MODURBAN

FP6 Project: TIP4 – 2005 – 516380

EC Contract n°: 516380

MODACCESS SUBPROJECT

– DELIVERABLE REPORT –

Deliverable ID:	**D52**
Deliverable Title:	Guidelines/definition of requirements to interface with platform screen doors
Responsible partner:	Knorr-Bremse Division IFE
Contributors:	WP14 and 15 Partners

Document Information

Document Name: Guidelines/definition of requirements to interface with platform screen doors
Document ID: **DEL_MODACCESS_D52_IFE_WP14_010808_v4.doc**
Revision: Final
Revision Date: 01/08/08
Author: Knorr-Bremse Division IFE
Security: **MODURBAN Consortium only**

Approvals

	Name	Company	Date	Visa
Technical Management Committee	B. VON WULLERSTORFF P. TEILLET / G. P.-RIVIERE D. DIMMER G. LEGOFF L. LINDQVIST A. PRICE / U. HENNING M. NOCK JP RICHARD/D. COINEAU Y. AMSLER C. GOUTORBE	UNIFE ALSTOM THALES ANSALDO STS BOMBARDIER SIEMENS KNORR BREMSE RATP UITP ALMA	10/09/2008	OK
Subproject Coordinator	M. NOCK	KNORR BREMSE	01/08/2008	MN
Coordinator	B. VON WULLERSTORFF	UNIFE	10/09/2008	OK
Quality Manager	B. VON WULLERSTORFF C. GOUTORBE	UNIFE ALMA	10/09/2008	OK

Documents history

Revision	Date	Modification	Author
V1	09/05/08	Content of D52	H. Pöchhacker
V2	20/05/08	Draft	H. Pöchhacker
V3	18/07/08	Final draft including the RATP comments from 09/07/08	M. Nock / H. Pöchhacker
V4	01/08/08	Final version with corrections basing on RATP comments from 31/07/08	M. Nock

SECTION I – DELIVERABLE SUMMARY

Deliverable Title	
Deliverable ID , associated WP & Subproject	*DEL_MODACCESS_D52_IFE_WP14_010808_v4 .doc* *MODACCESS / WP14*
Type of Deliverable	*Report*
Input / Starting stage	*MODACCESS meetings + inputs from other MODURBAN Subprojects and WPs* *D53*
Output / Final stage	*not relevant*

Lead partner(s)	
Achievement to date (%)	100 %
Expected date of achievement	*T0+42*
Type of exploitation	*Not relevant*
Exploitation potential	*Not relevant*
Protection	*Not relevant*
Protection date	*Not relevant*

IP's	**Partners, (type, identification, date)**
Pre-existing Know-How	*Not relevant*
Exploitation Rights	*Not relevant*

Associated Risk analysis	**Type, solution envisaged, action, actors**	**Actual Reduction**
Before start		
During task implementation		

Deliverable Title
Deliverable Abstract WP14 - Requirements for door systems on automatic operated trains (GOA 3/4 Systems) The target is the functional specification of control interfaces of the door system modules specific for the use of platform screen doors. Specifications summarised in guidelines, function analysis with special consideration of the system safety will accompany the R&D.
Associated Milestone (if relevant):

TABLE OF CONTENT

2 – DELIVERABLE DETAILED DESCRIPTION

1 INTRODUCTION

1.1 Objectives

The major output expected is the Interface description (Functional and Non Functional) between train side doors (doors) and platform screen doors (PSD, PED, PEG) in GOA3 or GOA4 operation.

1.2 References

Not available at present.

1.3 Glossary

CC	Car borne controller
DCU	Door Control Unit
GOA	Grade of Automation
GOA3	Driverless train operation
GOA4	Unattended train operation
OCC	Operations Control Centre
PSD	Platform Screen Doors
PED	Platform Edge Doors
PEG	Platform Edge Gates
PXSS	Passenger EXchange Sub System
SIL	Safety Integrity Level
TCMS	Train Control and Monitoring System
TSI	Technical Specification for Interoperability
ZC	Zone controller

