ITEA2 PROJECT

2012-2015

Frame to be used to indicate a customer reference number.

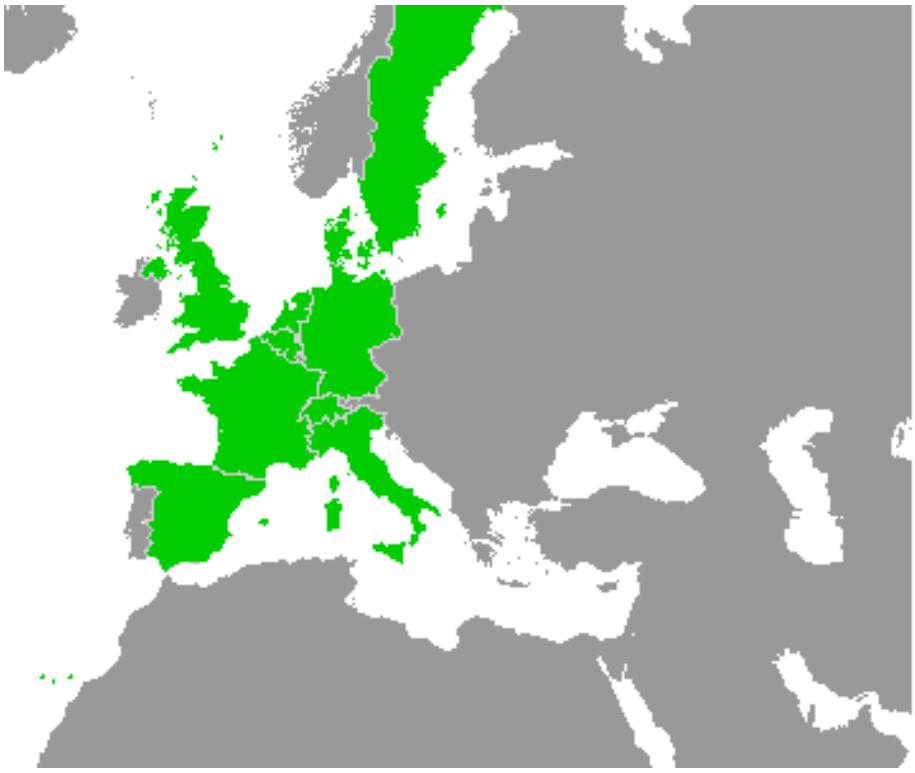
Client :	C/Ref. :

Work-Package 2 : “Requirements”

API Requirements for OpenETCS – appendix - Application Layer v1.0

N. Boverie

February 2014



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Amendment record

Rev.[1]	Author	Version	Date	§	Modifications
	N. Boverie	1.0	06/02/2014	All	creation of the document

1 M : meeting review, R : read-back process

Table of Content

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1. INTRODUCTION

1.1 SUBJECT

This appendix document provides the OpenETCS application layer interface definition (telegram definition) for:

- the DMI interface
- the JRU interface
- the TIU interface

This document is an appendix document of the ALSTOM proposal for the Application Programming Interface (API) Specification of the OpenETCS Onboard Application Software (applicable document /1/).

This specification shall be directly based on the Application Programming Interface (API) Specification of the ALSTOM ERTMS Onboard CORE Application Software.

1.2 FIELD OF APPLICATION

This document is to be considered in the frame of the OpenETCS program.

This specification is compliant to Unisig Baseline 3 of the ETCS Onboard unless explicitly mentioned in the document.

The DMI interface is not yet compliant to Baseline 3; it is currently compliant to Subset 26 v.2.3.0d.

As the ALSTOM development for the ETCS Baseline 3 is still in progress, this document could be modified in the future.

This document is an appendix of the applicable document /1/.

1.3 DOCUMENT DESCRIPTION

For each interface, the following definition is provided:

- Telegram structure
- Packets
- Variables

2. DOCUMENTS & TERMINOLOGY

2.1 REFERENCE DOCUMENTS

/1/ System Requirements Specification, ref. SUBSET-026, v3.3.0

/2/Glossary of terms and abreviations, ref. SUBSET-023, v3.0.0

/3/ ERTMS/ETCS – ETCS Driver Machine Interface, ERA_ERTMS_015560, v.3.3.0

2.2 APPLICABLE DOCUMENTS

/1/API Requirements for OpenETCS

2.3 DEFINITIONS

	Refer to /1/

Refer also to /2/

2.4 ABBREVIATIONS

	Refer to /1/

Refer also to /2/

3. OPENETCS APPLICATION - DMI INTERFACE

3.1 TELEGRAM STRUCTURE

This section describes the messages of the proprietary application layer between the DMI and the OpenETCS application (EVC CORE board).

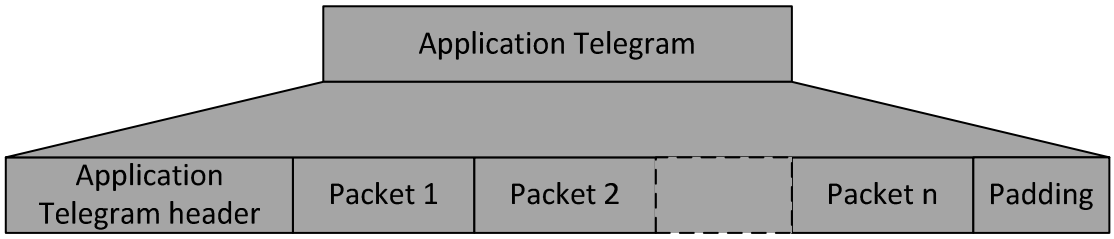
This section provides the list of packets for each function.

The packets are grouped together into telegram.

The telegrams between the OpenETCS application and the DMI are transmitted in an aperiodic way.

The telegram from/to EVC ETCS application shall be composed of a telegram header followed by zero, one or several packets.

The Application telegram structure is described below:



Application Telegram structure

The general telegram between the OpenETCS application and the DMI shall be built as following.

Description	General telegram structure between DMI and EVC	
Content	**Group**	**Comment**
	Telegram header	DMI_NID_TELEGRAM
		DMI_L_TELEGRAM
	Packet(s)	Optional packets (0 to N packets) as needed by application
	Padding	0 to 7 bits when required. Padding bits values are always set to 1.

The same packet may be present more than one time in a telegram.

If needed to obtain an integer number of bytes, padding shall be added at the end of the telegram.

The padding bits value shall always be set to 1.

Each packet and the header are composed of several variables.

3.2 TELEGRAM HEADER

The header shall be built as following.

Description	General telegram header between DMI and EVC		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_TELEGRAM	8	Telegram Identification Number: 1: Telegram from EVC (ETCS application) to DMI 3: Telegram from DMI to EVC (ETCS application)
	DMI_L_TELEGRAM	16	Telegram length in bytes including everything (from DMI_NID_TELEGRAM to padding).

In case the telegram length is not as expected in the header, the DMI shall reject the telegram.

In case the packet length is not as expected in the packet, the DMI shall reject the telegram.

In case the packet identifier is not not known by the DMI, the DMI shall skip the packet based on the packet length, without rejecting the whole telegram.

3.3 PACKETS

Packet 02: Delete text message (from EVC to DMI)

Description	EVC commands the deletion of text message.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 2
	DMI_NID_EVC_MESSAGE	8	Identifier of the message

Packet 03: Confirmation request (from EVC to DMI)

Description	This packet is sent from the EVC to the DMI when a confirmation screen has to be displayed.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 3
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCREEN	1	Destination Window
	DMI_M_CONFIRMATION_SCREEN	8	Identifier of the confirmation screen
	DMI_N_ITER_TEXT	5	Number of iteration for DMI_Q_TEXT_CONFIRM, DMI_L_TEXT, DMI_X_TEXT
	DMI_Q_TEXT_CONFIRM (i)	8	Identifier of the predefined text for confirmation
	DMI_L_TEXT (i)	8	Number of characters in text field. Length of free text to be added at the end of the predefined text.
	DMI_X_TEXT (i,j)	8	Characters of text field to be added at the end of the predefined text. The number of iterations is equal to the value of DMI_L_TEXT.
	DMI_N_ITER	5	Number of iteration for (DMI_NID_DATA,DMI_Q_VALUE, DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE)
	DMI_NID_DATA (k)	10	Identifier of the data

	DMI_Q_VALUE_TYPE (k)	2	0 : no value 1 : Character string 2 : value identifier
	DMI_L_VALUE (k)	8	If DMI_Q_VALUE_TYPE = 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted
	DMI_X_VALUE (k,l)	8	If DMI_Q_VALUE_TYPE = 1 : Data Value Text String Element If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted. The number of iterations is equal to the value of DMI_L_VALUE.
	DMI_NID_VALUE (k)	8	If DMI_Q_VALUE_TYPE = 2 : Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 the variable is not transmitted

Packet 04 : Screen control (From EVC to DMI)

Description	This packet sends to the DMI information to manage each display unit.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 4
	BUILD_IMAGE	1	DMI activity
	PRIMARY_DISPLAY_OTHER	1	Function allocation for primary display
	PRIMARY_DISPLAY_PA	1	Function allocation for primary display
	PRIMARY_DISPLAY_SPEEDO	1	Function allocation for primary display
	PRIMARY_DISPLAY_SPARE	1	Spare (defined for any possible future use not to impact the interface)
	SECONDARY_DISPLAY_OTHER	1	Function allocation for secondary display
	SECONDARY_DISPLAY_PA	1	Function allocation for secondary display

	SECONDARY_DISPLAY_SPEEDO	1	Function allocation for secondary display
	SECONDARY_DISPLAY_SPARE	1	Spare (defined for any possible future use not to impact the interface)

Packet 05: Menu button accessibility (from EVC to DMI)

Description	This packet contains information to configure menu button accessibility. This packet is sent only when the button accessibility change. This packet contains only buttons concerned by the modification of button accessibility.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 5
	DMI_L_PACKET	13	Packet length
	DMI_N_ITER_BUTTON	8	Number of iteration for (DMI_NID_BUTTON, DMI_M_BUTTON_STATUS)
	DMI_NID_BUTTON (i)	10	Identifier of button
	DMI_M_BUTTON_STATUS (i)	1	Status of button

Packet 06: Screen request (From EVC to DMI)

Description	This packet is used when a screen shall be displayed All the leafs are always listed in the packet. DMI_Q_VALUE_TYPE(1) corresponds to the default value sent by EVC. DMI_Q_VALUE_TYPE(2) corresponds to a predefined choice sent by EVC		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 6
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCREEN	1	Destination Window
	DMI_M_SCREEN	8	Screen request identifier

	DMI_N_ITER	5	Number of i-iterations for (DMI_NID_DATA, DMI_Q_VALUE_TYPE (1), DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE, DMI_T_CLOCK, DMI_Q_VALUE_TYPE (2), DMI_N_ITER_VALUE, DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE)
	DMI_NID_DATA (i)	10	Identifier of the i^{th} data
	DMI_Q_VALUE_TYPE(1) (i)	2	Type of the default value for the i^{th} data. 0 : no (default) value 1 :(default value in) Character string 2 : (default value in) value identifier 3 : (default value in) clock value
	DMI_L_VALUE (i)	8	String size for the i^{th} default value (when it is a string) If DMI_Q_VALUE_TYPE (1)= 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted
	DMI_X_VALUE (i,j)	8	j^{th} character of the i^{th} default value (when it is a string) If DMI_Q_VALUE_TYPE (1)= 1 Data Value Text String Element If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted The number of iterations is equal to the value of DMI_L_VALUE.
	DMI_NID_VALUE (i)	8	i^{th} default value identifier If DMI_Q_VALUE_TYPE (1) = 2 : Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 the variable is not transmitted

	DMI_T_CLOCK	32	Value of the i^{th} default value (when it is a clock) If DMI_Q_VALUE_TYPE (1) = 3 : Clock value If DMI_Q_VALUE_TYPE ≠ 3 the variable is not transmitted
	DMI_Q_VALUE_TYPE(2) (i)	2	Type of predefined values for the i^{th} data. 0 : no values (No predefined choices send by EVC) 1 : (predefined choices send by EVC in) Character string 2 : (predefined choices send by EVC in) value identifier
	DMI_N_ITER_VALUE (i)	5	Number of predefined values for the i^{th} data. If DMI_Q_VALUE_TYPE(2) = 1 or 2 Number of iteration for (DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE) If DMI_Q_VALUE_TYPE(2) ≠ 1 or 2 the variable is not transmitted
	DMI_L_VALUE (i,k)	8	Size of the k^{th} predefined value for the i^{th} data (when it is a string). If DMI_Q_VALUE_TYPE(2) = 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE(2) ≠ 1 the variable is not transmitted

	DMI_X_VALUE (i,k,l)	8	l^{th} character of the k^{th} predefined value for the i^{th} data (when it is a string). If DMI_Q_VALUE_TYPE = 1 Data Value Text String Element If DMI_Q_VALUE_TYPE(2) ≠ 1 the variable is not transmitted The number of iterations is equal to the value of DMI_L_VALUE.
	DMI_NID_VALUE (i,k)	8	Identifier of the k^{th} predefined value for the i^{th} data (when it is not a string). If DMI_Q_VALUE_TYPE(2) = 2 : Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 the variable is not transmitted

Packet 07: Sound activation (From EVC to DMI)

Description	EVC command to generate a sound.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 7
	DMI_L_PACKET	13	Packet length
	DMI_NID_EVC_SOUND	8	Sound identifier
	DMI_Q_SOUND	8	Sound qualifier

Packet 08: Analog train speed info (from EVC to DMI)

Description	This packet contains speed driving information (from EVC to DMI) to be displayed by means of CSG needle.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 8
	DMI_V_TRAIN_ANALOG	10	Analogic value of current train speed

Packet 09: EVC Text message (from EVC to DMI)

Description	Text message for the DMI with or without acknowledgement transmitted from EVC to DMI		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 9
	DMI_L_PACKET	13	Packet length
	DMI_NID_EVC_MESSAGE	8	Message identifier
	DMI_M_XATTRIBUTE	10	Attribute of message
	DMI_Q_ACK	1	Acknowledgement qualifier
	DMI_Q_PRIORITY	1	Priority qualifier
	DMI_Q_TEXT	8	Predefined text qualifier
	DMI_L_TEXT	8	Number of DMI_X_TEXT
	DMI_X_TEXT (i)	8	Text String Element. The number of iterations is equal to the value of DMI_L_TEXT.

