AWK Series 802.11ac Industrial Wireless Solutions

*Certification will be available in Q2, 2023.

Certified Security

- IEC 62443-4-2 SL2 certified* device-level security
- Supports WPA3 encryption
- One-to-many NAT secures and simplifies outbound connections

Always-on Connectivity

- Turbo Roaming for handovers under 150 ms
- Automatic Connection Check and Recovery
- Transparent PROFINET communication

Robust Durability

- Industrial-grade EMC
- Level 4 ESD protection and antenna isolation
- Diverse industry certifications (selected models only)

Learn More

Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With 35 years of industry experience, Moxa has connected more than 94 million devices worldwide and has a distribution and service network that reaches customers in more than 85 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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Boost Productivity With Industrial Wireless Connectivity

www.moxa.com

Boost Productivity

With Industrial Wireless Connectivity

Industrial wireless technology is changing the world as we know it, driving the development of unmanned and remote capabilities to facilitate autonomous and mobile operations in various applications such as material handling, medical care, manufacturing, and mining.

Compact mobile machines equipped with complex sensing and computing capabilities such as Autonomous Mobile Robots (AMR) open up a new realm of possibilities. Wireless connectivity combined with AI (artificial intelligence) lets autonomous vehicles leverage mobile intelligence to move on their own without an operator or follow fixed paths to scan, map, and navigate their environment.

Moxa's industrial Wi-Fi products are designed to boost productivity and flexibility for modern industrial operations. The new generation of AWK Series 802.11ac Wi-Fi solutions provides concurrent dual-band speeds of up to 1,300 Mbps for better and wider coverage. The robust design helps mitigate downtime caused by environmental factors such as extreme temperatures, shock and vibration, and power and radio interference. By combining millisecond-fast roaming, wireless resilience features, and IEC 62443-4-2 certified security, Moxa's AWK wireless solutions deliver field-proven reliable and secure Wi-Fi connectivity to support seamless mobility for stability-critical applications.

Learn More

Security

- IEC 62443-4-2 SL2 certified device-level security*
- Supports the latest WPA3 encryption protocol for securing Wi-Fi networks
- One-to-many NAT secures and simplifies outbound connections

Connectivity

- 2.4/5 GHz concurrent dual-band speeds up to 1,300 Mbps
- Turbo Roaming for handovers under 150 ms
- Connection Check and Recovery functionality
  - AP mode supports non-roaming legacy clients
  - Client mode supports flexible recovery options
- Transparent PROFINET communication

Usability

- Best-in-class RF compliance approved in major countries
- UN models support configurable multi-region RF compliance
- Rich tools to simplify data collection for easy review and troubleshooting

Reliability

- Reverse polarity protection and antenna isolation for robust durability
- -40 to 75°C wide operating temperature
- IP68-rated (AWK-4252A Series only)
- Diverse industry certifications (selected models only)

*Certification will be available in Q2, 2023.

Factory Automation

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Optimizing Material Handling on the Move

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Optimizing Material Handling on the Move

A global machine manufacturer wanted to upgrade their AGV/AMR solutions to improve individual mobility and fleet efficiency. As part of the upgrade, AGVs and AMRs needed to be outfitted with more advanced components.

Why Moxa

- Compact, robust design for easy machine integration and enhanced EMC and RF protection
- 802.11ac performance with Turbo Roaming for millisecond-level handovers
- UN model with multi-region RF certification compliance

AWK Products Used

AWK-1151C
802.11ac Wireless Client

System Requirements

- Compact devices that meet machine installation and network requirements
- Reliable operation with sufficient vibration and EMI noise resistance
- High bandwidth and around-the-clock availability