2.1 Communication on-board (CC - Train doors);

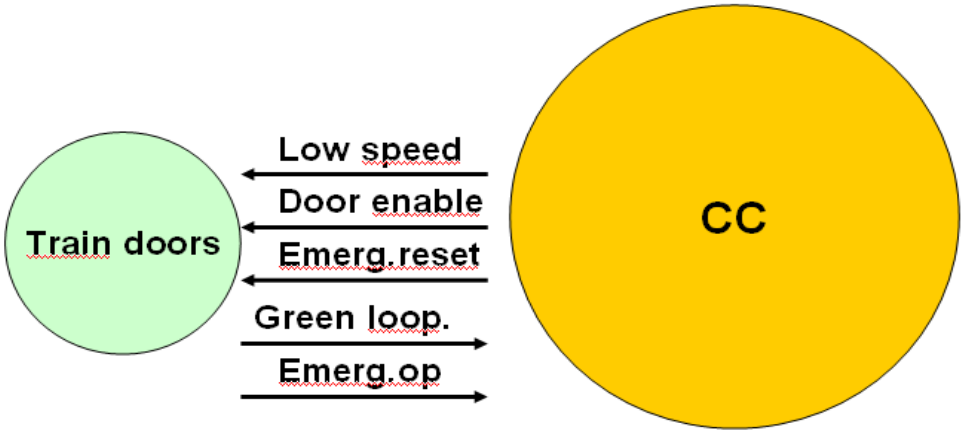

Figure 1 : Communication train doors - CC

2.1.1 Vital signals (Safety critical)

2.1.1.1 Low speed signal

The low speed signal (and/or enable signal) activates the safety relay of the DCU and releases the locking unit and the power circuits of the door drive motor.

The low speed signal is defined by the operator according to TSI (max. 10 km/h) or EN14752 (max. 5 km/h).

The signal has only two states:
low ($v \geq$ low speed signal)
high ($v <$ low speed signal)

2.1.1.2 Door enable signal

Each door is enabled (side selected) by an active high of door enable and Low speed signal.

Remark: An enabled door will open immediately automatically or when the doors open-pushbutton is pressed or in combination with central door open command (depending on the project specific way of door operation).

2.1.1.3 Emergency reset

Mandatory for GOA4 systems.

When the emergency handle is pulled, it is trapped in the operated position and will be reset only when the CC is sending the emergency reset signal.

2.1.1.4 Door green loop signal (locked loop signal)

The green loop / locked loop is a hard wired loop of all door closed & locked limit switches (voltage free contacts) of the train set. The door green loop (locked loop)

releases the traction system of the train set. If a single door system is not in the fully closed & locked position, the train is not able to move.

2.1.1.5 Emergency Egress operation

In case of emergency, it is possible for the passenger to open the door system via the Emergency egress device, even if there is no power supply or no release signal activated.
Emergency operation will be performed only when the train is at low speed.

2.1.2 Non-vital signals (safety related)

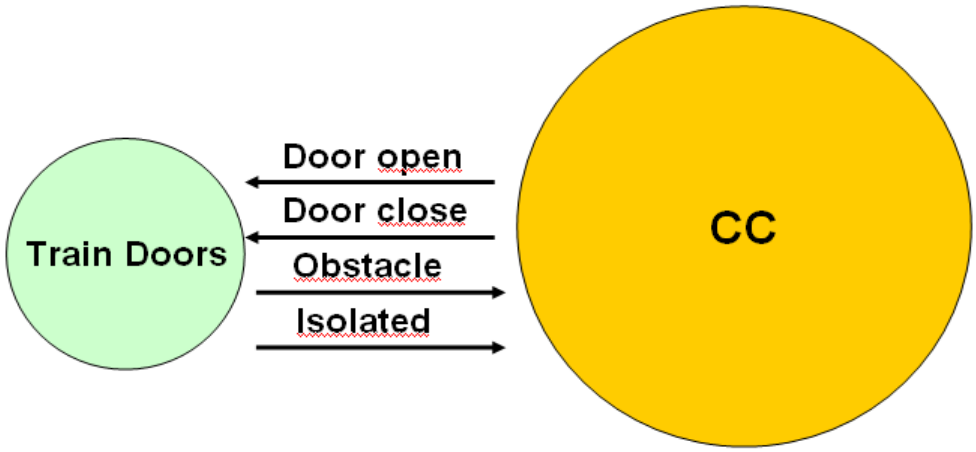

Figure 2 : Non-vital signals between train doors and CC

2.1.2.1 Command Train Door opening

This function is to command the automatic opening of the train doors in station when the conditions to authorize door opening are fulfilled.

Where there are platforms on both sides, it will be possible to open the doors on both sides of the train, with a time shift between both sides if required.

In the presence of platform doors, the opening of platform and train doors shall be synchronised within a given time tolerance, predefined by the operator.

2.1.2.2 Command Train Door closing

This function is to command the automatic closing of the train doors after the passengers transfer in station.

In GOA2, GOA3 and GOA4, (only if automatic closing is required by configuration), the closing of doors shall be automatically commanded once the dwell time has elapsed.

The DCU will recycle door closure a preset number of times (command open followed by command closed) if they are not detected closed and locked within a defined time of the command to close.