Packet 11: Update indicator (from EVC to DMI)

Description	This packet contains indicator displayed in the LCD screen.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 11
	DMI_L_PACKET	13	Packet length
	DMI_N_ITER_INDICATOR	8	Number of iteration for (DMI_NID_EVC_INDICATOR, DMI_NID_EVC_ICON, DMI_Q_INDICATOR)
	DMI_NID_EVC_INDICATOR(i)	10	Indicator Identifier
	DMI_NID_EVC_ICON(i)	8	Icon identifier
	DMI_Q_INDICATOR(i)	2	Indicator qualifier

Packet 12: Control keys activation (from EVC to DMI)

Description	This packet is used to enable control keys (X, End of entry)		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 12
	DMI_Q_SCREEN	1	Destination window
	DMI_Q_CONTROL	5	Control key qualifier

Packet 13: Echo Data (from EVC to DMI)

Description	This packet is used to send Echo Data to the DMI		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 13
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCREEN	1	Destination Window
	DMI_N_ITER	5	Number of iteration for (DMI_NID_DATA, DMI_Q_VALUE_TYPE, DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE)
	DMI_NID_DATA (i)	10	Identifier of a data
	DMI_Q_VALUE_TYPE (i)	2	Value = 1 : character string Value = 2 : value identifier
	DMI_L_VALUE (i)	8	If DMI_Q_VALUE_TYPE = 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted
	DMI_X_VALUE (i, j)	8	If DMI_Q_VALUE_TYPE = 1 : Data Value Text String Element If DMI_Q_VALUE_TYPE ≠ 1 : the variable is not transmitted. The number of iterations is equal to the value of DMI_L_VALUE

	DMI_NID_VALUE (i)	8	If DMI_Q_VALUE_TYPE = 2 : Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 : the variable is not transmitted

Packet 16 : EVC connection request (from EVC to DMI)

Description	This packet contains the connection or disconnection request to the DMI. This packet is also used for connection deny.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 16
	DMI_Q_CONNECT	4	Qualifier of the connection

Packet 17: Local time (from EVC to DMI)

Description	This packet contains local time information (from EVC to DMI)		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 17
	DMI_T_CLOCK	32	Local clock

Packet 18: Planning area icons info (from EVC to DMI)

Description	This packet contains planning area icons to display on D2/D3/D4 , D6 orD8 location		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 18
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCALE	2	Scale of DMI_D_TARGET
	DMI_N_ITER	5	Number of iteration for (DMI_NID_EVC_ICON, DMI_Q_AREA, DMI_D_TARGET)
	DMI_NID_EVC_ICON	8	Icon to display

	DMI_NID_AREA	2	Part of the planning area where the icon shall be displayed
	DMI_D_TARGET	15	Distance at which the icon shall be displayed

Packet 19: Planning area speed restrictions info (from EVC to DMI)

Description	This packet contains planning area speed profile displayed on D7 area		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 19
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCALE	2	Scale of DMI_D_TARGET
	DMI_N_ITER	5	Number of iteration for (DMI_Q_WIDTH, DMI_D_TARGET)
	DMI_Q_WIDTH	7	Width of the speed restriction
	DMI_D_TARGET	15	Distance at which the speed restriction shall end (its start is the previous speed restriction end, or 0 if this is the first speed restriction)

Packet 23: Set speed info (from EVC to DMI)

Description	This packet contains the set speed indication information (from EVC to DMI) to be displayed on CSG by means of a specific icon.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 23
	DMI_L_PACKET	13	Packet length
	DMI_V_SET_SPEED	10	Set speed value
	DMI_NID_EVC_ICON	8	Icon to display.

Packet 26: Planning area gradient profiles info (from EVC to DMI)

Description	This packet contains gradient profiles information displayed numerically on the D5 area.

Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 26
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCALE	2	Scale of DMI_D_TARGET
	DMI_N_ITER	5	Number of iteration for (DMI_Q_GDIR, DMI_G_A, DMI_D_TARGET)
	DMI_Q_GRAD_DIR	1	Qualifier for gradient slope
	DMI_M_GRAD	8	Absolute gradient value
	DMI_D_TARGET	15	Distance at which the gradient profile end (its start is the previous gradient profile end, or 0 if this is the first speed restriction)

Packet 27: Freeze Data Entry (From EVC to DMI)

Description	This packet is used to send Freeze Data Entry to the DMI		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 27
	DMI_Q_SCREEN	1	Destination Window
	DMI_Q_FREEZE	1	Screen State

Packet 28: Update technical indicator (from EVC to DMI)

Description	This packet contains technical indicator to display on the LCD screen.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 28
	DMI_L_PACKET	13	Packet length
	DMI_N_ITER_TECH_INDICATOR	8	Number of iteration for (DMI_NID_TECH_INDICATOR, DMI_NID_TECH_ICON)
	DMI_NID_TECH_INDICATOR(i)	8	Technical Indicator Identifier

	DMI_NID_TECH_ICON(i)	10	Technical Icon identifier

Packet 29: Freeze Confirmation Screen (From EVC to DMI)

Description	This packet is used to send Freeze Confirmation Screen to the DMI		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 29
	DMI_Q_SCREEN	1	Destination Window
	DMI_Q_FREEZE	1	Screen State

Packet 30: Driver language transmission (from DMI to EVC or from EVC to DMI)

Description	Driver language selection. Each DMI sends this packet on EVC applicative connexion (after packet 16 exchange) and on DMI language modification. DMI updates its language when EVC sends this message to DMI. If new language is unknown by DMI, this packet is ignored.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 30
	DMI_L_PACKET	13	Packet length
	DMI_NID_DRV_LANG	16	Driver language selection

Packet 31: Planning area displaying (from EVC to DMI)

Description	This packet contains the planning area status for displaying on D location		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 31
	DMI_L_PACKET	13	Packet length
	DMI_M_PLANNING	1	Displaying status of the planning area

Packet 32: Tunnel stopping area distance information (from EVC to DMI)

Description	This packet contains the tunnel stopping area status for displaying		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 32
	DMI_L_PACKET	13	Packet length
	DMI_Q_DISPLAY_TUN_STOPPING	1	Display status of the tunnel stopping area: 0 (not displayed) / 1 (displayed)
	DMI_D_TUN_STOPPING	24	Distance of tunnel stopping area

Packet 33: Geographical position information (from EVC to DMI)

Description	This packet contains the tunnel stopping area status for displaying		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 33
	DMI_L_PACKET	13	Packet length
	DMI_Q_DISPLAY_GEO_POS	1	Display status of the geographical position.
	DMI_D_GEO_POS	24	Value of kilometre point

Packet 37: STM specific test request (from EVC to DMI)

Description	Text message for the DMI indicating request for specific test request from STM. Text is displayed as high priority one and managed as an EVC text Message.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 37
	DMI_L_PACKET	13	Packet length
	DMI_NID_EVC_MESSAGE	8	Message identifier

	STM_M_XATTRIBUTE	10	Attribute for text string of the data and its associated value(s)
	DMI_L_TEXT	8	Number of DMI_X_TEXT
	DMI_X_TEXT (i)	8	Text String Element. The number of iterations is equal to the value of DMI_L_TEXT.

Packet 43: Speed and distance supervision information (from EVC to DMI)

Description	This packet contains speed bargraph information (from EVC to DMI) to be displayed on the Circular Speed Gauge. Many different coloured segments may be displayed according to information in variables.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 43
	DMI_L_PACKET	13	Packet length
	DMI_Q_SCALE	2	Scale of DMI_D_TARGET
	DMI_V_PERMIT	10	Permitted speed
	DMI_V_TARGET	7	Target speed
	DMI_V_RELEASE	10	Release speed
	DMI_V_INTERV	10	Intervention speed
	DMI_D_TARGET	15	Target distance
	DMI_M_COLOUR_SP	3	Colour of speed pointer (needle)
	DMI_M_COLOUR_PS	3	Colour of permitted speed
	DMI_Q_DISPLAY_PS	2	Display of permitted speed
	DMI_M_COLOUR_TS	3	Colour of target speed
	DMI_Q_DISPLAY_TS	2	Display of target speed
	DMI_M_COLOUR_RS	3	Colour of release speed
	DMI_Q_DISPLAY_RS	2	Display of release speed
	DMI_M_COLOUR_IS	3	Colour of intervention speed
	DMI_Q_DISPLAY_IS	2	Display of intervention speed
	DMI_Q_DISPLAY_TD	2	Display of target distance

Packet 47 : STM accessibility (from EVC to DMI)

Description	This packet contains information on the accessibility to the DMI for a STM (from EVC to DMI). This packet informs the DMI whether to treat the packets sent by STM and how.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 47
	STM_NID_STM	8	STM identity
	DMI_ACCEPTANCE_STATE	2	State of the acceptance for the STM

Packet 48 : STM error on DMI (from DMI to EVC)

Description	This packet contains information on error reported in case a STM sends an unknown object to the DMI or in case of DMI buffer overflow (from DMI to EVC).		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 48
	STM_NID_STM	8	STM identity

Packet 50: Acknowledgement reply (from DMI to EVC)

Description	Report from ETCS on acknowledgement of text message. If text message is deleted before acknowledgement, this packet is not transmitted.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 50
	DMI_NID_EVC_MESSAGE	8	Identifier of the ack message

Packet 52: Driver request (from DMI to EVC)

Description	Driver gives a request to the EVC (confirmation or menu request)		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 52

	DMI_NID_BUTTON	10	Identifier of button

Packet 53: Driver data reply (from DMI to EVC)

Description	Driver data sent to the EVC		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 53
	DMI_L_PACKET	13	Packet length
	DMI_NID_DATA	10	Identifier of the data
	DMI_Q_VALUE_TYPE	2	0 : no (default) value 1 : Character string 2 : value identifier
	DMI_L_VALUE	8	If DMI_Q_VALUE_TYPE = 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted
	DMI_X_VALUE (i)	8	If DMI_Q_VALUE_TYPE = 1 : Data Value Text String Element If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted The number of iterations is equal to the value of DMI_L_VALUE.
	DMI_NID_VALUE	8	If DMI_Q_VALUE_TYPE = 2 : Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 the variable is not transmitted

Packet 54: Confirmation reply (From DMI to EVC)

Description	Driver reply sent to the EVC

Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 53
	DMI_L_PACKET	13	Packet length
	DMI_M_CONFIRMATION_SCREEN	8	Identifier of the confirmation screen
	One bit to 0	1	Value = 0 (not used) This bit is kept to avoid integration problems
	DMI_Q_CONFIRM	1	Value = 0 : screen not confirmed Or value = 1 : screen confirmed
	DMI_N_ITER	5	Number of iteration for (DMI_NID_DATA, DMI_Q_VALUE_TYPE, DMI_L_VALUE, DMI_X_VALUE, DMI_NID_VALUE)
	DMI_NID_DATA (i)	10	Identifier of the data
	DMI_Q_VALUE_TYPE (i)	2	Value = 1 : Character string Or value = 2 : value identifier
	DMI_L_VALUE (i)	8	If DMI_Q_VALUE_TYPE = 1 : Number of DMI_X_VALUE If DMI_Q_VALUE_TYPE ≠ 1 The variable is not transmitted
	DMI_X_VALUE (i,j)	8	If DMI_Q_VALUE_TYPE = 1 : Data Value Text String Element If DMI_Q_VALUE_TYPE ≠ 1 the variable is not transmitted. The number of iterations is equal to the value of DMI_L_VALUE.
	DMI_NID_VALUE (i)	8	If DMI_Q_VALUE_TYPE = 2 Identifier of a value If DMI_Q_VALUE_TYPE ≠ 2 the variable is not transmitted

Packet 56: Text message deleted stack full (from DMI to EVC)

Description	Report from ETCS on deletion of text message when the stack is full.

Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 56
	DMI_NID_EVC_MESSAGE	8	Identifier of the message

Packet 57 : DMI connection confirm (From DMI to EVC)

Description	This packet contains the connection confirmation with the versions of DMI software and configuration data.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 57
	DMI_Q_CONNECT	4	Qualifier of the connection
	SW_INTERFACE_EVC_DMI_VERSION	24	SW interface between DMI and EVC
	DP_INTERFACE_EVC_DMI_VERSION	24	DP interface between DMI and EVC

Packet 58 : DMI state (from DMI to EVC)

Description	This packet contains the actual state of the DMI		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 58
	DMI_Q_STATE	4	DMI state qualifier
	SCREEN_STATE_MAIN	2	Primary screen status
	SCREEN_STATE_SECONDARY	2	Secondary screen status

Packet 65 : DMI control request (from DMI to EVC)

Description	Driver gives a control key reply to the EVC		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 65
	DMI_Q_SCREEN	1	Origin window
	DMI_NID_CONTROL	2	Type of control applied by the driver.