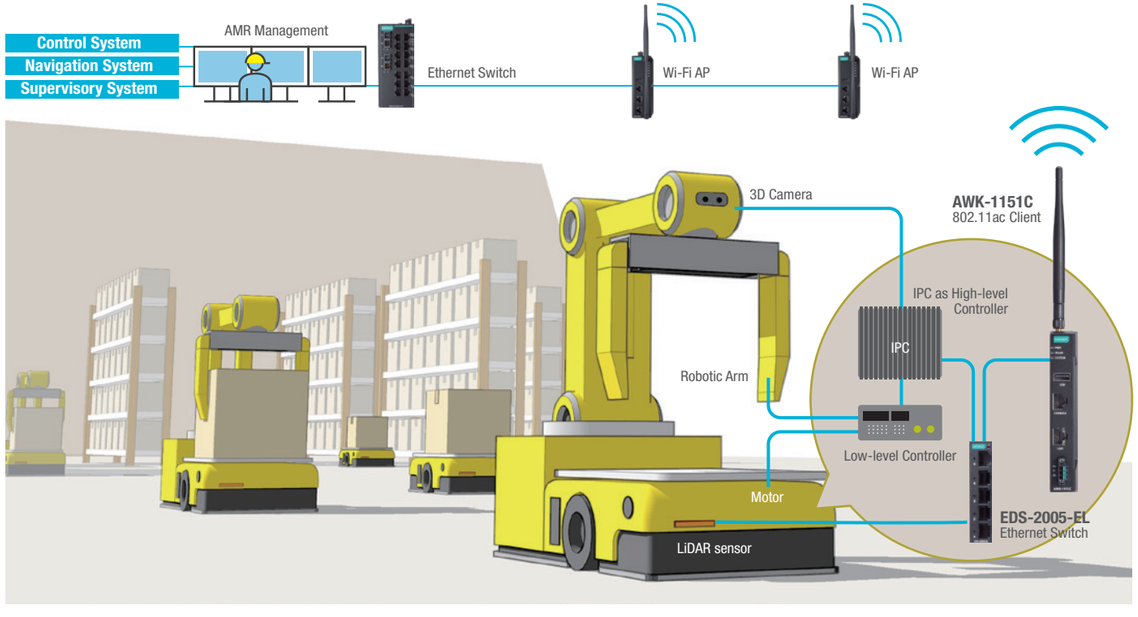
Moxa's Solution

Wireless connectivity is key to coordinating multiple autonomous AGVs/AMRs in busy operating environments. As the AGVs/AMRs scan their surroundings to choose the best route to their targets and perform pick-and-place tasks, they generate large amounts of data and video traffic on the network. High-bandwidth wireless becomes essential to avoid latency that could cause collisions or other problems.

Moxa's AWK-1151C Series helps create a stable wireless experience for AGV and AMR operations. The AWK-1151C wireless client offers IEEE 802.11ac speeds up to 867 Mbps and sub-150 ms seamless roaming to provide uninterrupted wireless connectivity and sufficient bandwidth for current and future data requirements.

To maximize uptime, the AWK-1151C Series meets industrial standards for protection against power surges, electromagnetic interference, ESD, shock, and vibration. The AWK also features WPA3 encryption and IEC 62443-4-2 certified security to protect AGV/AMR operations against cyberthreats.

The AWK-1151C Series offers a universal (UN) model with RF approvals for major regional markets. This allows users to choose region-specific RF compliance via software configuration to simplify inventory and reduce cost.



Unmanned Crane Operations for a Smart Steel Mill

A steel mill enhanced its overhead crane for unmanned remote-controlled material handling. The facility features a durable, heavy-duty crane construction that leverages real-time video streaming to perform material hauling and control tasks, improving operational safety and efficiency.

Why Moxa

- High-bandwidth wireless transmissions and seamless roaming
- Supports transparent PLC communication
- Industrial-grade reliability and security compliance