The CC commands door closure and provides visible and audible warnings informing the passengers of impending doors closure. Optionally, the CC provides visible and audible warnings instructing the passengers to stand clear of the doors.

If the emergency egress device of the train doors is activated by passengers, the train door closure command is inhibited.

Where platform doors are fitted, the closure of platform and train doors will be synchronised within a given time tolerance, predefined by the operator.

2.1.2.3 Obstacle detection

Obstacle detection will be displayed via TCMS to the driver´s desk.

Green loop (locked loop) signal is cut, as long as an obstacle (30x60 mm acc. EN 14752, 5x30mm, ø6mm acc. VDV 111) is trapped between the door panels.

2.1.2.4 Isolated Door

Isolation of a defective door system will be displayed on the drivers desk via TCMS. Green loop (locked loop) signal for the defective door system will be bypassed, when activated.

2.1.3 Diagnostic signals (Reliability significant)

Diagnostic codes:
Diagnostic codes will be displayed locally via status information (display or error Led) at the DCU, and additionally on the driver´s desk. (via TCMS)

2.2 Communication wayside (ZC - PSD);

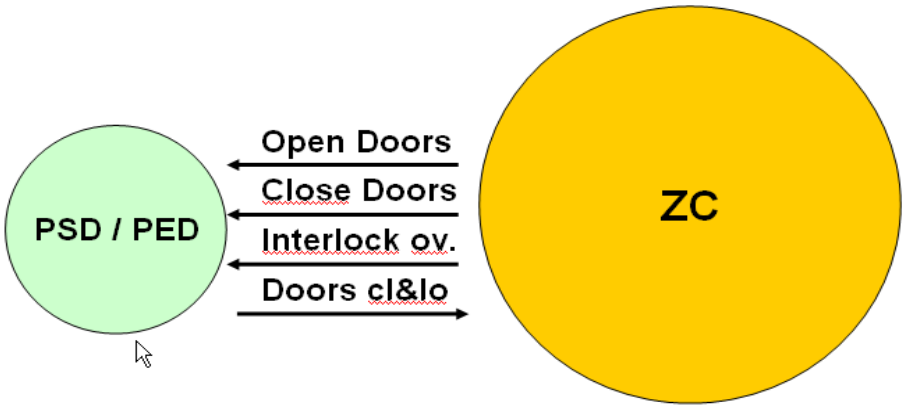

Figure 3 : Communication ZC – PSD / PED

PSD/PED Signals:

The interface between the signalling system and the PSD/PED comprises two vital commands:

2.2.1 Open Doors (extract of D53)

Optional: GOA 1b, 2, 3; Mandatory: GOA 4

This function is to command the automatic opening of the platform doors in stations where platform doors are fitted, when the conditions to authorize door opening are fulfilled (see section 3.4 of D53). Opening of platform and train doors will be synchronised within a given time tolerance predefined by the operator.

Where platform doors are fitted, the platform door system will receive an open signal, either locally from the CC or remotely from the OCC.

If an individual train/platform door has failed and it can not be opened the corresponding platform/train door will not be opened too. For greater explanations please refer to D53.

In case of emergency, the PXSS will enable the platform doors to be unlocked and opened either locally or remotely from the OCC.

2.2.2 Close Doors (extract of D53)

Optional: GOA 1b, 2, 3; Mandatory: GOA 4

This function is to command the automatic closing of the platform doors after the passengers transfer in station.
In GOA2, GOA3 and GOA4, (only if automatic closing is required by configuration), the closing of doors shall be automatically commanded once the dwell time has elapsed.
Closure of platform and train doors will be synchronised within a given time tolerance, predefined by the operator.
The CC will recycle platform door closure a preset number of times (command open followed by command closed) if they are not detected closed and locked within a preset time of the command to close. If the emergency handle is activated by passengers, the platform door closure command is inhibited.

2.2.3 Status signals from the PSD/PED to the signalling system:

- All doors closed and locked

2.2.4 Status signals from the signaling system to the PSD/PED:

- Interlock override

For greater explanation of the above please refer to D53

2.3 Provisions for higher Safety Integrity

Remark: Provisions for higher Safety Integrity have to be carried out (for safety critical functions e.g. unlocking the door system), if the required Safety Integrity Level for the door system is higher then the Safety Integrity Level of the door control unit software. (Software SIL)

External safety relays:
Safety critical functions are transferred from Software control to Hardware devices.

External, bi-polar controlled safety relays are used to improve the safety integrity level of the door system. Safety critical functions like Door release, Door unlocking, Door Emergency operation override are controlled via hardware instead of software only.