**teltronic**

# Mobile Communications for the Transport Sector

Public transport, as basic means of providing mobility for the general population, is a key factor in the development of our society.

**Buses, trams, subways, railways, and high-speed trains**, including sophisticated driverless vehicles, need an efficient communications system which grows at the same pace as their own operations, all the while as they meet the service availability and safety expectations of their customers.

For this kind of environment, TELTRONIC provides a **complete and professional solution** adapted to the specific requirements of each project.
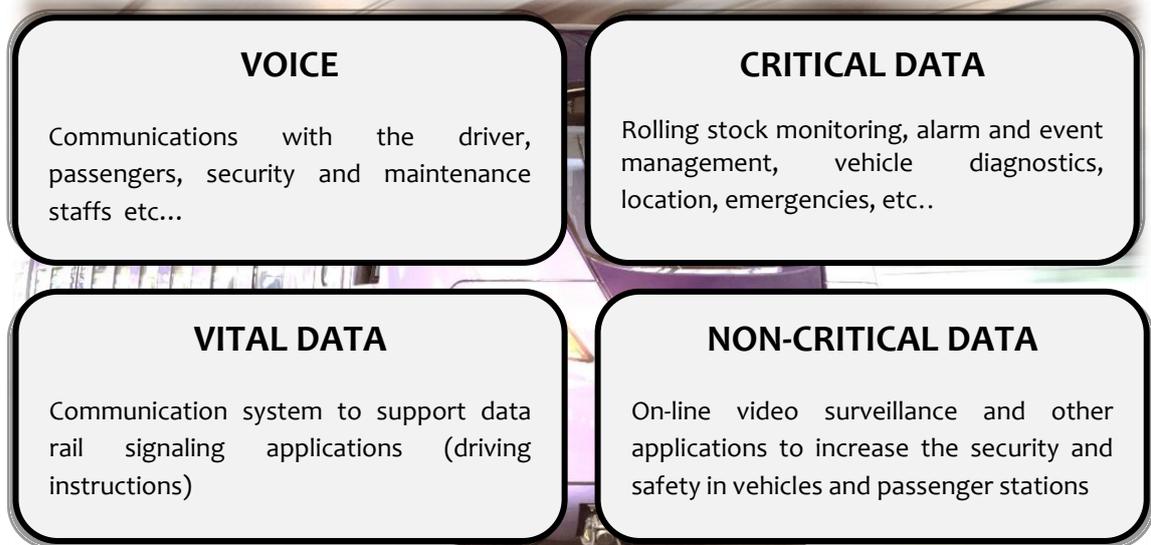
# Contents

# 1. Professional Communications Solutions for Transport

TELTRONIC's radio communications solutions, based on the **TETRA standard** and complemented with **broadband technologies**, provide continuous voice and data communication between vehicles and wayside control systems.

This link provides powerful and reliable support for the four basic groups of applications:



**VOICE**

Communications with the driver, passengers, security and maintenance staffs etc...

**CRITICAL DATA**

Rolling stock monitoring, alarm and event management, vehicle diagnostics, location, emergencies, etc..

**VITAL DATA**

Communication system to support data rail signaling applications (driving instructions)

**NON-CRITICAL DATA**

On-line video surveillance and other applications to increase the security and safety in vehicles and passenger stations

## 1.1 Voice communications

TETRA provides **group calls, broadcast calls, emergency calls, ambience listening calls, private calls between trains**, etc., for communication among the main players in the transport environment: drivers, stations, depots, Control Center, passengers, and security and maintenance staff.

Furthermore, it allows **integration with external communications networks** (police, firefighters, etc.) in critical situations for emergency coordination.

## 1.2 Critical data

TELTRONIC on-board equipment is responsible for obtaining the **location information,** and sending such data to the Control Center (CeCo-TRANS), so that the position of all vehicles is known within seconds and can be presented on various types of maps and/or synoptic line displays.
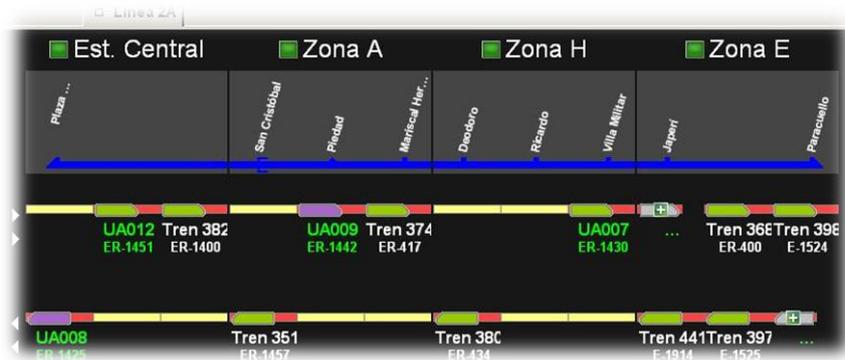
Another common application is the monitoring and management of **alarms and events** which take place in the on-board equipment and other train subsystems.

On the other hand, the on-board equipment has also **auto-diagnostic functions** and is able to be **integrated with Passenger Information Systems (PIS),** which allows passengers to be informed in real-time about next stops, arrival times, and incidents, reducing travelling and waiting times for the users.

## 1.3 Vital data



Rail **Signaling Systems** are responsible for assuring comfort, punctuality, availability, and security in passenger and freight transportation, managing driving operations of the trains.

TELTRONIC radio solutions, focused to optimize costs, provide a means of transmission for the data communication required for these kinds of applications such as, for example, ETCS European standard for railways, CBTC systems oriented to underground or trams, or other similar protection systems as the PTC systems, etc.