AWK Products Used

AWK-1151C
802.11ac Wireless Client

AWK-3252A
802.11ac Wireless AP/Client

System Requirements

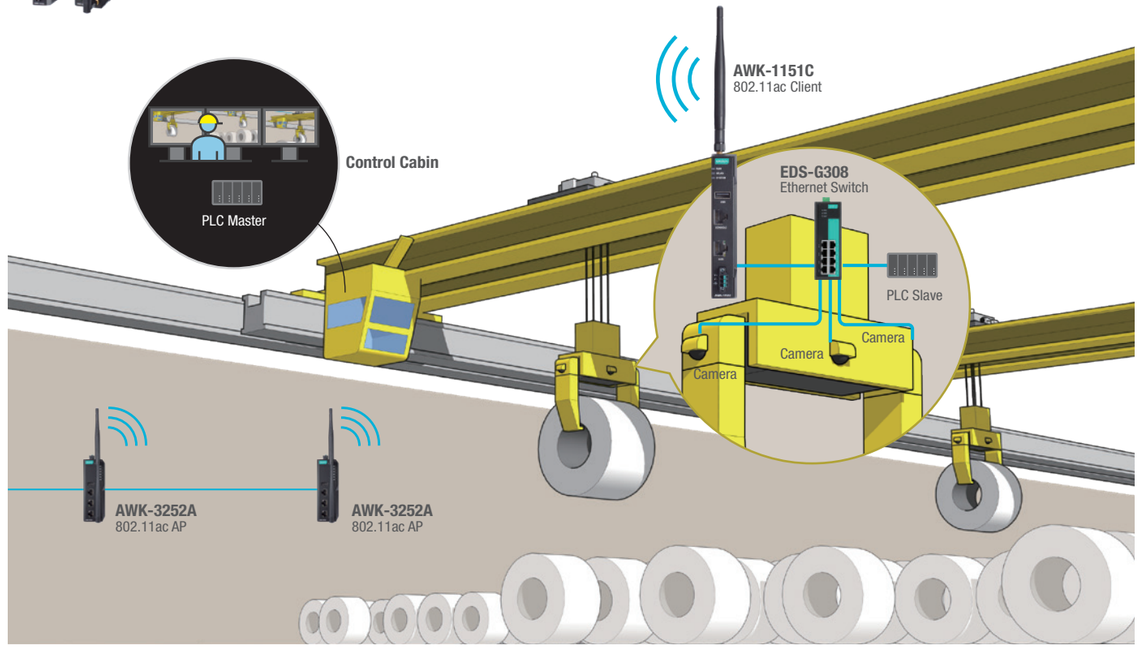
- Stable wireless transmissions to ensure operational safety and accuracy
- Support for high-volume IP video uplinks for process monitoring
- Support for industrial protocols to control the motor via wireless

Moxa's Solution

The overhead crane is maneuvered from a suspended control cabin, either by an operator or by an autonomous image recognition system. The heavy-duty crane is equipped with 4 HD IP cameras that capture live images from all angles and transmit these data and video streams to the control cabin through the AWK-1151C 802.11ac Wi-Fi client installed on the crane.

Reliable wireless connectivity is critical to ensure the availability and safety of the crane. Poor connectivity caused by insufficient bandwidth or heavy environmental interference could trigger the timeout protection and stop the crane from operating. To prevent this, AWK-3252A 802.11ac access points were installed on walls throughout the factory floor to create wireless infrastructure to support seamless roaming as the crane moves.

Tailor-made for industrial control, the AWK devices feature Layer 2 transparent wireless links that enable PLC communication between mobile cranes and the control room. Designed to ensure reliable operations, the IEC 62443-4-2 certified AWK products combine field-proven features such as high-speed 802.11ac, sub-150 ms Turbo Roaming, and automatic Connection Check and Recovery with resilient hardware to handle the extreme working temperatures, power surges, ESD, and vibration in the steel mill.



Driverless Trucks for Mining Safety and Productivity

A heavy machinery manufacturer used advanced SLAM (Simultaneous Localization and Mapping) scanner technology and high-definition video streaming to build driverless remote-controlled trucks for non-coal underground mining applications using rock-solid wireless communication.

Why Moxa

- 802.11ac, Turbo Roaming, and connection recovery technologies for fast, reliable, and seamless wireless connectivity
- Industrial hardened EMC and antenna protection to prevent downtime
- IP68 sealed waterproof design to withstand underground conditions

