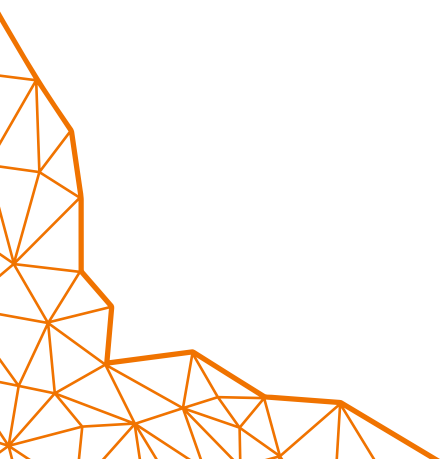




Case Study

Automotive & Transport

Robust Wireless Monitoring Solution for
Intelligent Transportation Systems





Robust Wireless Monitoring Solution for Intelligent Transportation Systems

Challenge

Our client is a manufacturer of trains known for their quality, reliability, and state-of-the-art technology. A variety of different public and private transport companies operate trains, subways, and trams (streetcars) built by this manufacturer, as part of the transit system.

The sophisticated equipment on such transportation systems requires professional maintenance. Additionally, warranty requirements mandate strict adherence to a specified usage profile. Manual monitoring and diagnostics proved to be very costly and time-consuming. While automation was a clear solution, there were challenges to address.-

It became apparent that monitoring sensor devices had to be very rugged to be able to work in a harsh environment, while fitting different types of vehicles easily. A device needed to be small enough to stay hidden and work reliably next to high-voltage cables and metal constructions that inhibit the radio signal propagation. Data had to be collected securely and continuously even during power outages.



Solution

A.N. Solutions designed intelligent, tailored monitoring and surveillance solution integrated into the existing control systems mainly located in an operator's cabin with additional wireless monitoring devices placed in dedicated positions throughout all carriages. A wireless sensing network collects condition data from each individual node and aggregates it in a central gateway featuring a secure cellular link to the transportation authority's and the manufacturer's back-end servers. Wireless sensing devices operate using on-board power systems and are equipped with a rechargeable emergency battery.

Due to strict requirements, no external antenna could be used on such monitoring devices, which was a major restriction. Thanks to the large portfolio of hardware platforms and years of experience in system and antenna design at A.N. Solutions, this challenge was overcome. A 2.4 GHz @ANY RF platform with an integrated antenna featuring a unique diversity scheme provided robust and stable data transmission, even inside weatherproof IP65/67 housing. A.N. Solutions engineers spent countless hours fine-tuning the antenna's output power for optimal performance, allowing it to compensate for the absorption effects of the enclosure material.

Additionally, sensors had to be carefully selected and integrated to work reliably in a harsh environment, and maintain its performance over time. A.N. Solutions utilized a state-of-the-art software simulation environment to optimize the antenna settings. The robust @ANY 2.4 GHz hardware platform was selected to keep the form factor small, while maintaining predictable latency.



Module @ANY2400-SC-3-2

Results

- Valuable data that could not be obtained otherwise is being successfully harvested.
- Predictive maintenance and a remote diagnostic solution allows for a reduction in service costs and prevention of breakdowns.
- Dedicated monitoring system helps manage potential warranty claims, and optimize future transportation system designs.
- Successful implementation of a reliable wireless monitoring solution for an intelligent transportation system created a solid platform with the ability to be scaled and customized for other versatile applications.





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