

Wireless train to trackside link with Neratec WLAN products

Reliable train to trackside communication is required for many applications: CCTV, Public Wi-Fi, maintenance and monitoring, VoIP passenger information systems. Neratec train to trackside link provides high speed, reliable and continuous communication link for these applications.

Neratec has a long history in designing and delivering IEEE 802.11 technology based products for railway industry and its applications. Neratec train to trackside solution is a onboard and wayside solution which optionally can provide seamless roaming and redundancy for the most demanding needs.



Train to trackside

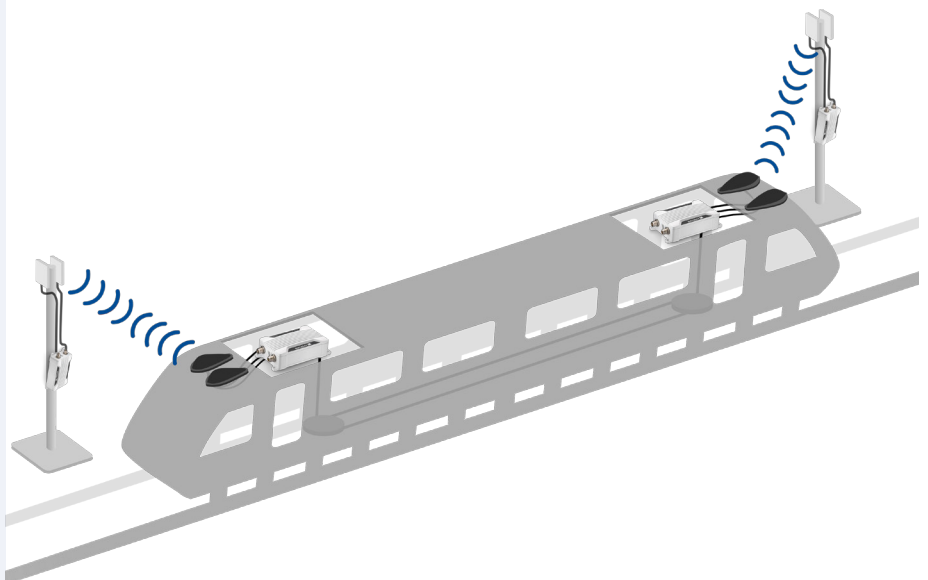
Onboard connectivity is becoming very important factor for the public transportation sector. Whether the connectivity is driven by the needs of the passengers, security or operations, everybody is benefiting all the same.

Passengers can stay connected to their social networks and the operations and the maintenance can become much simpler. A real-time predictive maintenance enables access to all the needed data which is the first step towards improvement.

Neratec offers WLAN based solution for train to ground communication. The system supports stationary connection at depots / stations, but also continuous coverage installation along the complete track.

Solution highlights

- Standard IEEE802.11 based
- Fast handover between the access points with low latency and jitter
- Continuous coverage with high user data throughput using multiple MIMO data streams
- Enables redundant and aggregated networks up to 460 Mbit/s per train
- Supports latest security features (802.1X)
- Configurable operation in 2.4 or 5 GHz channels
- Support 24/7 operation in DFS frequencies with AP-5312F as an access point
- No license requirements



Reliable and high speed
communications

Neratec train-to-ground

The Neratec train-to-ground network can be used to increase the safety on board by having live video surveillance monitoring as well as Automatic Train Operations (ATO) running through the same network. Train operations that coordinate trains to increase service efficiency and frequency and maximize track utilization requiring a large amount of data. This data can include train and passenger status, video-surveillance and emergency controls data which travels back and forth between the train and the central control at the trackside.

Neratec solution is WLAN based and offers several advantages over 3G and satellite communication. For example, in a tunnel where both 3G and satellite fail, WLAN can be deployed as the train to ground communication. WLAN based systems also makes it possible to deploy a privately managed network, which removes mobile operator dependencies, such as bandwidth allocations and mobile data costs.

Being WLAN based and complying with regulations, Neratec's train to ground solution does not require any costly licences for the operation.

Operation on 5GHz DFS frequency band is supported. With Neratec's highly optimized radar detection, the problems related to false radar detections are solved.

Prepared for redundancy

The most demanding ATO applications require redundancy in order to ensure the connectivity in case of a hardware defect. Neratec train-to-ground solution is taking this into consideration and enables the implementation of fully redundant train-to-ground connectivity. Alternatively there can be two aggregated links doubling the bandwidth to up to 460 Mbit/s.

As hybrid solution, the built-in Quality of Service (QoS) feature allows high priority control data to be redundant and low priority public Wi-Fi data being aggregated at the same time.

Installations and antennas

From train to ground the signal is transmitted using the standard IEEE 802.11n data rates. Neratec DT50

products allows using 2.4 GHz or 5 GHz band. In order to prevent interferences between the other communication networks employed within a train environment, the train to ground antenna system should be configured to use the 5 GHz band. The use of MIMO antennas allows a higher data rates to be transmitted. With 3x3 MIMO antennas and 40 MHz channel bandwidth data rates up to 450 Mbit/s can be achieved. Respectively with 1-stream SISO configuration data rates of 150 Mbit/s can be achieved. With SISO configuration the installation complexity is reduced.

Polarized directional antennas are installed on the roof of the train. The trackside antennas are also directional and are located together with the access points depending on the use case either along the track or only locally at the train stations.



Stay connected with Neratec train-to-ground solution

Neratec – wireless & embedded for more

Neratec Solutions AG is an independent Swiss technology company that specializes in industrial WLAN pro-

ducts and customized product developments. Neratec's industrial WLAN products meet the very highest standards for applications in the rail, automotive and production industries, as well as in process automation, security

and surveillance. Based on own wireless platforms Neratec also supports customers to create customer specific wireless sensor network solutions.

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