AWK Products Used

AWK-4252A
IP68 802.11ac Wireless AP/Client

System Requirements

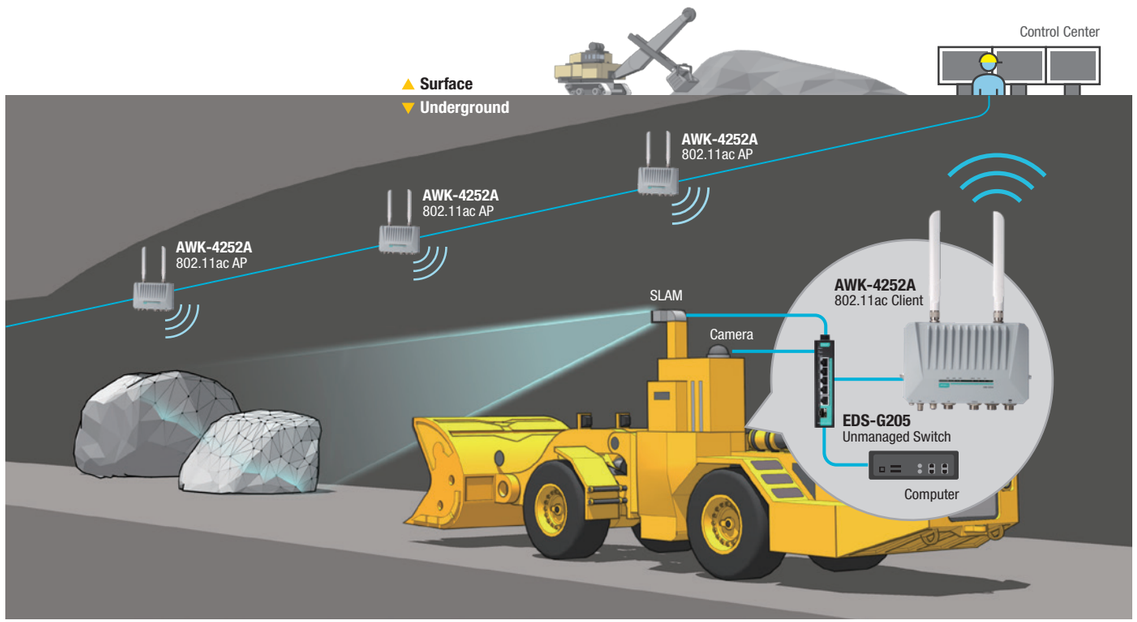
- Robust and high-speed wireless to support bandwidth-intensive HD video streaming
- Withstand harsh underground conditions, including EMI from nearby machines and motors
- Seamless connectivity while on the move

Moxa's Solution

The driverless trucks adopted SLAM technology with high-definition cameras to improve surroundings recognition and navigate to designated locations. Using live images from the onboard cameras, the trucks can calculate their distance and velocity in real time. High bandwidth and low latency wireless are key to enabling accurate mobility and coordination management from the control center.

Moxa's AWK-4252A 802.11ac devices double as Wi-Fi access points mounted on the tunnel walls and as Wi-Fi clients installed on the autonomous trucks. When acting as an onboard Wi-Fi client, the AWK-4252A leverages 867 Mbps wireless speeds, sub-150 ms roaming, and automatic Connection Check and Recovery functionality to transmit real-time video and telemetry collected from onboard computers, SLAM systems, and cameras to the surface control center.

Moxa's AWK-4252A devices are built for durability in underground conditions with robust hardware features including IP68 waterproof rating, high EMC immunity, high shock and vibration resistance, and -40 to 75°C operating temperature. Built-in IEC 62443-4-2 certified security and WPA3 encryption further enhance WLAN security. Meanwhile, the embedded firewall's IP filtering function provides an additional layer of access protection for the trucks.



Smart Shovel for Real-time Mining Automation

A mining automation leader integrated industrial-grade Wi-Fi technology into its shovel content analysis solutions. The smart shovels combined advanced X-ray fluorescence (XRF) sensors for content analysis with wireless connectivity, accelerating the information flow for on-site ore identification and sorting.

Why Moxa

- IEEE 802.11ac high-speed wireless performance
- Seamless wireless combined with Turbo Roaming and connection recovery features
- IP68-rated hardware and industrial-grade design for long-lasting reliability

AWK Products Used

AWK-4252A
IP68 802.11ac Wireless AP/Client

System Requirements

- High-speed wireless for on-the-spot ore analysis and sorting
- Uninterrupted wireless for real-time production accuracy
- Rugged designs to withstand harsh mining conditions

