

# Antennas for Railroad Applications

As communications protocols overall evolve, so do the needs of the railroad industry for updated wireless communications technologies requiring innovative antennas. Applications may vary from Positive Train Control (PTC) and End of Train (EOT) applications to data collection and communications for passenger trains, to handheld radio applications for rail yard management, to fleet and rail maintenance team tracking and communications, to keeping passengers connected while they are commuting to and from the office. All of these applications require the unique and innovative antenna solutions provided by Pulse.

Mandates such as the Railroad Safety Improvement Act (RSIA) of 2008 further drive applications for railroads. RSIA requires Class 1 freight companies and commuter trains to implement PTC systems by the end of 2015. PTC systems are designed to prevent train-to-train collisions, enforce speed restrictions, monitor brake pressure and apply a train's braking system when signals are not obeyed.

End of train devices contain sensors that determine motion of cars at the end of the train. EOT (SCADA) devices transmit information to the engine cab indicating the status of the train — stopped, moving forward or moving backward. This information is transmitted by radio to the engine cab which must have equipment to receive, decode and display the data. Through the EOT systems the engineer can monitor the train as he sets and releases the brakes.

GPS antennas are also being incorporated into railroad systems. Combination GPS antennas placed on top of locomotives assist in the collection of information on location, speed, engine performance and driver awareness, and the resulting transmission of the data to a control center. Trackside antennas placed at regular intervals provide a continuous wireless link between the train and the control center.

Rail and switching yards have a unique set of antenna requirements for communications equipment. Railroad workers must stay in touch via radio - both handheld and vehicle-mounted units, as well as base station antennas to cover the entire rail yard. Pulse provides antenna solutions for each of these applications.



Antennas placed on the engine and along the tracks provide continuous data to the control



Control Room and Dispatch Center



GPS satellites monitor the train's location

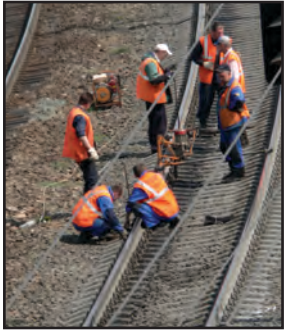


Communications Network

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## Portable Antennas

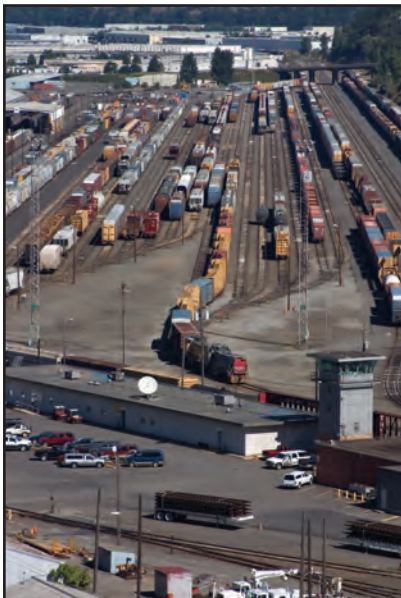
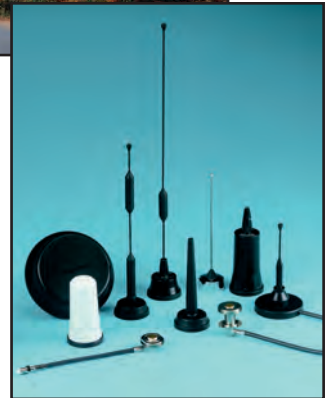
Frequencies from 136 MHz to 2.4 GHz



## Mobile Antennas

27 MHz to 5.9 GHz

Most frequencies available in a variety of mounting styles (NMO, direct, glass, magnetic) and form factors (low profile, stealth blade, low profile transit, whip)



## Small base station antennas for rail yards and control centers

- Yagis  
— 400 to 1450 MHz
- Radome Omnis  
— 2.4 to 6 GHz
- Fixed Base Antennas  
— 45 MHz to 2.4 GHz



## Broadband antennas keep commuters connected

- Variety of form factors
- Frequencies from 2.4 to 6 GHz



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