Packet 71: Digital train speed info (from EVC to DMI)

Description	This packet contains numeric speed driving information to be displayed with 3 digits in the centre of the needle.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 71
	DMI_V_TRAIN_NUM	10	Numerical train speed

Packet 76: Packet for sending fixed text messages (From EVC to DMI)

Description	Text message from track to train transmitted from EVC to DMI This packet is derived from **Erreur ! Source du renvoi introuvable.** packet 76		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 76
	DMI_L_PACKET	13	Packet length
	DMI_NID_TRACK_MESSAGE	8	Identifier of the message
	Q_TEXTCLASS	2	Value = 1: high priority message Value ≠ 1: low priority message
	DMI_Q_TEXTACK	2	Value = 0: no message to be acknowledged Value = 1: message to be acknowledged
	Q_TEXT	8	qualifier of predefined text

Packet 77: Track acknowledgement reply (from DMI to EVC)

Description	Report from ETCS on acknowledgement of text message. If text message is deleted before acknowledgement, this packet is not transmitted.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 77
	DMI_L_PACKET	13	Packet length

	DMI_NID_TRACK_MESSAGE	8	Identifier of the ack message

Packet 78: Delete track text message (from EVC to DMI)

Description	EVC commands the deletion of text message.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 78
	DMI_L_PACKET	13	Packet length
	DMI_NID_TRACK_MESSAGE	8	Identifier of the message

Packet 79: Track message deleted stack full (from DMI to EVC)

Description	Report from ETCS on deletion of text message when the stack is full…		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 79
	DMI_L_PACKET	13	Packet length
	DMI_NID_TRACK_MESSAGE	8	Identifier of the message

Packet 81 : Close current page (from EVC to DMI)

Description	This packet forces DMI to close current page if speed is currently masked by the page. Main page of specified window is then displayed.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 81
	DMI_Q_SCREEN	1	Destination window

Packet 82: Manage ATP test (from EVC to DMI)

Description	ATP test state during morning test. EVC sends this message once ATP to test is activated

Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 82
	DMI_L_PACKET	13	Packet length
	NID_ATP_TEST	9	ATP identity.
	ATP_TEST_STATE	8	Current state of the ATP test

Packet 85 : iBox_state (from DMI to EVC)

Description	This packet notifies EVC for iBox status modification. It is sent to EVC on iBox connection and on iBox status modification.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 85
	DMI_IBOX_FAULT_REPORT	16	Bitfield for iBox fault report
	DMI_L_FAULT_STATUS	8	Length of status list
	DMI_X_FAULT_STATUS(i)	8	Fault status array. The number of iterations is equal to DMI_L_FAULT_STATUS.

Packet 86 : Safety synchronization (from EVC to DMI)

Description	This packet is sent by EVC when the safety objects displayed must be verified.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 86
	SCREEN_NUMBER	8	Identify the objects that have to be verified on the screen
	CYCLE_NUMBER	8	Counter linking display and safety data

Packet 87: ATP test result (from DMI to EVC)

Description	Indicates that the ATP daily test is over and gives the result.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 87
	DMI_L_PACKET	13	Packet length

	NID_ATP_TEST	9	ATP identity
	ATP_TEST_RESULT	8	Result of the ATP test

Packet 179: Request for additional data entry (from EVC to DMI)

Description	This packet creates and initialises additional data entry. Transmitted from EVC to DMI to allow the driver to select the value for all parameters.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 179
	DMI_L_PACKET	13	Packet length
	STM_NID_STM	8	STM requesting additional data
	DMI_N_ITER	5	Maximum iteration data = 15
	STM_NID_DATA(j)	8	Functional identity of a STM data to be entered.
	STM_L_DATA_CAPTION(j)	6	Length of X_DATA_CAPTION maximum value = 40 (20 characters max coded in UTF-8 on 2 bytes)
	STM_X_DATA_CAPTION(j,q)	8	Data caption text byte string (UTF-8 on 1 or 2 bytes). The number of iterations is equal to the value of STM_L_DATA_CAPTION.
	STM_L_VALUE(j)	5	Length of X_VALUE for current value. Maximum value = 20 (10 characters max coded in UTF-8 on 2 bytes) =0 if there is no current value
	STM_X_VALUE(j,i)	8	Data value caption text byte string (UTF-8 on 1 or 2 bytes)
	DMI_N_ITER_VALUE(i)	5	Maximum iteration data value = 31
	STM_L_VALUE(j,i)	5	Length of X_VALUE maximum value = 20 (10 characters max coded in UTF-8 on 2 bytes)

	STM_X_VALUE(j,i,k)	8	Data value caption text byte string (UTF-8 on 1 or 2 bytes) The number of iterations is equal to the value of STM_L_VALUE.

Packet 180: Driver selection for additional data entry (from DMI to EVC)

Description	This packet is the report of the driver selection for each additional data entry parameter		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 180
	DMI_L_PACKET	13	Packet length
	STM_NID_STM	8	STM requesting additional data variables.
	STM_NID_DATA	8	Functional identity of a STM data to be entered.
	STM_L_VALUE	5	Length of DMI_X_VALUE maximum value = 20) (10 characters max coded in UTF-8 on 2 bytes)
	STM_X_VALUE(j)	8	Data value caption text byte string (UTF-8 on 1 or 2 bytes). The number of iterations is equal to the value of STM_L_VALUE

Packet 181: Confirmation for additional data entry (From EVC to DMI)

Description	This packet is sent by the EVC to the DMI to display to the driver all the parameters to be validated and request him to validate them. The validation is performed by pressing the key “screen confirmed” and the non-validation is performed by pressing the key “screen not confirmed”.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 181
	DMI_L_PACKET	13	Packet length
	STM_NID_STM	8	STM requesting additional data
	DMI_N_ITER	5	Maximum iteration data = 15

STM_L_DATA_CAPTION(j)	6	Length of X_DATA_CAPTION maximum value = 40 (20 characters max coded in UTF-8 on 2 bytes)
STM_X_DATA_CAPTION(j,k)	8	Data caption text byte string (UTF-8 on 1 or 2 bytes)
STM_L_VALUE(j)	5	Length of X_VALUE maximum value = 20) (10 characters max coded in UTF-8 on 2 bytes)
STM_X_VALUE(j,i)	8	Data value caption text byte string (UTF-8 on 1 or 2 bytes)

Packet 183: Specific STM data view values (from EVC to DMI)

Description	This packet creates and initialises additional view entry. Transmitted from EVC to DMI to allow the driver to show the value for all parameters.		
Content	**Variable**	LENGTH	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 183
	DMI_L_PACKET	13	Packet length
	STM_NID_STM	8	STM requesting additional data
	N_ITER	5	Maximum value = 15
	STM_L_DATA_CAPTION(j)	6	Length of X_DATA_CAPTION for data label Maximum value = 40 (20 characters max coded in UTF-8 on 2 bytes)
	STM_X_DATA_CAPTION(j,q)	8	Data label caption text byte string (UTF-8 on 1 or 2 bytes)
	STM_L_VALUE(j)	5	Length of X_VALUE for current value. Maximum value = 20 (10 characters max coded in UTF-8 on 2 bytes) =0 if there is no current value

	STM_X_VALUE(j,i)	8	Data value caption text byte string (UTF-8 on 1 or 2 bytes)

Packet 189: Driver confirmation for additional data entry (from DMI to EVC)

Description	This packet is the driver selection for the validation of additional data entry parameters.		
Content	**Variable**	**Length**	**Comment**
	DMI_NID_PACKET	8	DMI_NID_PACKET = 189
	DMI_L_PACKET	13	Packet length
	STM_Q_CONFIRM	1	1= validated /0 =cancel.

3.4 VARIABLES

All variables start with the DMI_ prefix.

The following letter enables to determine the nature of a variable:

A Acceleration

D Distance

NID Identifier

L Length

M Miscellaneous

N number of items

Q Qualifier

V Speed

X Text

T Time related data

The minimum and maximum values are only specified for non-enumerate values (like numbers, distances). When applicable, special and reserved enumerate values are described in the corresponding cell of the variable description.

ATP_TEST_RESULT

Name	Result of ATP test		
Description	Indicates the ATP daily test status		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	0 : ATP test OK 1 : ATP test KO 2..255 : Spare		

ATP_TEST_STATE

Name	State of ATP test		
Description	Indicate if DMI shall start or finish STM test sequence		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	0 : ATP acceptance OFF 1 : ATP acceptance IN PROGRESS 2 : ATP acceptance ON 3 : ATP test ABORTED 4..255 : Spare		

BUILD_IMAGE

Name	DMI activity		
Description	This variable is sent by EVC to activate the DMI screen		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : DMI CPU shall be inactive. 1 : DMI CPU shall be active.		

CYCLE_NUMBER

Name	Cycle number
Description	Synchronization number for display verification

Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0	127	
Special/Reserved Values	-1 : this value disables the safety verification. EVC shall use this value at standstill when the screen may be covered by technical menu or data entry. -128..-2 : Spare		

DMI_ACCEPTANCE_STATE

Name	State of acceptance		
Description	Tell if the STM "y" can have access to the DMI		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	00 : NON_ACCEPTANCE 01 : ACCEPTANCE 10 : PRELIMINARY ACCEPTANCE 11 : Spare		

DMI_DISPLAY_STATE

Name	State of the DMI terminal display		
Description	Indicate the DRU its terminal used for log display is no more visible		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	1 : the DMI terminal is cleaned		

DMI_D_GEO_POS

Name	Geographical position		
Description	Provides the kilometre point of the geographical position		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits	0	16777214 m	1 m
Special/Reserved Values	16777215: value out of range		

DMI_D_TARGET

Name	Target Distance		
Description	Next Target Distance (in BTS and BEOA sections) shows the remaining distance to the brake target.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
15 bits	0 m	327,660 km	10 cm, 1m or 10 m depending on DMI_Q_SCALE
Special/Reserved Values	32767: target unknown		

DMI_D_TUN_STOPPING

Name	Distance of tunnel stopping area		
Description	Provides the distance value of the tunnel stopping area		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits	0	16 777 214 m	1 m
Special/Reserved Values	16 777 215: distance out of range		

DMI_IBOX_FAULT_REPORT

Name	IBOX fault report		
Description	Bitfield for IBOX fault report		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
16 bits			Bitfield

Special/Reserved Values	Bit 0 : defect in national system selection Bit 1 : defect in cabin selection Bit 2 : link lost between iBox & (ATB/NG, TBL2/3, LZB/PZB or ATP/BR) Bit 3 : voltage loss on national system (ATB/NG,TBL2/3, LZB/PZB ou ATP/BR) Bit 4 : defect on the 0..20 mA entry (real speed measurement) Bit 5 : defect on frequential entry (V4 or V5) Bit 6 : defect on safety display Bit 7 : internal iBox defect Bit 8 : EVC isolation detected Bit 9 : timeout on answer from DMI Bit 10-15 : spare Bit 0, 1or 7 sets indicates a defect on iBox. Bit 6 or bit 9 set indicates a defect on DMI Bit 2, 3, 4 or 5 set indicates a defect on a national ATP Bit 8 shall never be set on packet 85 reception

DMI_L_FAULT_STATUS

Name	Fault status length		
Description	Length of iBox status length		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0	255	1 byte
Special/Reserved Values			

DMI_L_PACKET

Name	Packet length		
Description	DMI_L_PACKET indicates the length of the packet in bits, including all bits of the packet header		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
13 bits	0	8191	1 bit
Special/Reserved Values			

DMI_L_TELEGRAM

Name	Telegram length		
Description	Indicates the length of the telegram in bytes, including all packets and all variables defined in the telegrams header and padding bits if any.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
16 bits	0	65535	1 byte
Special/Reserved Values			

DMI_L_TEXT

Name	Length of text string		
Description	DMI_L_TEXT defines the length of a text string (DMI_TEXT * DMI_X_TEXT)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	1	255	1 Text String Element
Special/Reserved Values	0 : No string No DMI_X_TEXT in following DMI_L_TEXT		

DMI_L_VALUE

Name	Length of text data bytestring for value		
Description	DMI_L_VALUE defines the length of a text data bytestring for value (DMI_L_VALUE * DMI_X_VALUE)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	1	255	1 Text Sting Element
Special/Reserved Values	0 : No String – no DMI_X_VALUE in following DMI_L_VALUE		

DMI_M_BUTTON_STATUS

Name	Status of a Driver menu tree leaf		
Description	A menu tree leaf (button) may be sensitive or not		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			

Special/Reserved Values	0 : Button is not enabled 1 : Button is enabled

DMI_M_COLOUR_IS

Name	Colour of intervention speed		
Description	Colour of intervention speed indication for speed supervision; the colours are identical to those defined by ERA in **Erreur ! Source du renvoi introuvable.**.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
3 bits			
Special/Reserved Values	0 : White 1 : Grey 2 : Medium grey 3 : Dark grey 4 : Yellow 5 : Orange 6 : Red 7 : reserved		

DMI_M_COLOUR_PS

Name	Colour of permitted speed		
Description	Colour of permitted speed indication for speed supervision; the colours are identical to those defined by ERA (/3/)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
3 bits			

Special/Reserved Values	0 : White 1 : Grey 2 : Medium grey 3 : Dark grey 4 : Yellow 5 : Orange 6 : Red 7 : reserved

DMI_M_COLOUR_RS

Name	Colour of release speed		
Description	Colour of release speed indication for speed supervision; the colours are identical to those defined by ERA in (/3/)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
3 bits			
Special/Reserved Values	0 : White 1 : Grey 2 : Medium grey 3 : Dark grey 4 : Yellow 5 : Orange 6 : Red 7 : reserved		

DMI_M_COLOUR_SP

Name	Colour of speed pointer (needle)		
Description	Colour of analogic speed needle for speed supervision; the colours are identical to those defined by ERA in (/3/)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
3 bits			

Special/Reserved Values	0 : White 1 : Grey 2 : Medium grey 3 : Dark grey 4 : Yellow 5 : Orange 6 : Red 7 : reserved

DMI_M_COLOUR_TS

Name	Colour of target speed		
Description	Colour of target speed indication for speed supervision; the colours are identical to those defined by ERA in (/3/)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
3 bits			
Special/Reserved Values	0 : White 1 : Grey 2 : Medium grey 3 : Dark grey 4 : Yellow 5 : Orange 6 : Red 7 : reserved		