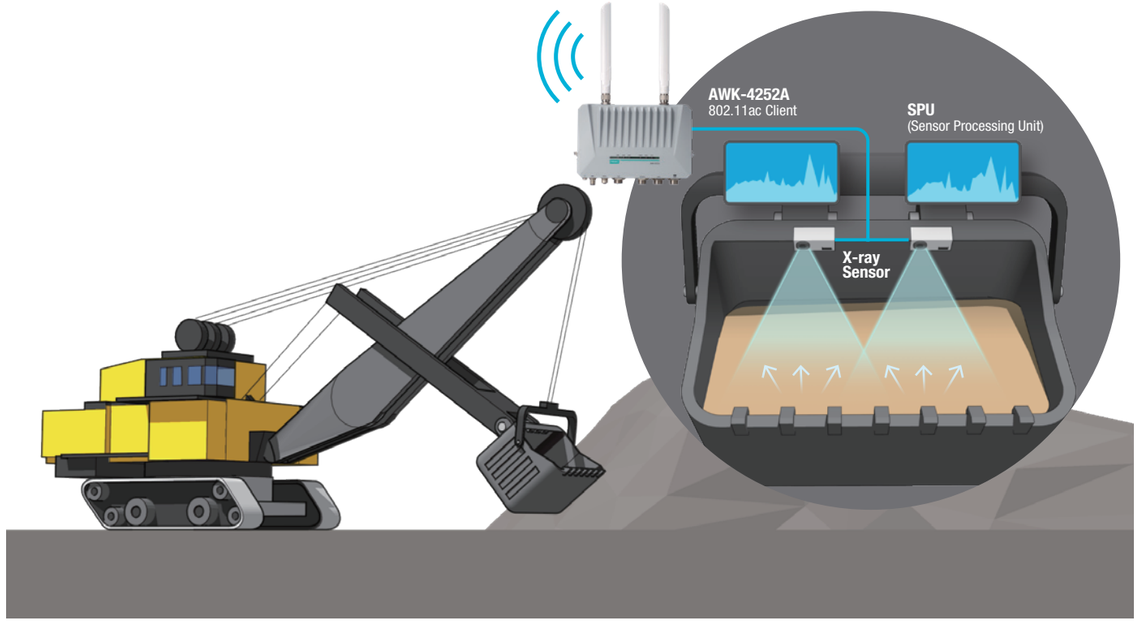
Moxa's Solution

The smart shovels can be placed into various mining machinery. It uses a set of advanced XRF sensors on the loader buckets of the mining shovels, which scan the excavated minerals, perform on-line ore analysis, and identify ore grades and ore waste to optimize real-time mining processes. Moxa's rugged AWK-4252A Wi-Fi devices are integrated into the smart shovels, capable of withstanding the tough operating conditions inside the mine.

With 802.11ac client speeds up to 867 Mbps, the AWK-4252A Series Wi-Fi device transmits ore information, analyzed results, and recommended decisions to the loader cab, cloud server, and fleet management system (FMS) to accelerate ore processing.

The AWK-4252A combines sub-150 ms Turbo Roaming with the field-proven Connection Check and Recovery functions to build seamless Wi-Fi connectivity to support uninterrupted shoveling operations.

The IP68-rated AWK-4252A provides industry-proven features to enhance device durability, reducing downtime caused by severe operating temperature deviations, ESD, EMI, surges, or shock and vibration. Certified for the IEC 62443-4-2 security standard, the AWK-4252A Series also provides WPA3 encryption to protect the smart shovels from cyberthreats.



Mobile X-ray Robots Driving Up Medical Efficiency

A leading medical equipment supplier designed and manufactured a mobile DR (digital radiography) system for X-ray inspection to perform bedside medical diagnosis for immobile patients. Wireless capabilities allow the mobile DR machine to process X-ray images on the go and provide diagnoses remotely, improving treatment efficiency.

Why Moxa

- Industrial-grade EMC for uninterrupted wireless reliability and resilience
- Dual-band high-bandwidth transmissions
- Comprehensive security to protect confidential patient information

