

Train Collision Avoidance System



Introduction

Rail operations deploy expensive capital assets including rolling stock, track infrastructure, traction power, signalling and telecommunications. In order to achieve more with stretched budgets, the focus of the rail industry is often to increase capacity utilization of these assets - safely. The objective is to run more trains on the existing infrastructure, carry more passengers and freight and generate more revenue and profitability. This demands cutting edge solutions for managing rail traffic in a sustainable manner.

Running more trains, faster, on an already congested network demands a high level of safety to prevent accidents and other disruption. The railway operator needs automated systems that can anticipate potential hazards in all possible areas of train operations and prevent their occurrence - by performing vital safety functions. One such class of systems is referred to as "Automatic Train Protection" (ATP) systems. These systems have a high level of real-time situational awareness, combined with advanced algorithms to determine potential hazards, analyze and perform preventive actions.

HBL's  ATP system, developed indigenously for Indian Railways, provides not only train protection, but also collision avoidance functionality.

The train protection features include

- ⦿ On-board display of signal aspects
- ⦿ Enforcement of temporary and permanent speed restrictions
- ⦿ Prevention of Signal Passing At Danger (SPAD) and
- ⦿ Train integrity monitoring

HBL's  system is independently certified by European 3rd party auditors to SIL4 standards. It offers significant cost reduction when compared to ERTMS and other technologies – allowing railway operators to install and operate state of the art, proven railway technology on lines where the business case is unproven or marginal with more costly systems.

Key System Features

- ⦿ Comprehensive Collision Prevention - Head On, Side and Rear End collisions
- ⦿ Detection and Prevention of Signal Passing At Danger (SPAD)
- ⦿ In-Cab Signalling to assist Loco-pilots and ensure no degradation of capacity utilization
- ⦿ Continuous update of Movement Authority
- ⦿ Automatic enforcement of Speed Restrictions
- ⦿ Designed to work in both Absolute and Auto Block Sections
- ⦿ Auto and Manual SOS generation both for Loco-pilot and Station Manager
- ⦿ Works by leveraging cost effective communication infrastructure; does not need CAPEX intensive infrastructure like GSM-R
- ⦿ Key decision making sub-systems designed with 2 out of 3 architecture to meet the stringent RAMS requirements
- ⦿ Designed to handle train speeds of 200 kmph and over 120 trains by adopting FDMA+TDMA+SDMA technologies

Key System Components

LOCO



Loco TCAS



Loco Pilot - OCIP



Brake Interface Unit



RFID Reader

STATION



Station Manager - OCIP



Radio Tower



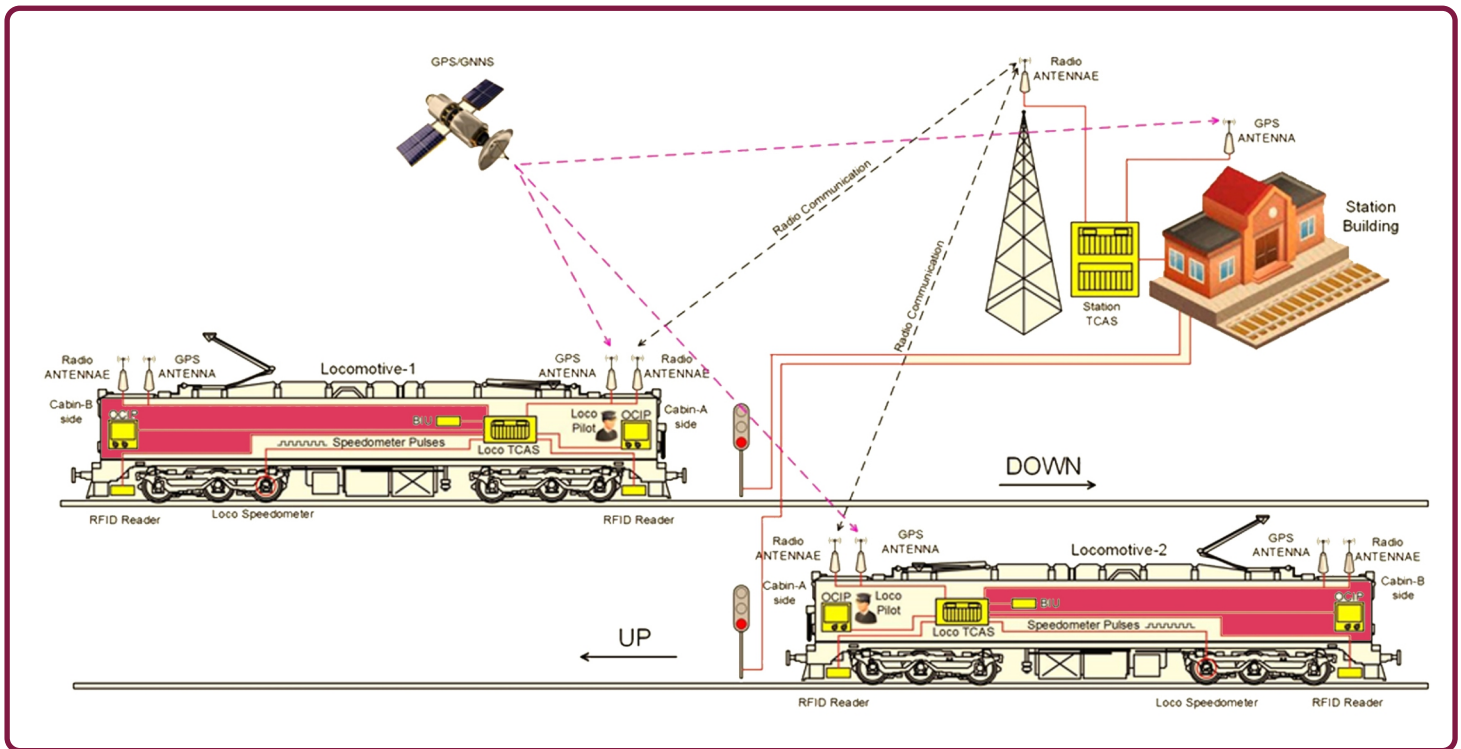
Station TCAS

TRACK SIDE



On Track RFIDs

System Architecture



Our Other Signaling Products

- Train Management System
- Integrated Power Supply

HBL[®]

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