DMI_M_CONFIRMATION_SCREEN

Name	Confirmation Screen identifier		
Description			
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	0 : no screen requested Other values: refer to screen ID configuration		

DMI_Q_DISPLAY_GEO_POS

Name	Status of the geographical position display		
Description	Inform whether the geographical position shall be displayed or hidden.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : geographical position is not shown 1 : geographical position is shown		

DMI_M_GRAD

Name	Absolute safe gradient value		
Description	DMI_G_GRAD is the value of the gradient to be displayed on the planning area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0	254	1 ‰
Special/Reserved Values	255 : not used		

DMI_M_PLANNING

Name	Status of the planning area displaying		
Description	Inform whether the planning area shall be displayed or hidden		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : planning area is disabled 1 : planning area is enabled		

DMI_M_SCREEN

Name	Screen request identifier		
Description	Identification number of the screen /window to be displayed		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	0 : no screen requested Other values: refer to screen ID configuration		

DMI_Q_DISPLAY_TUN_STOPPING

Name	Status of the tunnel stopping area display		
Description	Inform whether the tunnel stopping area distance shall be displayed or hidden		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : distance of tunnel stopping area is not shown 1 : distance of tunnel stopping area is shown		

DMI_M_XATTRIBUTE

Name	Attributes for text string used by EVC and DRU		
Description	Attributes are either selected explicitly using foreground and background colour etc, or using predefined attributes selected by the DMI. The predefined attributes should be consistent with attributes used in ETCS levels of operation Colour shall be defined in the configuration data “Colour”		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values	Xxxxxxx000 : Black text Xxxxxxx001 : White text Xxxxxxx010 : Red text Xxxxxxx011 : Blue text Xxxxxxx100 : Green text Xxxxxxx101 : Yellow text Xxxxxxx110 : Light red text Xxxxxxx111 : Light green text Xxxx000xxx : Dark blue background Xxxx001xxx : White background Xxxx010xxx : Red background Xxxx011xxx : Blue background Xxxx100xxx : Green background Xxxx101xxx : Yellow background		

	Xxxx110xxx : Light red background Xxxx111xxx : Light green background

DMI_N_ITER

Name	Number of iterations of a data set following this variable in a packet		
Description	Two nested levels of iterations can exist.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits	0	31	integer
Special/Reserved Values			

DMI_N_ITER_BUTTON

Name	Number of iterations of BUTTON following this variable in a packet		
Description	Number of iterations of BUTTON following this variable in a packet		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0	255	integer
Special/Reserved Values			

DMI_N_ITER_INDICATOR

Name	Number of iterations of indicator in a packet		
Description	Number of iterations of indicator in a packet.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8bits	0	255	Integer
Special/Reserved Values			

DMI_N_ITER_TECH_INDICATOR

Name	Number of iterations of technical indicator in a packet		
Description	Number of iterations of technical indicator in a packet		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0	255	Integer
Special/Reserved Values			

DMI_N_ITER_TEXT

Name	Number of iterations of a TEXT following this variable in a packet		
Description	Number of iterations of a TEXT following this variable in a packet. Two nested levels of iterations can exist.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits	0	31	integer
Special/Reserved Values			

DMI_N_ITER_VALUE

Name	Number of iterations of a data set following this variable in a packet		
Description	Number of iterations of a data set following this variable in a packet		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits	0	31	Integer
Special/Reserved Values			

DMI_NID_ACK

Name	Qualifier of the acknowledgement		
Description	DMI_NID_ACK is a qualifier of the acknowledgement.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	"0 : false : data is not acknowledged, " "1 : true : data is acknowledged." "2..3 : spare"		

DMI_NID_AREA

Name	Qualifier of the display area of the planning area		
Description	DMI_NID_AREA is a qualifier to select the display area of the planning area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			

Special/Reserved Values	0 : area D2/3/4 (track conditions) 1 : area D6 (flags) 2 : area D8 (indication point) 3 : Spare

DMI_NID_BUTTON

Name	Button identifier		
Description	Functional identifier of requested button. Allows DMI to apply customisation, if defined within the DMI. Functional identity is dependent of button state. Each button are defined in the data prep		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values			

DMI_NID_CONTROL

Name	Control key identifier		
Description	Control key identifier of requested Control key		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : close activated by the driver 3 : End of entry activated by the driver 1 : spare 2 : spare		

DMI_NID_DATA

Name	DATA identifier		
Description	Identifier of train data		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values			

DMI_NID_DRU_MESSAGE

Name	DRU MESSAGE identity		
Description	Identify a text message		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			integer
Special/Reserved Values			

DMI_NID_DRV_LANG

Description	Driver Language Selection This table includes a subset of the language identifiers included in the norm.		
Length of variable	***Value***	***Language***	
16 bits (2 characters)			
Special/Reserved Values	en	ENGLISH	
	de	GERMAN	
	fr	FRENCH	
	es	SPANISH	
	it	ITALIAN	
	nl	DUTCH	
	hu	HUNGARIAN	
	da	DANISH	
	fi	FINNISH	
	no	NORWEGIAN	
	sv	SWEDISH	
	bg	BULGARIAN	
	hr	CROATIAN	
	cs	CZECH	
	et	ESTONIAN	
	el	GREEK	
	pl	POLISH	

	pt	PORTUGUESE
	ro	ROMANIAN
	ru	RUSSIAN
	sr	SERBIAN
	sh	SERBO-CROATIAN
	sk	SLOVAK
	sl	SLOVENIAN
	tr	TURKISH
	lv	LATVIAN
	lt	LITHUANIAN

DMI_NID_EVC_ICON

Name	Icon identifier		
Description	Identifier of icon. Allow DMI to apply customisation, if defined within the DMI. Functional identify is part of button or indication.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_NID_EVC_INDICATOR

Name	Indicator Identifier		
Description	Functional identity of indicator. Allows DMI to apply customisation, if defined within the DMI.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values			

DMI_NID_EVC_MESSAGE

Name	EVC MESSAGE identifier		
Description	Identifier a text message		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**

8 bits			integer
Special/Reserved Values			

DMI_NID_EVC_SOUND

Name	Identifier of sound		
Description	Identifier of sound		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_NID_LANGUAGE

Name	Driver Languages		
Description	This variable contains the driver language choice.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
6 bits			
Special/Reserved Values	Special reserve value are defined in the data prep "available languages".		

DMI_NID_PACKET

Name	Packet identifier		
Description	This is used in the header for each packet, allowing the receiving equipment to identify data which follows.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			Numbers
Special/Reserved Values			

DMI_NID_PRIOR_INDICATOR

Name	Priority Indicator Identifier		
Description	Functional identity of priority indicator. Allows DMI to apply customisation, if defined within the DMI.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			

Special/Reserved Values	

DMI_NID_TECH_ICON

Name	Technical Icon identifier		
Description	Identifier of technical icon.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values	0 : erase the current indicator content		

DMI_NID_TECH_INDICATOR

Name	Technical Indicator Identifier		
Description	Functional identity of technical indicator. Allows DMI to apply customisation, if defined within the DMI.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_NID_TELEGRAM

Name	Telegram identifier		
Description	Telegram identifier		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			

Special/Reserved Values	1: Telegram from EVC application SW 2: Telegram from EVC basic SW 3: Telegram to EVC application SW 4: Telegram to EVC basic SW 5: Telegram from EVC diagnostic application 6: Telegram to EVC diagnostic application 9: diagnostic Telegram 10: Telegram from DRU ERTMS application 11: Telegram to DRU ERTMS application 12: Telegram from diagnostic application (technical function) 13: Telegram to diagnostic application (technical function) 14..21: Spare 22: Telegram from EVC to Safety module 23: Telegram from Safety module to EVC 24..255: Spare

DMI_NID_TRACK_MESSAGE

Description	Identify a text message		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_NID_VALUE

Name	Identifier of a data value		
Description	Each data value is identified by DMI_NID_VALUE+ DMI_NID_DATA.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_OBJECT_ID

Name	Graphical object identifier

Description	Each object that can be readback by the DMI have one unique identifier.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	This identifier is specified in READBACK SILO application configuration file.		

DMI_Q_ACK

Name	Acknowledgement qualifier		
Description	Tell if a text message must be acknowledged or not.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : No acknowledgement required 1 : Acknowledgement required		

DMI_Q_CHANGE

Name	Change data qualifier		
Description	This variable is used to inform the EVC that Driver request to change data or not.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : Driver did not request to change data 1 : Driver request to change data		

DMI_Q_CONFIRM

Name	Confirmation screen qualifier		
Description	The variable is used to identify if the confirmation screen is confirmed or not.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	Value = 0 : screen no confirmed Value = 1 : screen confirmed		

DMI_Q_CONNECT

Name	State of connection		
Description	Reports protocol state of connection or command		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits			
Special/Reserved Values	0 : connection request 1 : connection confirmation 2 : disconnection request 3 :disconnection confirmation 4 : connection deny 5-15 : spare		

DMI_Q_CONTROL

Name	Key control management		
Description	This variable is used to define who manage control keys. The EVC or The DMI.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits			
Special/Reserved Values	xxxx0 : DMI Management xxxx1 : EVC Management x0xxx : close key disable x1xxx : close key enable 0xxxx: end of entry key disable 1xxxx: end of entry key enable		

DMI_Q_DISPLAY_IS

Name	Display mode for intervention speed		
Description	Display mode for intervention speed		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			

Special/Reserved Values	00 : no display 01 : display with normal bar width 10 : display with wide bar width 11 : spare

DMI_Q_DISPLAY_PS

Name	Display mode for permitted speed		
Description	Display mode for permitted speed		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	00 : no display 01 : hook only displayed 10 : speed bar displayed without hook 11 : speed bar displayed with hook		

DMI_Q_DISPLAY_RS

Name	Display mode for release speed		
Description	Display mode for release speed		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	00 : no display 01 : digital indicator only displayed 10 : bar indication only displayed 11 : bar and digital indicator displayed		

DMI_Q_DISPLAY_TD

Name	Display mode for target distance		
Description	Display mode for target distance		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			

Special/Reserved Values	00 : no display 01 : digital indicator only displayed 10 : bar indication only displayed 11 : bar and digital indicator displayed

DMI_Q_DISPLAY_TS

Name	Display mode for target speed		
Description	Display mode for target speed		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	00 : no display 01 : hook only displayed 10 : speed bar displayed without hook 11 : speed bar displayed with hook		

DMI_Q_DISPLAY_UNIT

Name	DMI Display unit qualifier		
Description	Indicate to the state of both display DMI		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits			
Special/Reserved Values	0 : Both display unit are **in failure** 1 : Main display unit is ok, secondary display unit is in failure 2 : Main display unit is in failure secondary display unit is ok 3 : Both display unit are **ok** 4..15 : spare		

DMI_Q_DRU_CONNECT

Name	State of DRU connection		
Description	Reports protocol state of connection or command		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**

4 bits			
Special/Reserved Values	0 : undefined 1 : connect request 2 : connect confirm 3 : connect denied 4 : disconnect request 5 : disconnect confirm 6..15 : spare		

DMI_Q_DRU_TEXT

Name	Fixed message to be displayed.		
Description	DMI_Q_DRU_TEXT is a pointer to select a fixed text message from the defined in the DMI configuration data. The language selected by the driver for the DMI shall be used additionally as a qualifier to choose the appropriate language table.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_Q_FREEZE

Name	Frozen state of the DMI		
Description	DMI_Q_FREEZE is a qualifier indicating if the data entry currently displayed on the DMI shall be frozen or not		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : not frozen 1 : frozen		

DMI_Q_GRAD_DIR

Name	Qualifier for gradient slope of the planning area		
Description	DMI_Q_GRAD_DIR is a qualifier indicating the direction of the gradient to be displayed on the planning area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**

1 bit			
Special/Reserved Values	0 : downhill 1 : uphill		

DMI_Q_INDICATOR

Name	Status of DMI indicator		
Description	The DMI_Q_INDICATOR variable is a status that controls icon objet.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : The icon is not displayed (the area is cleared) 1 : The icon is displayed with no flashing 2 : The icon is displayed with slow flashing 3 : The icon is displayed with fast flashing		

DMI_Q_PRIORITY

Name	Message text priority		
Description	This variable defines the priorities of the message.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : low priorities 1 : high priorities		

DMI_Q_SCALE

Name	Qualifier for the distance scale.		
Description	Qualifier to indicate the same scale used for describing all distances inside the packet that contains Q_SCALE.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			

Special/Reserved Values	0 : 10 cm scale 1 : 1 m scale 2 : 10 m scale 3 : spare

DMI_Q_SCREEN

Name	Destination Window		
Description	This variable defines the destination / origin window for some messages		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : ERTMS window 1 : TECHNICAL window		

DMI_Q_SOUND

Name	sound qualifier		
Description	Indicate to the sound generator if the sound defined by DMI_NID_SOUND shall be activated or stopped		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	1	254	
Special/Reserved Values	0 : the sound shall be stopped 1..254 : the sound shall be activated X times (x is the value of DMI_Q_SOUND) 255 : the sound shall be activated infinitely		

DMI_Q_STATE

Name	DMI STATE qualifier		
Description	Indicate to the state of the DMI (operational mode)		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits			

Special/Reserved Values	0 : Self_test 1 : Initialisation 2 : Waiting EVC connection mode 3 : Establish connection mode 4 : Nominal ERTMS mode 5 : Technical Mode 1 6 : ERTMS mode one screen failure 7 : Out of Communication mode 8 : Technical mode 2 9 : Error mode 10..15 : spare

DMI_Q_TECH

Name	Technical menu status		
Description	This variable is used to define whether the Technical menu is available or not.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : Technical menu not available 1 : Technical menu available		