AWK Products Used

AWK-3252A
802.11ac Wireless AP/Client

System Requirements

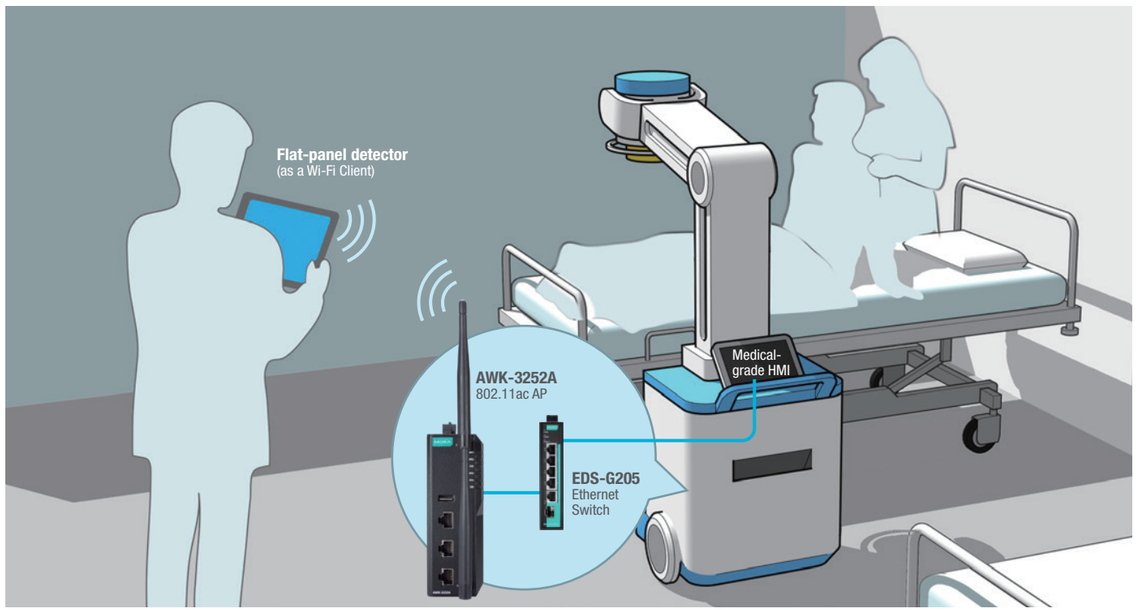
- High-speed wireless for transmitting large HD X-ray image files between the mobile X-ray machine and physicians' HMI diagnostics device
- Compact design to fit into the limited space inside the machine
- Reliable signal that can resist operational EMI and RFI noise

Moxa's Solution

The mobile DR systems speed up X-ray imaging for rapid diagnostic assessment over wireless networks and can be easily moved to bedsides, ICUs, emergency rooms, and makeshift hospitals. Wireless networks facilitate the transmission of high-definition X-ray images and patient information for quick access to medical images and faster clinical assessment.

The AWK-3252A Series access point was selected and installed into the space-constrained mobile machine. When in AP mode, the AWK-3252A Series' 1,300 Mbps 2.4/5 GHz dual-band connectivity easily handles bandwidth-heavy X-ray image transmissions.

The AWK-3252A Series features industrial-grade EMC compliance, providing stable and reliable wireless communication for the DR system, even in the presence of other high-power electrical components inside the machine. Additionally, a complete set of built-in security features including IEC 62443-4-2 certified security, firewall ACLs, and WPA3 encryption protect confidential patient information against cyberthreats.



Smart Gait Training Machines

A leading rehabilitation robotics company has developed an intelligent gait training machine that combines suspended mobility and wireless technology to help therapists easily formulate the most suitable rehabilitation plan for each patient through handheld devices such as mobile phones.

Why Moxa

- A perfect combination of 802.11ac AP functionality and a compact design for easy machine integration
- IEC 62443-4-2 certified security that protects the systems from unauthorized access and cyberthreats
- Industrial-grade reliability to ensure stable performance and a long service life

AWK Products Used

AWK-3252A
802.11ac Wireless AP/Client

System Requirements

- High-performance Wi-Fi AP devices with a compact design for track-mounted overhead machines
- Wireless reliability and security to ensure authorized access for safe and secure configuration
- Long-lasting reliability to extend machine utilization and operational lifetime

