PD CLC/TR 50542-1:2014

BSI Standards Publication

Railway applications — Driver's cab train display controller (TDC)

Part 1: General architecture

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee GEL/9, Railway Electrotechnical Applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

This document (CLC/TR 50542-1:2014) has been prepared by CLC/TC 9X "Electrical and electronic applications for railways".

This document supersedes CLC/TR 50542:2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Introduction

The purpose of this Technical Report is to propose harmonisation for communication between the DMIs and the train systems on the driver's desk.

The need for this harmonisation has grown out of several trends.

One trend is that the rolling stock is being computerised more and more, enabling sophisticated functions within the rolling stock and various subsystems of the train.

Furthermore, the driver's desk of such rolling stock is built around one or several computer screens[1]. These allow the driver to interact with the computerised rolling stock functions. The user interfaces are typically user friendly, featuring e.g. graphics and colours.

In case of degraded situation (screen failure) and with several screens available on the desk, it should be possible to relocate important information to a screen that is still working. This improves operational availability.

Another trend is the harmonisation of onboard signalling safety equipment.

For ERTMS/ETCS onboard, the driver-machine interface is also based on computerised screen(s).

The ERTMS/ETCS defines the concept of Specific Transmission Module STM, allowing the integration of national control-command systems into the ERTMS/ETCS onboard system via a standardised interface.

Since desk space is a limited resource, the STM concept allows national onboard control-command systems to use the driver machine interface resources of ERTMS/ETCS. For this purpose the ERTMS/ETCS driver machine interface allows the driver to interact with any of the installed STMs connected by STMs specification or/and ERTMS/ETCS onboard.

A third trend is that a European market is opened for control-command and TCMS equipments as well as rolling stock.

Traditionally, control-command systems were generally linked to a country, and rolling stock was equipped with one or more national control-command systems. This has effectively limited the rolling stock to operate within a limited number of countries.

The ERTMS/ETCS, in combination with STMs enables cross-border traffic, freeing rolling stock from this barrier.

The combination of the above trends leads to the conclusion that during train operation, TCMS need to have access to the screens on the desk. Furthermore, it is desirable to maintain the advantages of multi-screen installations, allowing the ability to switch to another screen in case of screen failure for information to be still displayed. Thus a certain level of integration and harmonised communication is demanded.

Another motivation for this Technical Report is related to Life Cycle Cost. The recommendations written here simplify the replacement of screens and desk equipment through the lifetime of the vehicle, independent of the supplier.

[1] In this Introduction the term "screen" is used in a popular sense, implying e.g. touch screen or other means of input from driver.

This document is the first one of a series of three documents:

CLC/TR 50542-1 *Railway applications — Driver's cab Train Display Controller (TDC) — General architecture*

pr TR50542-2 *Railway applications — Driver's cab Train Display Controller (TDC) — Display systems FIS*

pr TR50542-3 *Railway applications — Driver's cab Train Display Controller (TDC) — Other systems FIS*

1 Scope

In accordance with the ERTMS/ETCS specifications, Subset 121, UIC 612 leaflet, ERA ERTMS-015560 3.3.0 document, EN 50126 and EN 61375 series requirements, this Technical Report describes the Train Display System (TDS) in the driver's cab, and the link between the TDS/TDC and some of its interfaces (Blue box and blue links only):

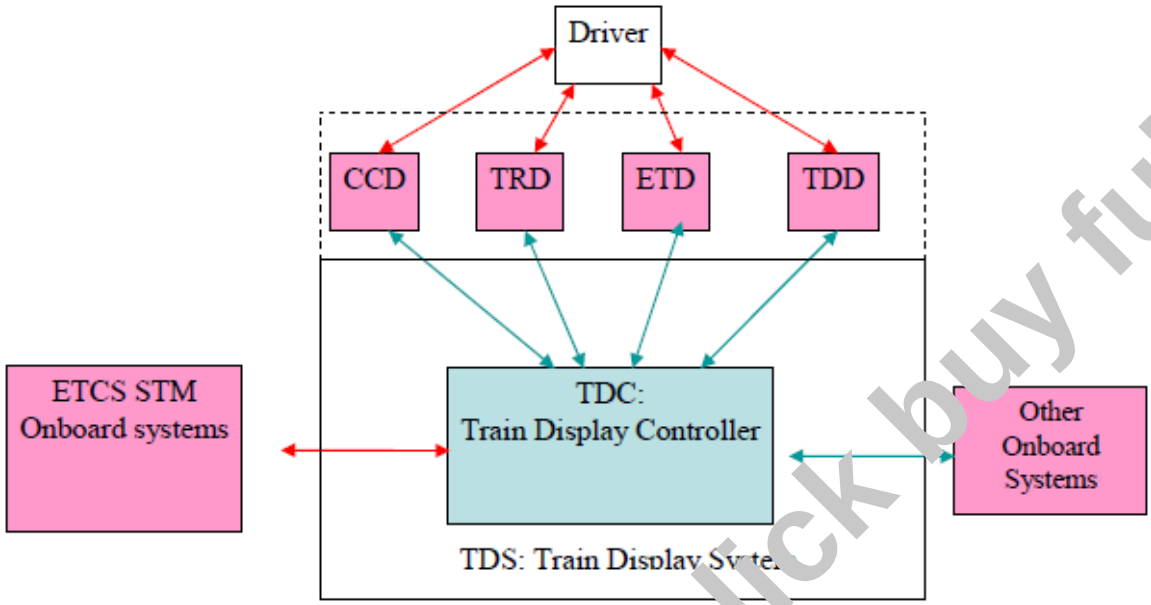

Figure 1 — Terms and definitions

The scope of the Train Display System (TDS) thus includes:

a) Functions, except functions defined in the ETCS Subset 121. These functions describe exchanges between TDC and the connected display systems;

b) Performance allocation (RAMS included as per EN 50126): for each function defined in item a), defining the performances needed and the degraded modes recovering;

c) Needs for certification: description of special requirements to avoid ETCS recertification after other display system modification;

d) Train Display Controller (TDC):

- Redundancy management;
- Architecture;

e) For each system connected (except those defined in ETCS Subset 121): the Functional Interface Specification (FIS).

This Technical Report excludes the following items:

- Communication protocols (e.g. EN 61375 series);
- Ergonomic aspects;
- Interface with ETCS (Subset 121);
- Train functions;
- GSMR EIRENE functions;