DMI_Q_TEXT

Name	Fixed message to be displayed.		
Description	DMI_Q_TEXT is a pointer to select a fixed text message from the defined in the DMI configuration data. The language selected by the driver for the DMI shall be used additionally as a qualifier to choose the appropriate language table.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_Q_TEXTACK

Name	Qualifier of for acknowledgement of the fixed text message.		
Description	DMI_Q_TEXTACK is a qualifier to determine if the text message has to be acknowledged or not		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : No acknowledgement 1 : acknowledgement required 2..3 : Spare		

DMI_Q_TEXT_CONFIRM

Description	DMI_Q_TEXT_CONFIRM is a pointer to select a fixed text message from the defined table the DMI configuration data. The language selected by the driver for the DMI shall be used additionally as a qualifier to choose the appropriate language table.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DMI_Q_VALUE_TYPE

Name	Qualifier of value type.		
Description	DMI_Q_VALUE is a qualifier to select : no value associated to the DATA or Character sting value is associated to the data or a identifier of value is associated to the data		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : No value 1 : Character string 2 : Value identifier 3 : DMI_T_CLOCK (only available for packet 06)		

DMI_Q_WIDTH

Name	Qualifier of the speed restriction width of the planning area		
Description	DMI_Q_WITDH is a qualifier to select the speed restriction width of the planning area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
7 bits	0	100	1%
Special/Reserved Values	101-127 : Spare		

DMI_RB_VALUE

Name	Displayed value read back by the DMI		
Description	This variable contains the value that has been read back by the DMI. The value is associated to the DMI_OBJECT_ID and depends on the object type. ANALOGICAL SPEED : speed pointed by needle NUMERICAL SPEED : speed displayed by numerical speed object ICON : checksum of a pictogram TARGET DISTANCE : distance displayed on vertical bargraph Note: because 100 pixels can represent 3000 m, target distance readback value cannot be accurate.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
32 bits	0	4294967295	
Special/Reserved Values			

DMI_T_CLOCK

Name	Local time		
Description	This variable gives the local time, in order to allow the DMI clock to update its value. This is an absolute time, the original date for time 0 is fixed on the 01/01/2000		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
32 bits	0s	4294967294 s (> 130 years)	1 s
Special/Reserved Values	0xFFFF FFFF: no time		

DMI_V_INTERV

Name	Intervention speed value		
Description	Intervention speed value for CSG displaying		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601..1022 : Spare (no value displayed) 1023 speed unknown		

DMI_V_PERMIT

Name	Permitted speed value		
Description	Value of the permitted speed from EVC for CSG displaying		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601..1022 : Spare (no value displayed) 1023 speed unknown		

DMI_V_RELEASE

Name	Release speed value		
Description	Release speed value for numeric release speed indication and CSG displaying		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601:1022 : Spare (no value displayed) 1023 speed unknown		

DMI_V_SET_SPEED

Name	Set speed value		
Description	Value of the speed which is set by the driver (on an external cruise control system).		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601..1022 : Spare (no icon displayed) 1023 speed unknown (no icon displayed)		

DMI_V_TARGET

Name	Target speed value		
Description	Target speed value for CSG displaying		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
7 bits	0	600 km/h	5 km/h
Special/Reserved Values	121..126 : Spare (no value displayed) 127 speed unknown		

DMI_V_TRAIN_ANALOG

Name	Current train speed analogic value		
Description	Current train speed analogic value		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601..1022 : Spare (no value displayed) 1023 speed unknown		

DMI_V_TRAIN_NUM

Name	Current train speed numeric value		
Description	Current train speed numeric value		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits	0	600 km/h	1 km/h
Special/Reserved Values	601..1022 : Spare (no value displayed) 1023 speed unknown		

DMI_X_FAULT_STATUS

Name	Fault status		
Description	iBox status indicating gravity of fault encountered.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			

Special/Reserved Values	Indicate for each DMI_IBOX_FAULT_REPORT the gravity level. The gravity is represented with one byte corresponding to the DMI_IBOX_FAULT_REPORT bit : DMI_X_FAULT_STATUS[0] is linked to DMI_IBOX_FAULT_REPORT(bit 0) The value of each byte is : 0 : none 1 : minor 2 : major 3 : critical 4 : safety related 4..255 : Spare

DMI_X_TEXT

Name	Text String Element		
Description	Text strings are used to transmit plain text messages. Each element of a text string contains a single character encoded as ISO 8859-1, also known as Latin Alphabet # or ISO 8859-7, Latin-greek in function fo the driver languages		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			ASCII
Special/Reserved Values			

DMI_X_VALUE

Name	Data Value Text String Element		
Description	Text Bytestring for data value Character set ISO 8859-1 (Latin Alphabet #1) or ISO 8859-7 (Latin-Greek) in function of the driver languages		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			ASCII
Special/Reserved Values			

DP_INTERFACE_EVC_DMI_VERSION

Name	Version of the data preparation interface between EVC & DMI		
Description	This version is sent by the DMI and checked by the EVC. It is part of the DMI data preparation		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits			String of 3 characters
Special/Reserved Values			

DP_INTERFACE_TRU_DMI_VERSION

Name	Version of the data preparation interface between TRU & DMI		
Description	This version is sent by the TRU and checked by the EVC. It is part of the DMI data preparation		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits			String of 3 characters
Special/Reserved Values			

DRU_L_PACKET

Name	DRU Packet length		
Description	DRU_L_PACKET indicates the length of the packet in bytes, including all variables.		
Source of definition	TRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
16 bits	0	65535	1 Byte
Special/Reserved Values			

DRU_M_DIAG

Name	Diagnostic code		
Description	Identity number of diagnostic code.		
Source of definition	DRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
12 bits	0	4095	
Special/Reserved			

Values	

DRU_N_PACKET

Name	Number of packets in a DRU Telegram.		
Description	Number of packets in a DRU Telegram.		
Source of definition	TRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits	0	31	
Special/Reserved Values			

DRU_NID_CHANNEL

Name	Channel number identification		
Description	Identity number of the channel number – or like - which issue the message		
Source of definition	DRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits			
Special/Reserved Values	1 : Cab A 2 : Cab B		

DRU_NID_PACKET

Name	Packet identifier		
Description	This is used in the header for each packet, allowing the receiving equipment to identify data which follows.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values			

DRU_NID_SOURCE

Name	Identification of the source		
Description	Defines the source that is sending the diagnostic code message. This variable is required in order to select the proper documentation for interpreting the diagnostic log.		
Source of definition	DRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	4: DMI		

DRU_T_TRAIN

Name	Profibus safety layers profibus local reference time		
Description	Value of the Profibus safety layers local reference time		
Source of definition	DRU definition		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
32 bits	0	42949672.94 s	0.01 s
Special/Reserved Values			

L_MESSAGE

Name	STM message length		
Description	This variable indicates, in bytes, the full length of a STM message, including header variables.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	1	255	1 byte
Special/Reserved Values			

NID_ATP_TEST

Name	ATP identity		
Description	The identifier of an ATP connected to DMI		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**

9 bits			
Special/Reserved Values	Value 256 is reserved for EVC identification.		

PRIMARY_DISPLAY_OTHER

Name	Function allocation of the primary screen		
Description	This variable is sent by EVC to perform the functional repartition of the graphical objects. ALSTOM DMI will treat this data by displaying all the ERTMS data available, including Planning Area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : DMI shall not display any ERTMS data 1 : DMI shall display ERTMS data		

PRIMARY_DISPLAY_PA

Name	Function allocation of the primary screen		
Description	This variable is sent by EVC to indicate that the DMI shall display the Planning Area on its primary display.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	This variable will not be used by ALSTOM DMI in a first step.		

PRIMARY_DISPLAY_SPARE

Name	Function allocation of the primary screen		
Description	This variable is currently not used.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit	0	1	Bit
Special/Reserved Values			

PRIMARY_DISPLAY_SPEDO

Name	Function allocation of the primary screen
Description	This variable is sent by EVC to perform the functional repartition of the graphical objects. ALSTOM DMI will treat this data by displaying only the speedo.

Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : DMI shall not display the alone speedo 1 : DMI shall display the alone speedo		

SECONDARY_DISPLAY_OTHER

Name	Function allocation of the seconday screen		
Description	This variable is sent by EVC to perform the functional repartition of the graphical objects on the secondary screen. ALSTOM DMI will treat this data by displaying all the ERTMS data available, including Planning Area.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : DMI shall not display any ERTMS data 1 : DMI shall display ERTMS data		

SECONDARY_DISPLAY_PA

Name	Function allocation of the primary screen		
Description	This variable is sent by EVC to indicate that the DMI shall display the Planning Area on its secondary display.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	This variable will not be used by ALSTOM DMI in a first step.		

SECONDARY_DISPLAY_SPARE

Name	Function allocation of the primary screen		
Description	This variable is currently not used.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values			

SECONDARY_DISPLAY_SPEDO

Name	Function allocation of the primary screen		
Description	This variable is sent by EVC to perform the functional repartition of the graphical objects. ALSTOM DMI will treat this data by displaying only the speedo.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0 : DMI shall not display the alone speedo 1 : DMI shall display the alone speedo		

SCREEN_NUMBER

Name	Screen number		
Description	Identifier of the current screen displayed. This identifier is used to determine the screen configuration and define what objects must be verified. In the way EVC → DMI : indicates the screen requested In the way DMI → EVC : indicates what screen has been checked The values of SCREEN_NUMBER shall be configurable.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	For PP : screen number shall always be 1		

SCREEN_STATE_MAIN

Name	Primary screen state		
Description	This variable is sent by DMI to indicate the status of the primary screen		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : Primary screen state is OK 1 : Primary screen state is KO 2 : Primary screen state is UNKNOWN 3 : Primary screen state is NOT INSTALLED		

SCREEN_STATE_SECONDARY

Name	Secondary screen state

Description	This variable is sent by DMI to indicate the status of the secondary screen		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/Reserved Values	0 : Secondary screen state is OK 1 : Secondary screen state is KO 2 : Secondary screen state is UNKNOWN 3 : Secondary screen state is NOT INSTALLED		

STM_L_DATA_CAPTION

Name	Length of text caption bytestring		
Description	STM_L_DATA_CAPTION defines the length of text caption string in bytes (STM_L_DATA_CAPTION*STM_X_DATA_CAPTION). Corresponds to the number of bytes transmitted for caption characters coded in UTF-8.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
6 bits	1	40	1 byte
Special/Reserved Values	0 : No string, only icon should be used No STM_X_DATA_CAPTION following STM_L_DATA_CAPTION 41 to 63 not used since the maximum number of characters (coded in UTF-8 with 1 or 2 bytes) for data caption is limited to 20.		

STM_L_VALUE

Name	Length of text data bytestring for value		
Description	STM_L_VALUE defines the length of a text data string in bytes for value (STM_L_VALUE * STM_X_VALUE) encoded in UTF-8 with 1 or 2 bytes.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits	0	20	1 byte
Special/Reserved Values	0 : No String No STM_X_VALUE in following STM_L_VALUE 21 to 31 not used since the maximum number of characters (coded in UTF-8 with 1 or 2 bytes) for value is limited to 10.		

STM_M_XATTRIBUTE

Name	Attributes for text string used by STM		
Description	Attributes are either selected explicitly using foreground and background colour etc, or using predefined attributes selected by the MMI. The predefined attributes should be consistent with attributes used in ETCS levels of operation		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
10 bits			
Special/Reserved Values	0xxxxxxxxx : Not displayed (Note: this allows to "remove" associated object from display) x0xxxxxxxx : Indicator Normal flashing x1xxxxxxxx : Indicator Counterphase flashing Xx00xxxxxx : Indicator No flashing Xx01xxxxxx : Indicator Slow flashing Xx10xxxxxx : Indicator Fast flashing Xx11xxxxxx : Reserved xxxx000xxx : Dark blue background (applicable while no icon is referenced) xxxx001xxx : White indicator background (applicable while no icon is referenced) xxxx010xxx : Red indicator background (applicable while no icon is referenced) xxxx011xxx : Blue indicator background (applicable while no icon is referenced) xxxx100xxx : Green indicator background (applicable while no icon is referenced) xxxx101xxx : Yellow indicator background (applicable while no icon is referenced) xxxx110xxx : Light red indicator background (applicable while no icon is referenced) xxxx111xxx : Light green indicator background (applicable while no icon is referenced) xxxxxxx000 : Black text label (applicable while no icon is referenced) xxxxxxx001 : White text label (applicable while no icon is referenced) xxxxxxx010 : Red text label (applicable while no icon is referenced) xxxxxxx011 : Blue text label (applicable while no icon is referenced) xxxxxxx100 : Green text label (applicable while no icon is referenced) xxxxxxx101 : Yellow text label (applicable while no icon is referenced) xxxxxxx110 : Light red text label (applicable while no icon is referenced) xxxxxxx111 : Light green text label (applicable while no icon is referenced)		

STM_NID_DATA

See NID_DATA description in UNISIG Subset 58.

STM_NID_STM

Name	STM Identity		
Description	This variable is the identifier of the Specific Transmission Module requesting specific data entry or data view through ETCS EVC		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			
Special/Reserved Values	255 reserved for multicast		

STM_Q_CONFIRM

Name	Confirmation screen qualifier		
Description	The variable is used to identify if the additional data entry confirmation screen is confirmed or not.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	Value = 0 : screen no confirmed Value = 1 : screen confirmed		

STM_X_DATA_CAPTION

Name	Caption Text Byte		
Description	First or second (if any) byte of bytestring used for text caption of DMI objects (label of button, indicator and data) Encoded in UTF-8 with 1 or 2 bytes.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			UTF-8 with 1 or 2 bytes
Special/Reserved Values			

STM_X_VALUE

Name	Data Value Text Byte		
Description	First or second (if any) byte of bytestring used for data value. Encoded in UTF-8 with 1 or 2 bytes.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits			UTF-8 with 1 or 2 bytes

Special/Reserved Values	

SW_INTERFACE_EVC_DMI_VERSION

Name	Version of the software interface between EVC & DMI		
Description	This version is sent by the DMI and checked by the EVC. It is part of the DMI data preparation		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits			String of 3 characters
Special/Reserved Values			

SW_INTERFACE_TRU_DMI_VERSION

Name	Version of the software interface between TRU & DMI		
Description	This version is sent by the TRU and checked by the EVC. It is part of the DMI data preparation		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
24 bits			String of 3 characters
Special/Reserved Values			

4. OPENETCS APPLICATION - JRU INTERFACE

4.1 JRU MESSAGES DEFINITION

The list defines the type of messages with the corresponding Message Identifier ("TRU_NID_MESSAGE") and the Message Name.