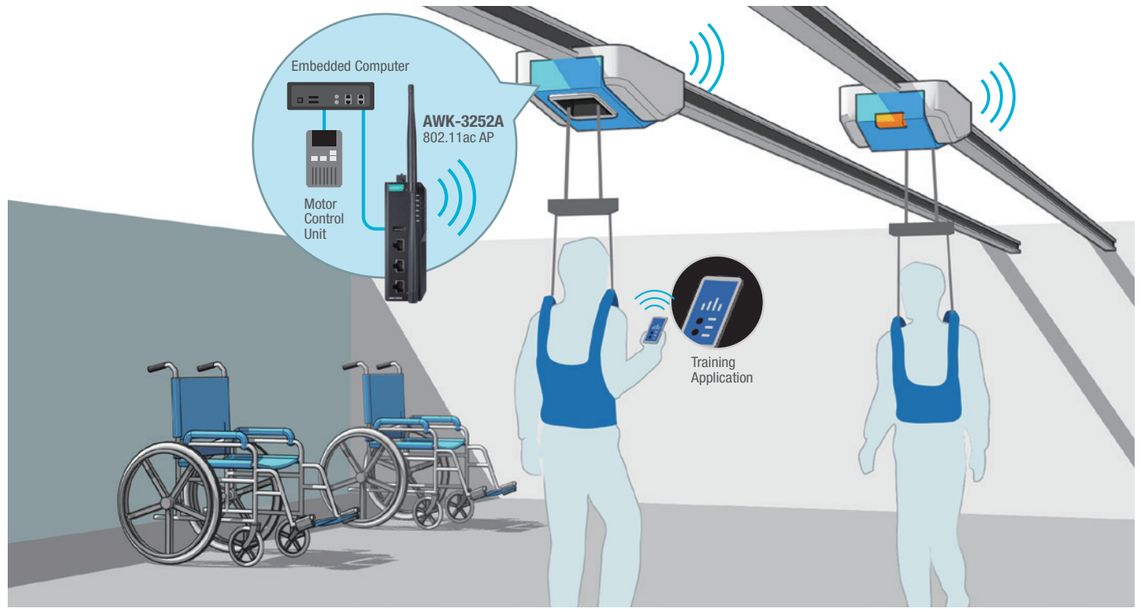
Moxa's Solution

The gait training system features an overhead trolley and body harness that provides variable bodyweight support while tracking countless data points during training. The system collects and records important training data including walking distance, training minutes, falls prevented, and the bodyweight support to a secure database over the wireless network.

The slim and compact AWK-3252A saves valuable space, allowing easy integration into the mobile gait training systems. These 802.11ac access points maintain fast and secure data transmissions between the overhead machine and handheld management interface.

The AWK-3252A device supports the latest WPA3 encryption as well as IEC 62443-4-2 certified security to prevent unauthorized access to the rehabilitation gait machine. These security features help prevent training processes from being compromised and confidential patient data from leaking.

The rugged AWK wireless solution is outfitted with industrial reliability features, such as industrial EMC up to Level 4 ESD protection, antenna isolation, and shock and vibration resistance based on the IEC 60068-2-6 standard to ensure operational stability and lasting durability.



UV-C Disinfection Robots for Public Health

A global manufacturer sought a robust wireless solution to develop their hospital-grade disinfection robots, which integrate AI (artificial intelligence), UV-C (ultraviolet type-C irradiation), and mobile operations to help minimize the spread of infectious pathogens in hospitals and other public spaces.

Why Moxa

- High bandwidth and fast Turbo Roaming for seamless data transmissions
- Industrial-grade design to ensure reliable connectivity and fleet efficiency
- Broad regional RF compliance to develop major global markets

AWK Products Used

AWK-1151C
802.11ac Wireless Client

System Requirements

- Compact enough to meet machine construction and network needs
- Reliable operation with high resistance to vibration and radio interference
- High bandwidth and seamless roaming for uninterrupted networking

