# Railway IoT: Efficient and Secure Operation with Better Passenger Experienc...

**With extensive interfaces, the VG710 enables connection to a wide range of devices on board, keeps track of the location and status of trains, and conducts vehicle diagnostics. High-speed in-vehicle Wi-Fi and infotainment enhance passengers' travel experience. With Python and Docker, users can also develop their own applications based on business.**

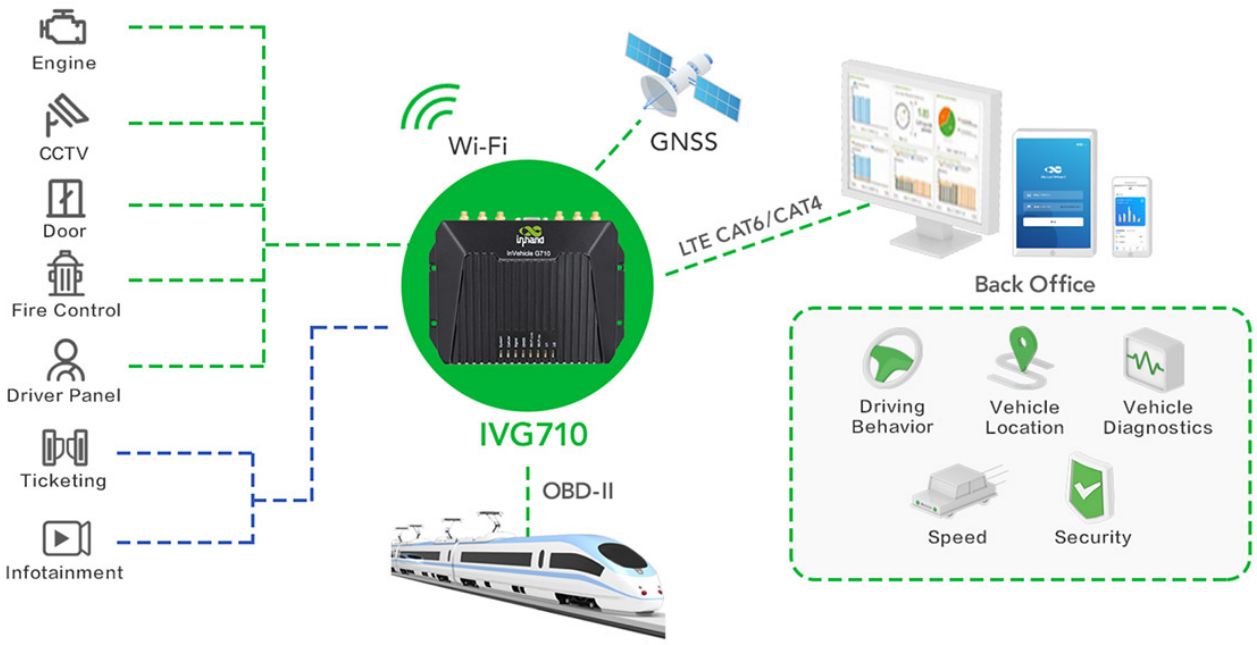
## Background

Trams and trains are an indispensable part of urban transportation. With continuous waves of urbanization, it is required that operation of the rail transit system be more intelligent and efficient. As those vehicles run in separate and closed tracks, railways entail a number of challenges and risks in terms of security and management, including engines, doors, fire control, as well as vibration and electromagnetic disturbance. Making sure everything is in good order can be a major challenge. Danger must be identified as soon as possible, as accidents mean not only revenue losses, but more importantly, life security.

Meanwhile, with a large amount of time spent on the way, travel is expected to be not only convenient but also pleasant - especially in the IoT era where everything can and should be connected.
Better passenger experience is the key to success in the increasingly fierce market competition.

Thus, a full-functional communications system is needed for rail transportation.

## InHand's Connectivity Solution for Rail Transit




Endowed with powerful functions, the VG710 performs multiple roles in the railway communications system.

- **Telematics:**
  Numerous interfaces such as RS232, RS485 and I/O enable a wide range of onboard devices connected to the Internet. Data collected from those peripherals are constantly transmitted over high-speed LTE CAT6/CAT4 network. Integrating OBD-II and J1939, the VG710 keeps track of the train status. With high-precision GNSS and inertial navigation system, the gateway constantly tracks the vehicle?s location, be there signal or not. All the data are then viewed from management center which is located at the middle or back office. Any fault alert can immediately inform operation staff of preventive maintenance.

- **CCTV Surveillance:**
  Passengers' safety is top priority for railway operation. The VG710 builds a secure and reliable network connection between the camera and the back office. What's going on in trains is constantly monitored in case of accidents or crimes.

- **Ticketing:**
  Using VPN technologies such as OpenVPN or IPsec, payment transactions can be made secure. Redundant connectivity ensures continuous transmission of transaction data.

- **Passenger Wi-Fi:**
  Smart devices are becoming an integral part of everyday life. Train passengers expect the journey to be not only secure and fast but also

pleasant. The VG710 grants passengers access to high-speed Wi-Fi so that they can better enjoy time on the way.

- **Passenger Infotainment:**
  With fast and reliable LTE connectivity brought by the VG710, the rail communications system keeps feeding passengers real-time information, timetable updates, important announcements, as well as advertising and entertainment, delivering a nice passenger experience.

- **Applications Hosting:**
  With python programming and Docker available, the VG710 enables users to develop an in-vehicle ecosystem of different onboard applications without any additional hardware.

## Why VG710?

- High-speed and reliable LTE CAT6/CAT4 network, dual SIM redundancy;
- Rich in-Vehicle networking: Gigabit Ethernet, 2x2 MIMO Wi-Fi5, CANbus;
- Compliant with railway standards EN50155, EN50121, EN61373, EN45545, etc., immune to challenging railway environments, including vibration, fire/explosion risks, electromagnetic disturbance, etc.;
- Extensive interfaces for connection to different peripherals on board;

- Global GNSS with Dead reckoning keep track of the vehicle;
- Edge computing ready: Python programmable and Docker supported, easy for custom development;
- Cloud ready: Support for major IoT cloud platforms such as Azure, AWS and FlexAPI for 3rd party platforms;
- Rugged and compact. All industrial-grade design, metal enclosure, IP64 protection, enduring in unpredictable, harsh environments.