## 1.4 Video and other applications

The TELTRONIC TETRA solution for critical voice and data communications is complemented with a broadband radio access layer which supports applications such as:

- − Real-time video to monitor from the Control Center images taken from inside the trains.
- − Real-time video to display in the driver cabin images of the station as the train approaches it.

－ File transfer between the Control Center and trains for various required operations.



## 2. Differentiating aspects in the TELTRONIC solutions
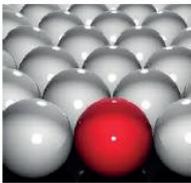


Some of the key differentiating aspects which make TELTRONIC a leader in the supply of radio solutions for the transport sector are shown as follows:

| CHARACTERISTICS | BENEFITS |
|---|---|
| **Design and manufacturing control** | Product and solution **customization. Flexibility** |
| **Wide range of solutions** according to the functionality required | **Adaptation** to the needs of each project |
| **Integration** of all elements of the solution | **Complete solution** |
| Unified **multiservice** system | **Profitability and economic viability** |
| **Mobility** | Radio technologies specially adapted to **mobile environments** |
| **Redundancy** | Maximum **availability** and **reliability** |
| Standardized services such as **authentication, encryption**, etc. | **Data integrity and security** |
| On-board equipment adapted to the **transport sector** | Compliance with railway regulation **EN50155** |
| Useful standard services: **Group calls, broadcast, ambience listening call**, etc. | Specific **functionality** for the transport environment |
| Technology with capacity for growth | Future integration of new services. Possibility of **evolution**. |
| Gradual installation, easy maintenance, turnkey projects | Convenience for the customer |

## 3. Funcionality

As TELTRONIC is aware of the vast differences between distinct transport environments and their characteristics, it provides a wide range of functionalities to achieve radio communications solutions adapted in a flexible and scalable manner to the needs of each project

- **Critical voice communications with the driver and other operational groups:**
  - Individual calls
  - Group calls / Broadcast
  - Emergency calls
  - Ambience listening calls
  - Direct Mode calls (DMO)
  - Interconnection calls with maintenance teams
  - Interconnection calls with public safety agencies

- **Critical data communications:**
  - Interconnection with on-board control systems (TCMS: Train Control and Management System)
  - Operational, security, and maintenance commands for rolling stock management
  - Train diagnostics
  - Train identity assignment
  - Alarm and event management
  - Advanced location function (by beacons or GPS)

- **Interconnection with other train subsystems:**
  - Public Address systems
  - Intercom systems
  - Passenger Information Systems
  - Ticketing and counting systems

- **Vital data communications:**
  - Railway signaling data transmission (integration with ETCS, CBTC, PTC systems, and others)
  - Adaptation of interfaces for connection between the on-board and wayside equipment and the signaling applications.

- **Non-critical data communications:**
  - Fixed video surveillance (monitoring of tunnels, crossings, and stations)
  - On-board video surveillance (displaying real-time images from trains)
  - Advertising and entertainment for passengers

- Download and upgrade of operational files in depots

## 4. Complete and integrated solution

The set of applications described sometimes is resolved generally by means of several independent communications systems which are not integrated among themselves.

This fact, as well as coordination problems, especially in critical situations, can result in high investment and maintenance costs. The **unified and multiservice** solution provided by TELTRONIC unites all communications into an integrated system, thereby optimizing operational costs and maximizing ROI (Return of Investment).

Telecommunication Infrastructure (TETRA & Broadband)

Control Center designed for transport environment (CeCo-TRANS)

Portable radios

Mobile radios for maintenance vehicles

Desktop units for stations

Specialized on-board radio terminals (EN50155 compliant)

On-board user interface (standard or touch-screen)

## 5. Range of on-board equipment

The on-board equipment requires always an specific adaptation to assure the right performance and make easy the integration with the particularities of each vehicle and each Project.

Besides a **wide and flexible range of on-board equipment**, TELTRONIC provides technical capability to support these **specific services of engineering and integration**.

As follows, a brief summary of the main characteristics of the equipment for Transport:

## RTP-300

- ♦ Railway regulation compliant
- ♦ Several on-board configuration options
- ♦ Functionality: TETRA voice and data communications, interconnection with PA and Intercom systems, location via GPS.
- ♦ Power supply according to EN50155
- ♦ Serial Communication interface (RS-232/RS-422/RS-485) and Ethernet
- ♦ Digital I/Os
- ♦ Communications rack managed from touch-screen user interface designed for railway environment or from external application

## RTP-603

In addition to the above:

- ♦ Railway specific communications interfaces such as MVB bus
- ♦ Up to two internal radio interfaces
- ♦ Advanced functionality integrated in the communications rack: TETRA voice and data communications, interconnection with PA, Intercom systems and Passenger Information Systems, interconnection with TCMS for the integration with other train subsystems, location via GPS or beacons, etc.
- ♦ Full redundancy of radios and systems: 100% availability
- ♦ Support for signaling systems such as ETCS, CBTC, PTC, and others.

## On-board control console

- ♦ User interface to access to the different on-board radio equipment functions. Connection to the audio accessories: handset with PTT, loudspeaker, ambient microphone.
- ♦ Connection to the audio accessories: handset with PTT, loudspeaker, ambient microphone.

♦ Touch-screen version with advanced functions and capacity for management and display of video



## Control Center for Transport

This range of on-board products is complemented by **CeCo-TRANS**, a Control Center designed for the transport environment, from which voice and critical data communication is managed.  The location and status of each radio unit in the system are also monitored.