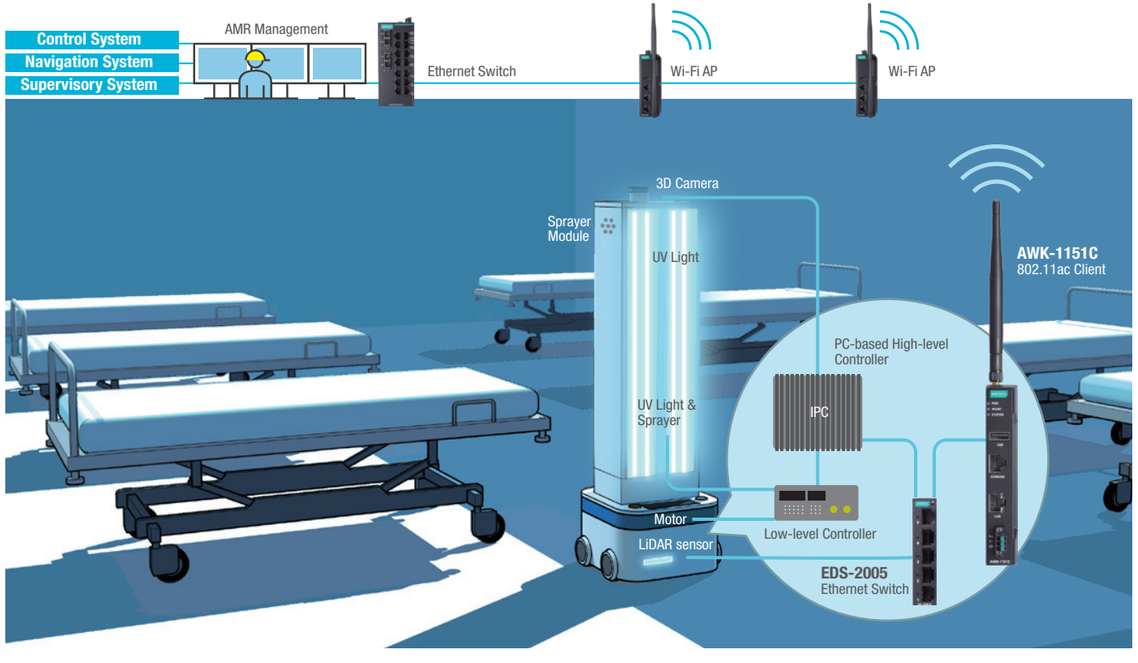
Moxa's Solution

Equipped with complex computing and sensing capabilities, the disinfection robots can adjust their speed and route to navigate one or multiple floor plans, while relying on wireless communication to transmit large volumes of data, such as video records, locations, and trajectory progress to the robot fleet control center.

To ensure mobile stability and reliability, the AWK-1151C supports IEC 60068-2-6 compliant vibration resistance and durable hardware to withstand EMC noise, ESD, sudden motor discharges, and radio interference.

The AWK-1151C Series' 802.11ac high-speed wireless capabilities facilitate communication between robots and the control center, and enable fast roaming under 150 ms between access points to ensure seamless coordination.

The machine builder adopted the AWK-1151C Series UN model for easy RF configuration and compliance in major global markets to simplify inventory management. The AWK-1151C also features IEC 62443-4-2 certified security features and the latest WPA3 encryption to protect WLAN connections and secure operations.



Retrofitting a Landscape Ferris Wheel Network

The operator of a landscape Ferris wheel with 28 cabins for guests to enjoy 360-degree panoramic tours wanted to upgrade the facility's network infrastructure to improve security and bandwidth to support in-cabin HD IP surveillance and provide a better passenger Wi-Fi experience during the ride.

Why Moxa

- 802.11ac bandwidth to improve IP video streaming and passenger Wi-Fi services
- Optimized wireless connectivity with Moxa's connection recovery features
- Wireless PTP bridging for connections between moving cabins

AWK Products Used

AWK-4252A
IP68 802.11ac Wireless AP/Client

AWK-3252A
802.11ac Wireless AP/Client

System Requirements

- High bandwidth for real-time cabin monitoring through HD IP surveillance
- Reliable point-to-point (PTP) wireless connections from the cabins to the wired network for backhaul
- Ruggedized design suitable for demanding operating environments

Moxa's Solution

The massive system relies on a complex integrated wired and wireless network infrastructure connecting the individual cabins, rim, and ground center to allow long, continuous operations in harsh outdoor conditions. For better safety and entertainment, part of the network infrastructure was upgraded to wired Gigabit and 802.11ac wireless to integrate IP surveillance and improve the passenger Wi-Fi service in each cabin.

Each cabin uses two AWK-3252A 802.11ac units to replace the original Wi-Fi equipment. Each set provides dual-band wireless speeds of up to 1,300 Mbps to transmit IP video streams to the ground center and provide Internet service for passengers.

Outside of the cabins, IP68-rated waterproof AWK-4252A Wi-Fi access points provide PTP bridge connections between the wired uplink of the rim shaft and the moving cabins. In addition, the sub-150 ms Turbo Roaming and automatic Connection Check and Recovery features ensure non-stop connectivity.

Using the IEC 62443-4-2 certified AWK Series together with other similarly certified devices such as the EDS-G4012 Ethernet switches strengthens network security. Meanwhile, the robust hardware supports wide operating temperatures to ensure solid reliability in challenging outdoor environments.