TRU_NID_MESSAGE	MESSAGE NAME	TYPE OF MESSAGE
0	DATA MESSAGE	DATA MESSAGE
1	TRU STATE	CONTROL MESSAGE
2	TRU STATE REQUEST	CONTROL MESSAGE
3	JRU FAILURE	CONTROL MESSAGE
4	JRU UTC TIME REQUEST	CONTROL MESSAGE
5	JRU UTC TIME	CONTROL MESSAGE
6	JRU LOCAL TIME REQUEST	CONTROL MESSAGE
7	JRU LOCAL TIME	CONTROL MESSAGE

Only the juridical data messages shall be recorded in the juridical protected memory. The control messages are exchanged with the OpenETCS application (EVC CORE board) but not recorded by the JRU.

4.2 OPENETCS APPLICATION – JRU CONTROL MESSAGES

Message 1: TRU STATE (JRU → EVC)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message
2	TRU_M_STATUS	8	State of TRU

Message 2: TRU State Request (EVC → JRU)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message

Message 3: JRU Failure (JRU → EVC)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message

Message 4 : UTC Request (EVC → JRU)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message
2	JRU_T_TRAIN	32	EVC Clock

Message 5 : JRU_UTC Time (JRU → EVC)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message
2	JRU_T_UTC	38	Universal time
3	JRU_T_TRAIN	32	EVC Clock
4	Padding bit	2	Fix value = 2 bits

Message 6 : JRU Local Time request (EVC →JRU)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message
2	JRU_NID_C	10	Identifier of country
3	JRU_T_TRAIN	32	EVC Clock
4	Padding bit	6	Fix value = 6 bits

Message 7: JRU Local Time (JRU → EVC)

Field N°	VARIABLE	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message
2	JRU_T_LOCAL_TIME	32	Local time
3	JRU_T_TRAIN	32	EVC Clock

4.3 OPENETCS APPLICATION-JRU DATA MESSAGES

The data message generated by the EVC is composed of a common header with potentially a set of predefined packets.

The following section gives the list of packets with the corresponding packet Identifier "JRU_NID_PACKET." and the packet name.

This list is based on the list of messages defined in FIS Juridical recording.

	Type of packet	**Origin**	**Remarks**
1	GENERAL MESSAGE	EVC	
2	TRAIN DATA	EVC	
3	EMERGENCY BRAKE COMMAND STATE	EVC	
4	SERVICE BRAKE COMMAND STATE	EVC	
5	MESSAGE TO RADIO INFILL UNIT	EVC	
6	MESSAGE FROM BALISE	EVC	
7	MESSAGE FROM EUROLOOP	EVC	
8	MESSAGE FROM RADIO INFILL UNIT	EVC	
9	MESSAGE FROM RBC	EVC	
10	MESSAGE TO RBC	EVC	
11	DRIVER'S ACTIONS	EVC	
12	BALISES GROUP ERROR	EVC	
13	RADIO ERROR	EVC	
14	STM INFORMATION	STM	
15	INFORMATION FROM COLD MOVEMENT DETECTOR	EVC	
16	START DISPLAYING FIXED TEXT MESSAGE	EVC	
17	STOP DISPLAYING FIXED TEXT MESSAGE	EVC	
18	START DISPLAYING PLAIN TEXT MESSAGE	EVC	
19	STOP DISPLAYING PLAIN TEXT MESSAGE	EVC	
20	SPEED AND DISTANCE MONITORING INFORMATION	EVC	
21	DMI SYMBOL STATUS	EVC	
22	DMI SOUND STATUS	EVC	

23	DMI SYSTEM STATUS MESSAGE	EVC	
24	ADDITIONAL DATA	EVC	
25	SR SPEED/DISTANCE ENTERED BY THE DRIVER	EVC	
26	NTC SELECTED	EVC	
27	SAFETY CRITICAL FAULT IN MODE SL, NL OR PS	EVC	
28	VIRTUAL BALISE COVER SET BY THE DRIVER	EVC	
29	VIRTUAL BALISE COVER REMOVED BY THE DRIVER	EVC	
30	SLEEPING INPUT	EVC	
31	PASSIVE SHUNTING INPUT	EVC	
32	NON LEADING INPUT	EVC	
33	REGENERATIVE BRAKE STATUS	EVC	
34	MAGNETIC SHOE BRAKE STATUS	EVC	
35	EDDY CURRENT BRAKE STATUS	EVC	
36	ELECTRO PNEUMATIC BRAKE STATUS	EVC	
37	ADDITIONAL BRAKE STATUS	EVC	
38	CAB STATUS	EVC	
39	DIRECTION CONTROLLER POSITION	EVC	
40	TRACTION STATUS	EVC	
41	TYPE OF TRAIN DATA	EVC	
42	NATIONAL SYSTEM ISOLATION	EVC	
43	TRACTION CUT OFF COMMAND STATE	EVC	
44-254	SPARE		
255	ETCS ON-BOARD PROPRIETARY JURIDICAL DATA	EVC	

Common header:

Field No.	Variable	Bits	Remarks
1	TRU_NID_MESSAGE	8	Type of message (for data message = 0)
2	JRU_L_MESSAGE	16	Total message length (Fields 1 to 19 and packets)
3	JRU_T_TRAIN	32	EVC clock
4	Reserved	8	Fix value = 8 bits reserved for conversion to T_UTC

5	JRU_Q_SCALE	2	Current train position
6	JRU_NID_LRBG	10+14	Current train position
7	JRU_D_LRBG	15	Current train position
8	JRU_Q_DIRLRBG	2	Current train position
9	JRU_Q_DLRBG	2	Current train position
10	JRU_L_DOUBTOVER	15	Current train position
11	JRU_L_DOUBTUNDER	15	Current train position
12	JRU_V_TRAIN	10	Current train speed
13	JRU_DRIVER_ID	128	Driver identifier
14	JRU_NID_ENGINE	24	Train running number
15	JRU_SYSTEM_VERSION	7	Version of ETCS System
16	JRU_M_LEVEL	3	Current level
17	JRU_M_MODE	4	Current mode
18	Padding	1	Fix value = 1 bit
19	JRU_N_PACKET	4	Number of packets in message
N	Packets		0 to N Packets

Note: The total length of a message is always a multiple of bytes.

The JRU_NID_PACKET, the JRU_L_PACKET and the JRU_T_TRAIN are the only fields to be read by the JRU to process the message as necessary from its reception from the EVC up to its transmission to the JDR. The content of the packets as well as the structure of the packets is to be considered by the JRU as 'transparent'.

The table here below defined the value to be given to a data when it is to be considered as 'unknown'.

Field No.	Variable	Value	Definition
5	JRU_Q_SCALE	0	Pre-set
6	JRU_NID_LRBG	16777215	Unknown
7	JRU_D_LRBG	32767	Unknown
8	JRU_Q_DIRLRBG	2	Unknown
9	JRU_Q_DLRBG	2	Unknown
10	JRU_L_DOUBTOVER	32767	Unknown
11	JRU_L_DOUBTUNDER	32767	Unknown

12	JRU_V_TRAIN	1023	Standstill
13	JRU_DRIVER_ID	????????????????	Unknown
14	JRU_NID_ENGINE	FFFF FFFF	Pre-set
15	JRU_SYSTEM_VERSION	127	Spare
16	JRU_M_LEVEL	0	Pre-set
17	JRU_M_MODE	0 except 10 when EVC isolation	Pre-set

Packet 1: GENERAL MESSAGE

The JRU common header contents all the necessary data to create the 'General Message'. Only, the variable JRU_T_TRAIN is to be replaced by the variables DATE and TIME (UTC).

Packet 2: TRAIN DATA

This packet is sent by the EVC when the driver enters the data at start of mission and each time the driver changes the data values during the mission.

Field No.	**VARIABLE/ PACKET**	**Length bits**	**Remarks**
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_V_MAXTRAIN	7	
4	JRU_NC_CDTRAIN	4	
5	JRU_NC_TRAIN	15	
6	JRU_L_TRAIN	12	
7	JRU_T_TRACTION_CUT_OFF	12	
8	JRU_M_BRAKE_POSITION	2	
9	JRU_M_NOM_ROT_MASS	5	
10	JRU_M_REGENERATIVEBRAKE	2	
11	JRU_M_EDDYCURRENTBRAKE	2	
12	JRU_M_MAGNETICSHOEBRAKE	2	
13	JRU_M_ELECTROPNEUMATICBRAKE	2	
14	JRU_Q_TRACTIONCUTOFFINTERFACE	1	
15	JRU_Q_SERVICEBRAKEINTERFACE	1	

16	JRU_Q_SERVICEBRAKEFEEDBACK	1	
17	JRU_Q_BRAKE_CAPT_TYPE	1	
18	JRU_M_BRAKE_PERCENTAGE	8	Only if Q_BRAKE_CAPT_TYPE = 0
19	JRU_N_BRAKE_CONF	4	Only if Q_BRAKE_CAPT_TYPE = 0
20	JRU_M_BRAKE_LAMBDA_CONF(k)	3	Only if Q_BRAKE_CAPT_TYPE = 0: specific configuration of the special brakes for lambda train
21	JRU_T_BRAKE_SERVICE(k)	12	Only if Q_BRAKE_CAPT_TYPE = 0: service Brake delay time
22	JRU_N_BRAKE_CONF	4	Only if Q_BRAKE_CAPT_TYPE = 1 (gamma type), N_BRAKE_CONF and the following variables follow until A_BRAKE_SERVICE_COMP inclusive
23	JRU_M_BRAKE_GAMMA_CONF(k)	4	
24	JRU_T_BRAKE_EMERGENCY(k)	12	
25	JRU_N_BRAKE_SECTIONS(k)	3	
26	JRU_V_BRAKE_EMERGENCY_COMP(k, m)	10	
27	JRU_A_BRAKE_EMERGENCY_COMP(k, m)	8	
28	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 0)	5	
29	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 1)	5	
30	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 2)	5	
31	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 3)	5	
32	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 4)	5	
33	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m),	5	

	5)		
34	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 6)	5	
35	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 7)	5	
36	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 8)	5	
37	JRU_M_KDRY_RST(A_BRAKE_EMERGENCY_COMP(k, m), 9)	5	
38	JRU_M_KWET_RST(A_BRAKE_EMERGENCY_COMP(k, m))	5	
39	JRU_T_BRAKE_SERVICE(k)	12	
40	JRU_N_BRAKE_SECTIONS(k)	3	
41	JRU_V_BRAKE_SERVICE_COMP(k, m)	10	
42	JRU_A_BRAKE_SERVICE_COMP(k, m)	8	
43	JRU_M_LOADINGGAUGE	8	
44	JRU_N_AXLE	10	
45	JRU_M_AXLELOADCAT	7	
46	JRU_N_ITER	5	
47	JRU_M_VOLTAGE (k)	4	
48	JRU_NID_CTRACTION(k)	10	Only if M_VOLTAGE(k) ≠ 0.
49	JRU_N_ITER	5	
50	JRU_NID_NTC(k)	8	
51	JRU_M_AIRTIGHT	2	
52	Padding		

Packet 3: EMERGENCY BRAKE COMMAND STATE

This packet is used to record the emergency brake application order. This information will be stored, independently, whether the action has been either performed by the driver or triggered by the system.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	

2	JRU_L_PACKET	16	
3	JRU_M_BRAKE_COMMAND_STATE	1	
4	Padding bits	7	

Packet 4: SERVICE BRAKE COMMAND STATE

This packet shall record the service brake application order. This information will be stored, independently, whether the action has been either performed by the driver or triggered by the system.

Field No.	**VARIABLE/ PACKET**	**Length in bits**	**Remarks**
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_BRAKE_COMMAND_STATE	1	
4	Padding bits	7	

Packet 5: MESSAGE TO RADIO INFILL UNIT

This packet shall be sent after sending a message to an RIU.

Field No.	**VARIABLE/ PACKET**	**Length in bits**	**Remarks**
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_NID_C	10	
4	JRU_NID_RIU	14	
5	Radio infill bytes		The size of "Radio infill bytes" is variable

Packet 6: MESSAGE FROM BALISE

This packet shall be sent to the JRU after receiving a balise. The content of this packet is all message packets defined in Unisig documents.

Field No.	**VARIABLE/ PACKET**	**Length in bits**	**Remarks**
1	JRU_NID_PACKET	8	

2	JRU_L_PACKET	16	
3	Balises bytes		The size of "Balises bytes" is variable

Packet 7: MESSAGE FROM EUROLOOP

This packet shall be sent to the JRU after receiving a packet from an EUROLOOP unit.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	Euroloop bytes		The size of "euroloop bytes" is variable

Packet 8: MESSAGE FROM RADIO INFILL UNIT

This packet shall be sent to the JRU after receiving a message from a radio infill unit. The content of this packet is all message packets defined in Unisig document

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_NID_C	10	
4	JRU_NID_RIU	14	
5	Radio infill bytes		The size of "Radio infill bytes" is variable

Packet 9: MESSAGE FROM RBC

This packet shall be sent to the JRU after receiving a message from the RBC. The content of this packet is all message packets defined in Unisig document.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	

3	JRU_NID_C	10	
4	JRU_NID_RBC	14	
5	RBC bytes		The size of "RBC bytes" is variable

Packet 10: MESSAGE TO RBC

This This packet shall be sent to the JRU after sending a message to the RBC. The content of this packet is all message packets defined in Unisig document.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_ PACKET	16	
3	JRU_NID_C	10	
4	JRU_NID_RBC	14	
5	RBC bytes		The size of "RBC bytes" is variable

Packet 11: DRIVER'S ACTIONS

This packet shall be sent to the JRU when the driver acts on the on board system (MMI, TIU).

