7 over the long haul.
- **Scalability** – Connect thousands of individual locations with a synchronized network that enables RF frequencies to be re-used throughout the network to provide the highest level of connectivity in the least total amount of spectrum.
- **Total Cost of Ownership** – Minimize the total cost of network ownership with one IP-based wireless network comprised of licensed and unlicensed backhaul and access components that can be rapidly deployed and perform reliably with minimum maintenance cost.
- **Planning Software** – End-to-end network design using LINKPlanner for prediction of capacity and availability.
- **Sustainability** – Solutions designed to operate for years from a supplier with a proven track record of stability and sustainable product evolution.
- **Spectral Efficiency** – Provide the highest amount of information transfer in the least amount of scarce spectrum with industry award winning throughput.



ABOUT CAMBIUM NETWORKS

Cambium Networks is a leading global provider of wireless connectivity solutions that strengthen connections between people, places and things. Specializing in providing an end-to-end wireless fabric of reliable, scalable, secure, cloud-managed platforms that perform under demanding conditions, Cambium Networks empowers service providers and enterprise, industrial and government network operators to build intelligent edge connectivity. Cambium Networks' commitment to continuous innovation in wireless access is demonstrated in the millions of radios deployed in thousands of networks that benefit communities around the world. Team members also contribute to social responsibility activities to serve the communities in which they live. Headquartered outside Chicago and with R&D centers in the U.S., U.K. and India, Cambium Networks sells through a range of trusted global distributors.

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