Invengo – Railway Application Overview

Invengo is best known as the RFID technology provider for China Railway's automatic train identification system, which includes 17,000 RFID readers, 565,000 passive tags and an information system integrated across 995 facilities in the China Railway network.

The **XC series Automatic Identification System** is an RFID solution developed by Invengo for China's Ministry of Railway's *Automatic Train Number Identification System* or ATIS project. It enables automatic information collection and monitoring of trains in real-time and provides that information in real-time to railway administration for train management and safety.

The system is resistant to EMI, vibration and shock, which makes it ideal for use in railway applications.

As the critical component of the ATIS project, XC series Automatic Identification System plays an important role in the modernization of China Railway System. It greatly improves China railway transportation management efficiency, generates over $ 40 Million annual income for China Railway Ministry in freight and people management and accounting, and decreases vehicle delay by more than 30%; it also has great potential in other applications like intelligent train weighing, infrared train axis temperature detection and position etc. The ID-tags are mounted on the front, side, top or underneath each individual vehicle or on the sleepers in special tag encapsulations. The ID-tag is an extremely resistant, totally encapsulated and maintenance free. Heavy Duty readers are ruggedized, designed to

withstand environmental factors such as temperature, moisture, shock and vibration. This allows them to be mounted directly on the outside of vehicles. This reader can be used to provide positioning information for onboard systems on a train.

- Automated tracking of railcars:

Automated tracking of railcars via RFID tags makes railcar location information available to railroads for asset management and other purposes

- Traffic and Passenger Information:

The system provides accurate and reliable information about where a train is located. This real-time information is forwarded to our middleware and railroad management software and used to update the passenger information displays at stations and terminal.

- Operation and Maintenance:

Precise information about the configuration of railcars within a train can be provided automatically by the system. This information can be integrated with other systems such as track inspection systems, so that the recorded information can be automatically matched to the actual railcar, thus eliminating errors.

Functions

◇ Automatic Information Collection and Monitoring

This is the main function of the System. Supervisory staff have instant visibility of real-time monitoring and tracing of all operating trains and railway vehicles. A Data inquiry capability is included.

◇ Daily Report

The System can also generate detailed daily reports of information and status of all operating trains.

◇ Train Notification

The System can send an automatic notification to waiting passengers when a specified train is passing through or its expected arrival time.

◇ Self-Inspection

The System can run a scheduled self-inspection and report any irregularity automatically.

System Components

XC series Train Number Identification System employs RFID and other advanced technologies to automatically collect train information such as train number, status, position, designation, speed , and enables real-time tracking of all operating trains. It consists of Electronic Tag AEI equipment (RFID

Reader), Tag Programmer Control and Process System (CPS), and Train Inspection & Verification System.

Success

As one of only two designated equipment providers for the ATIS project Invengo's XC series Automatic Identification system and corollary instruments has been applied to all 18 China Regional Administrations and over forty thousand miles of railway system including world highest railway: Qinghai-Tibet Railway. With more than 60% of market share Invengo is the proven leader for China railway market and looks forward to sharing our experience and success with more international customers.