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_ PACKET	16	
3	JRU_M_DRIVERACTIONS	8	

Packet 12: BALISES GROUP ERROR

This packet contains the balise identity. The packet contains the variable: JRU_NID_LRBG. All kinds of balise group error can be recorded inside the JRU.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	

2	JRU_L_ PACKET	16	
3	JRU_NID_LRBG	10+14	
4	JRU_M_ERROR	8	

Packet 13: RADIO ERROR

This packet contains the identifier of the error triggered within a radio transmission. All kinds of radio error can be recorded inside the JRU.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_ PACKET	16	
3	JRU_NID_C	10	
4	JRU_NID_RBC	14	
5	JRU_M_ERROR	8	

Packet 14: STM INFORMATION

This packet contains all STM data that have to be recorded by the JRU.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_ PACKET	16	
3	NID_STMX	8	STM identification from general header STM
4	NID_STMEVENT	2	STM Event type
5	M_DISCENDER	1	If NID_STMEVENT = 0
6	M_DISCTYPE	1	If NID_STMEVENT = 0
7	M_DISCREASON	8	If NID_STMEVENT = 0
8	STM_SYSTEM_STATUS_MESSAGE	3	If NID_STMEVENT = 1
9	NID_STMPACKET	8	If NID_STMEVENT = 2 Packet identifier
10	L_STMPACKET	13	If NID_STMEVENT = 2

			Packet length
11	T_JRU	32	Time Stamp
12	N_L_ITER	8	Number of data bytes in message
13	M_DATA (k)	8	Information to JRU

Packet 15: INFORMATION FROM COLD MOVEMENT DETECTOR

This packet gives the information from the cold movement detector at the power-up.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_ M_COLD_MVT	2	
4	Padding	6	

Packet 16: START DISPLAYING FIXED TEXT MESSAGE

This packet shall record a fixed text message from the trackside that is currently being shown to the driver.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_Q_TEXT	8	

Packet 17: STOP DISPLAYING FIXED TEXT MESSAGE

This packet shall record fixed text message from the trackside that is not shown to the driver any more.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_Q_TEXT	8	

Packet 18: START DISPLAYING PLAIN TEXT MESSAGE

This packet shall record a plain text messages from the trackside that is currently being shown to the driver.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_L_TEXT	8	JRU_L_TEXT defines the number (L) of characters X
4	JRU_X_TEXT	L x 8	

Packet 19: STOP DISPLAYING PLAIN TEXT MESSAGE

This packet shall record a plain text messages from the trackside that is not shown to the driver any more.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_L_TEXT	8	JRU_L_TEXT defines the number (L) of characters X
4	JRU_X_TEXT	L x 8	

Packet 20: SPEED AND DISTANCE MONITORING INFORMATION

This packet shall record the Speed and Distance monitoring data displayed to the driver.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_SDMTYPE	2	
4	JRU_M_SDMSUPSTAT	3	
5	JRU_V_PERM	10	
6	JRU_V_FLOI	10	
7	JRU_V_TARGET	10	

8	JRU_D_TARGET	15	
9	JRU_V_RELEASE	10	
4	PADDING	4	

Packet 21: DMI SYMBOL STATUS

This packet shall record the status of the set of symbols that can be displayed on the DMI.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_DMI_SYMB_STATUS	86	
4	PADDING	2	

Packet 22: DMI SOUND STATUS

This packet shall record the status of the sounds that are used to draw the driver's attention from the outside to the display.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_DMI_SOUND_STATUS	3	
4	PADDING	5	

Packet 23: DMI SYSTEM STATUS MESSAGE

This packet shall record which system status messages are displayed to the driver.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	

3	JRU_SYSTEM_STATUS_MESSAGE	23	
4	PADDING	1	

Packet 24: ADDITIONAL DATA

This packet shall record the additional data.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_ADHESION	1	
4	JRU_NID_MN	24	
5	JRU_Q_RBCENTRY	2	
6	JRU_NID_C	10	Only if JRU_Q_RBCENTRY = 2
7	JRU_NID_RBC	14	Only if JRU_Q_RBCENTRY = 2
8	JRU_NID_RADIO	64	Only if JRU_Q_RBCENTRY = 2
9	JRU_NID_OPERATIONAL	32	

Packet 25: SR SPEED/DISTANCE ENTERED BY THE DRIVER

This packet shall record the change of the SR Speed or Distance entered by the driver.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_D_SR	17	
4	JRU_V_SR	10	
5	PADDING	5	

Packet 26: NTC SELECTED

This packet shall record the identity of the NTC when the selected level is NTC.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	NID_NTC	8	

Packet 27: SAFETY CRITICAL FAULT IN MODE SL, NL OR PS

This packet records the occurrence of a safety critical fault in mode SL, NL or PS.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	

Packet 28: VIRTUAL BALISE COVER SET BY THE DRIVER

This packet records the code entered by the driver to set a VBC.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_NID_VBCMK	6	
4	JRU_NID_C	10	
5	JRU_T_VBC	8	

Packet 29: VIRTUAL BALISE COVER REMOVED BY THE DRIVER

This packet records the code entered by the driver to remove a VBC

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_NID_C	10	
4	JRU_NID_VBCMK	6	

Packet 30: SLEEPING INPUT

This packet records the state of the sleeping input.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_SLEEPING	1	
4	PADDING	7	

Packet 31: PASSIVE SHUNTING INPUT

This packet records the state of the passing shunting input.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_PASSIVE_SHUNTING	1	
4	PADDING	7	

Packet 32: NON LEADING INPUT

This message records the state of the Non leading input.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_NON_LEADING	1	
4	PADDING	7	

Packet 33: REGENERATIVE BRAKE STATUS

This packet shall record the regenerative brake status.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_RB_STATUS	1	
4	PADDING	7	

Packet 34: MAGNETIC SHOE BRAKE STATUS

This packet shall record the magnetic shoe brake status .

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_MSB_STATUS	1	
4	PADDING	7	

Packet 35: EDDY CURRENT BRAKE STATUS

This packet shall record the eddy current brake status .

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_ECB_STATUS	1	
4	PADDING	7	

Packet 36: ELECTRO PNEUMATIC BRAKE STATUS

This packet shall record the electro pneumatic brake status.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	

3	JRU_M_EP_STATUS	1	
4	PADDING	7	

Packet 37: ADDITIONAL BRAKE STATUS

This packet shall record the additional brake status .

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_AB_STATUS	1	
4	PADDING	7	

Packet 38: CAB STATUS

This packet shall record the cab status that the ERTMS/ETCS on-board received from the train interface.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_CAB_A_STATUS	1	
4	JRU_Q_CAB_B	1	
5	JRU_M_CAB_B_STATUS	1	Only if JRU_Q_CAB_B = 1
6	JRU_Q_SINGLE_DESK	1	Only if JRU_Q_CAB_B = 0
7	JRU_M_ORIENTATION	1	ONLY if JRU_Q_SINGLE_DESK = 1
8	PADDING		

Packet 39: DIRECTION CONTROLLER POSITION

This packet shall record the direction controller position.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks

1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_DIRECTION_CONTROLLER	2	
4	PADDING	6	

Packet 40: TRACTION STATUS

This packet shall record the traction status.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_TRACTION_STATUS	1	
4	PADDING	7	

Packet 41: TYPE OF TRAIN DATA

This packet shall record the type of train data entry.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_TRAIN_DATA_ENTRY	2	
4	PADDING	6	

Packet 42: NATIONAL SYSTEM ISOLATION

This packet shall record that a National System, which is interfaced to the on-board through an STM, is isolated or not.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	

3	NID_NTC	8	
4	JRU_M_NATIONAL_SYSTEM_ISOLATION	1	
5	PADDING	7	

Packet 43: TRACTION CUT OFF COMMAND STATE

This packet shall record the traction cut off command state.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	JRU_M_TCO_COMMAND_STATE	1	
4	PADDING	7	

Packet 255: ETCS ON-BOARD PROPRIETARY JURIDICAL DATA

This packet shall record information that is specific to an ETCS on-board equipment.

Field No.	VARIABLE/ PACKET	Length in bits	Remarks
1	JRU_NID_PACKET	8	
2	JRU_L_PACKET	16	
3	Proprietary Data		

5. OPENETCS APPLICATION - TIU INTERFACE

5.1 COMPONENTS OF LANGUAGE

5.1.1 Introduction

The language is used in transmitting information between the OpenETCS application to the TIU.

The language is based on variables and packets.

5.1.2 Definition of Variables

Variables shall be used to encode single data values. Variables cannot be split in minor units. The whole variable has one type (meaning).

Variables may have special values that are related to the basic meaning of the variable.

Signed values shall be encoded as 2's complement.

One bit variables (Boolean) shall always use 0 for false and 1 for true.

Offsets for numerical values shall be avoided (0 shall be used for 0, 1 for 1, etc.) except where justified.

When transmitting over the transmission media, the most significant bit must be transmitted first.

All Variables have one of the following prefixes:

A_	Acceleration
D_	distance
G_	Gradient
L_	length
M_	Miscellaneous
N_	Number
NC_	class number
NID_	identity number
Q_	Qualifier
T_	time/date
V_	Speed
X_	Text

CCPU_	Data generated by Core CPU board
TIU_	Data generated by TIU board

5.1.3 Definition of Packets

Packets are multiple variables grouped into a single unit, with a defined internal structure.

This structure consists of a packet header with a unique packet number, the length of the packet in bits, optionally the distance scale and an information section containing a defined set of variables. The packet structure is as follows:

Number	NID_PACKET	Packet identifier
Length	L_PACKET	Number of bits in the packet
Scale	Q_SCALE	Specifies which distance scale is used for all distance information within the packet. There is no Q_SCALE variable in packets that do not contain distance information.
Information	.....	Well-defined set(s) of variables.

The packet definition does not change when transmitted over different transmission media.

All currently not defined packet identifiers are reserved for future use. All future packet definitions shall follow the above defined structure.

N_ITER specifies the number of iterations of a variable or group of variables that follow.

If N_ITER is 0 then no variables follow.

Two nested levels of iterations can exist.

Indented variables are optional, depending on the value of the previous qualifier variable in the packet.

5.2 PACKETS

5.2.1 List of Packets

5.2.1.1 TIU to OpenETCS application

Packet Number	Packet Name
0	Inputs from train devices
1	Plain text message
2	Fixed text message
3	brake models
4	*Not used*
5	*Not used*
6	Test and failure detection
7	STMs specific behavior
8	Specific from MVB
12	Diagnostic
13	Inhibition Level

5.2.1.2 OpenETCS application to TIU

Packet Number	Packet Name
0	Commands
1	Track conditions
2	Odometric data
3	Other information
4	Train type
5	Track condition change of traction power
6	Location reference update
7	Sporadic commands
8	STMs states
9	Train information
10	Doors control section
11	Track description deletion information
14	Gradients

5.2.2 PACKETS: TIU to OpenETCS application

Packet Number 0 : Inputs from train devices

Description	Gives the state of the train devices, received from the I/O board inputs, or from the optional CAN/train bus.		
Sent	Sporadically		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	V_TIU_EB_STATE_FILTERED	2	
	V_TIU_SB_STATE_FILTERED	2	
	V_TIU_TRACTION_CUT_OFF_STATE_FILTERED	2	
	V_TIU_ISOLATION_STATE_FILTERED	2	
	V_TIU_SLEEPING_STATE_FILTERED	2	
	V_TIU_TILTING_STATE_FILTERED	2	
	V_TIU_DIRCONT_STATE_FILTERED	3	
	V_TIU_DESKS_STATE_FILTERED	3	
	V_TIU_INTEGRITY_STATE_FILTERED	2	
	V_TIU_DRIVEREM_STATE_FILTERED	2	
	V_TIU_VIGIL_ACTION_STATE_FILTERED	2	
	V_TIU_VIGIL_DISABLE_STATE_FILTERED	2	
	V_TIU_COLD_MOVE_STATE_FILTERED	2	
	V_TIU_EB_STATE	2	
	V_TIU_SB_STATE	2	
	V_TIU_TRACTION_CUT_OFF_STATE	2	
	V_TIU_ISOLATION_STATE	2	
	V_TIU_SLEEPING_STATE	2	
	V_TIU_TILTING_STATE	2	
	V_TIU_DIRCONT_STATE	3	

V_TIU_DESKS_STATE	3	
V_TIU_INTEGRITY_STATE	2	
V_TIU_DRIVEREM_STATE	2	
V_TIU_VIGIL_ACTION_STATE	2	
V_TIU_VIGIL_DISABLE_STATE	2	
V_TIU_COLD_MOVE_STATE	2	
CIRCUIT_BREAKER_COHERENCY	3	
PANTOGRAPH_COHERENCY	3	
V_TIU_COMMANDING_EB	1	
V_TIU_COMMANDING_SB	1	
V_TIU_TRACTION_STATUS	3	

Packet Number 1 : Plain text message

Description	Plain text given by TIU, to be displayed on the MMI by the Core CPU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	TIU_Q_TEXTCLASS	2	
	TIU_Q_TEXTDISPLAY	1	
	TIU_L_TEXTDISPLAY	15	End condition
	TIU_T_TEXTDISPLAY	10	End condition
	TIU_Q_TEXTCONFIRM	2	
	TIU_L_TEXT	5	
	TIU_X_TEXT (TIU_L_TEXT)	8	

Packet Number 2 : Fixed text message

Description	Fixed text given by TIU, to be displayed on the MMI by the Core CPU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	TIU_Q_TEXTCLASS	2	
	TIU_Q_TEXTDISPLAY	1	
	TIU_L_TEXTDISPLAY	15	End condition
	TIU_T_TEXTDISPLAY	10	End condition
	TIU_Q_TEXTCONFIRM	2	
	TIU_Q_TEXT	8	

Packet Number 3 : Brake models

Description	Model of the emergency brake, traction, and service brake (if present), to be used by the Core CPU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	TIU_MODEL_BEGIN_BRAKE	8	Part of EB model
	TIU_MODEL_FULL_BRAKE	11	Part of EB model
	N_ITER	5	Part of EB model In this case range=0..5
	TIU_MODEL_SPEED(k)	8	Part of EB model
	TIU_MODEL_DECELER(k)	8	Part of EB model
	TIU_CUT_TRACT_DELAY	8	Part of traction model
	TIU_TRAIN_MAX_ACC	10	Part of traction model
	TIU_ACC_COEF_SB_UNUSED	7	Part of traction model
	TIU_ACC_COEF_SB_USED	7	Part of traction model
	Q_SB_MODEL_PRESENT	1	Part of SB model
	TIU_MODEL_BEGIN_BRAKE	8	Part of SB model

TIU_MODEL_FULL_BRAKE	11	Part of SB model
N_ITER	5	Part of SB model In this case range=0..5
TIU_MODEL_SPEED(k)	8	Part of SB model
TIU_MODEL_DECELER(k)	8	Part of SB model
TIU_MIN_ROT_MASS_PERCENT	8	Part of rot mass model
TIU_NOM_ROT_MASS_PERCENT	8	Part of rot mass model
TIU_MAX_ROT_MASS_PERCENT	8	Part of rot mass model
TIU_T_W	13	Part of driver delay
TIU_T_P	13	Part of driver delay
TIU_T_I_P	13	Part of driver delay
TIU_T_RSMA	13	Part of driver delay

Packet Number 6 : Test and failure detection

Description	Result of EB tests on demand and safety failure detection		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	TIU_EB_TESTS_ON_DEMAND_RESULT	3	
	TIU_SAFETYFAIL_DETECT	2	

Packet Number 7 : STMs specific behavior

Description	List of STMs identified by the TIU as "having an inappropriate behavior" or "having a specific behavior after an inappropriate behavior"		
Sent	Sporadically		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	N_ITER	5	

	NID_STM	8	
	NID_STMSPECIFICSTATE	3	

Packet Number 8 : Specific_from_MVB

Description	"non discrete" info coming from MVB and to be sent to the Core CPU		
Sent	At each computer cycle		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SET_TARGET_SPEED	1	
	SET_TARGET_SPEED	16	if Q_SET_TARGET_SPEED = 1

Packet Number 12: Diagnostic

Description	The packet gives reason information about diagnostic : emergency and service braking.		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	N_ITER_EVENT	5	
	TIU_MAINTENANCE_EVENT_ID	8	

Packet Number 13: Inhibition Level

Description	The packet gives the command of inhibition of level.		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	N_ITER	5	
	CCPU_LEVEL(k)	3	
	NID_NTC(k) (if CCPU_LEVEL = NTC)	8	
	LEVEL_CHANGE_ORIGIN(k)	2	

5.2.3 PACKETS: OpenETCS application to TIU

Packet Number 0 : Cyclic Commands

Description	Any command given by the Core CPU		
Sent	At each computer cycle		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	CCPU_EB_COMMAND	1	
	CCPU_SB_COMMAND	2	
	CCPU_TRACTION_CUT_OFF	1	
	CCPU_VIGIL_DISABLE_ORDER	1	

Packet Number 1: Track Conditions

Description	The packet gives details concerning the track ahead to support the driver when e.g. lower pantograph		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C	10	
	CCPU_NID_BG	14	
	Q_LINK	1	
	Q_TRACKINIT	1	
	D_TRACKINIT	16	Only if Q_TRACKINIT = 1
	D_TRACKCOND	16	Only if Q_TRACKINIT = 0
	L_TRACKCOND	16	Only if Q_TRACKINIT = 0
	M_TRACKCOND	4	Only if Q_TRACKINIT = 0
	N_ITER	5	Only if Q_TRACKINIT = 0
	D_TRACKCOND(k)	15	
	L_TRACKCOND(k)	16	
	M_TRACKCOND(k)	4	

Packet Number 2 : Odometric data

Description	Periodic transmission of odometric data		
Sent	At each computer cycle		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_LOCATION_PRESENT	1	
	Q_SCALE	2	present only if Q_LOCATION_PRESENT = 1
	CCPU_NID_C	10	idem
	CCPU_NID_BG	14	idem

	CCPU_L_MAX_SAFE_FRONT_END	16	idem
	CCPU_L_MIN_SAFE_FRONT_END	16	idem
	CCPU_L_ESTIMATED_FRONT_END	16	idem
	CCPU_L_MIN_SAFE_REAR_END	16	idem
	CCPU_NO_MOTION	2	
	CCPU_TRAIN_MOVEMENT	2	
	CCPU_V_TRAIN_NOMINAL	15	
	CCPU_A_TRAIN_NOMINAL	11	
	CCPU_D_TRAIN_NOMINAL	32	

Packet Number 3 : Other information

Description	Other information required by the TIU from the Core CPU		
Sent	At each computer cycle		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	CCPU_MODE	4	
	CCPU_LEVEL	3	
	NID_NTC	8	If CCPU_LEVEL = NTC

Packet Number 4 : Train type

Description	Information used by the TIU smart board, to select appropriate models to be sent to the Core CPU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	CCPU_DECELERATION_CLASS_ID	8	
	CCPU_BRAKE_DELAY_CLASS_ID	8	

Packet Number 5: Track Condition Change of traction power

Description	The packet gives information about change of the traction power system.		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C	10	
	CCPU_NID_BG	14	
	Q_LINK	1	
	Q_TRACKINIT	1	
	D_TRACKINIT	16	Only if Q_TRACKINIT = 1
	D_TRACTION_MAX	16	Only if Q_TRACKINIT = 0 Related to max safe front end
	D_TRACTION_MIN	16	Only if Q_TRACKINIT = 0 Related to min safe rear end
	M_VOLTAGE	4	Type of traction, only if Q_TRACKINIT = 0.
	NID_CTRACTION	10	Only if M_VOLTAGE <> 0

Packet Number 6: Location reference update

Description	The packet gives information about the new reference location balise group to be used by the TIU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C_OLD	10	
	CCPU_NID_BG_OLD	14	

	CCPU_NID_C_NEW	10	
	CCPU_NID_BG_NEW	14	
	CCPU_D_OLD_TO_NEW_LINKED_ESTI	16	
	CCPU_D_OLD_TO_NEW_LINKED_MIN	16	
	CCPU_D_OLD_TO_NEW_LINKED_MAX	16	
	CCPU_D_OLD_TO_NEW_NOT_LINKED_ESTI	16	
	CCPU_D_OLD_TO_NEW_NOT_LINKED_MIN	16	
	CCPU_D_OLD_TO_NEW_NOT_LINKED_MAX	16	

Packet Number 7 : Sporadic commands

Description	Any sporadic command given by the Core CPU		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	CCPU_START_EB_TESTS_ON_DEMAND	2	
	CCPU_VIGIL_RESET_ORDER	1	
	CCPU_SB_MONITORING_STATE	1	

Packet Number 8 : STMs states

Description	States of STMs given by the Core CPU		
Sent	Sporadically		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	N_ITER	5	
	NID_STM	8	
	NID_STMSTATE	4	

	NID_STMSTATEORDER	4	

Packet Number 9 : Train information

Description	Other information required by the TIU from the Core CPU		
Sent	Sporadically		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	CCPU_CORE_INHIBITION	1	
	CCPU_NID_OPERATIONAL	32	
	CCPU_RUNNING_DIRECTION_CHANGE_FOR_DATA	1	
	CCPU_TRAIN_LENGTH	12	

Packet Number 10 : Doors control section

Description	Information required by the TIU from the Core CPU to manage a doors control section		
Sent	Sporadically		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C	10	
	CCPU_NID_BG	14	
	Q_LINK	1	
	D_DOORS_SECTION_START	16	
	D_DOORS_SECTION_END	16	
	CCPU_M_SIDE_DOOR	2	

Packet Number 11: Track description deletion information

Description	The packet gives deletion information about track description.		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C	10	
	CCPU_NID_BG	14	
	TRACK_DESC_DELETION_LOCATION_ESTI	16	not used by the TIU
	TRACK_DESC_DELETION_LOCATION_MIN	16	
	TRACK_DESC_DELETION_LOCATION_MAX	16	not used by the TIU

Packet Number 14: Gradients information

Description	The packet gives gradient information about track description.		
Sent	Sporadically (sending triggered by event)		
Content	**Variable**	**Length**	**Comment**
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	CCPU_NID_C	10	
	CCPU_NID_BG	14	
	N_GRADIENTS	6	
	D_GRADIENT(k)	16	
	G_GRADIENT(k)	9	

5.3 VARIABLES

5.3.1 List of Variables

1. CCPU_A_TRAIN_NOMINAL

Name	Nominal train acceleration		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
11 bits	-10.24 [m/s²]	10.23 [m/s²]	0.01
Special/Reserved Values			

2. CCPU_BRAKE_DELAY_CLASS_ID

Name	brake delay class ID		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	1
Special/Reserved Values			

3. CCPU_CORE_INHIBITION

Name	Core signal to inhibit pantograph optimization in powerless section and change of traction power		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	Do_not_inhibit	
	1	Inhibit	

4. CCPU_D_OLD_TO_NEW_LINKED_ESTI

Name	/		
Description	Estimated distance between the old (the previous) reference balise group and the new reference balise group with information linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

5. CCPU_D_OLD_TO_NEW_LINKED_MAX

Name	/		
Description	Maximum distance maximum between the old (the previous) reference balise group and the new reference balise group with information linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

6. CCPU_D_OLD_TO_NEW_LINKED_MIN

Name	/

Description	Minimum distance between the old (the previous) reference balise group and the new reference balise group with information linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

7. CCPU_D_OLD_TO_NEW_NOT_LINKED_ESTI

Name	/		
Description	Estimated distance between the old (the previous) reference balise group and the new reference balise group with information not linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

8. CCPU_D_OLD_TO_NEW_NOT_LINKED_MAX

Name	/		
Description	Maximum distance between the old (the previous) reference balise group and the new reference balise group with information not linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

9. CCPU_D_OLD_TO_NEW_NOT_LINKED_MIN

Name	/		
Description	Minimum distance between the old (the previous) reference balise group and the new reference balise group with information not linked to the balise		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

10. CCPU_D_TRAIN_NOMINAL

Name	/		
Description	Absolute distance moved		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
32 bits	-15 000 000.00 m	15 000 000.00 m	0.01 m
Special/Reserved Values			

11. CCPU_DECELERATION_CLASS_ID

Name	deceleration class ID		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

8 bits	0	255	1
Special/Reserved Values			

12. CCPU_EB_COMMAND

Name	Emergency brake command		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	Do_no_apply_EB	
	1	Apply_EB	

13. CCPU_L_ESTIMATED_FRONT_END

Name	Absolute location of the estimated front end of the train		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

14. CCPU_L_MAX_SAFE_FRONT_END

Name	Absolute location of the maximum safe front end of the train		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

15. CCPU_L_MIN_SAFE_FRONT_END

Name	Absolute location of the minimum safe front end of the train		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

16. CCPU_L_MIN_SAFE_REAR_END

Name	Absolute location of the minimum safe rear end of the train		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327680 m	327 670 m	10cm, 1m or 10m, depending on Q_SCALE

17. CCPU_LEVEL

Name	Current Operating Level
Description	

Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	Level 0	
	1	Level NTC specified by NID_NTC	
	2	Level 1	
	3	Level 2	
	4	Level 3	
	5-7	Spare	

18. CCPU_M_SIDE_DOOR

Name	Side(s) authorized to be opened inside the allowed area		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Door side to open : left	
	1	Door side to open : right	
	2	Door side to open : both	
	3	Spare	

19. CCPU_M_TRACTION

Name	Type of traction		
Description	See subset 026, chapter 7, variable M_TRACTION		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	1
Special/Reserved Values			

20. CCPU_MODE

Name	Generic Onboard operating mode		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
4 bits			
Special/Reserved Values	0	Full Supervision	
	1	On Sight	
	2	Staff Responsible	
	3	Shunting	
	4	Unfitted	
	5	Sleeping	

6	Stand By
7	Trip
8	Post Trip
9	System Failure
10	Isolation
11	Non Leading
12	Limited_Supervision
13	STM National
14	Reversing
15	Passive Shunting

21. CCPU_NID_BG

Name	Identity number of the balise group used as reference for the related distances/locations		
Description	Identity number of a balise group or loop within the country or region defined by NID_C.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
14 bits	0	16382	1
Special/Reserved Values	/	/	

22. CCPU_NID_BG_NEW

Name	Identity number of the new balise group to use as reference for the related distances/locations		
Description	Identity number of a balise group or loop within the country or region defined by NID_C.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
14 bits	0	16382	1
Special/Reserved Values	/	/	

23. CCPU_NID_BG_OLD

Name	Identity number of the current (old) balise group used as reference for the related distances/locations		
Description	Identity number of a balise group or loop within the country or region defined by NID_C.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
14 bits	0	16382	1
Special/Reserved Values	/	/	

24. CCPU_NID_C

Name	Identity number of the country or region where is located the reference balise group		
Description	Code used to identify the country or region in which the balise group is situated. These need not necessarily follow administrative or political boundaries.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
10 bits	0	1023	1

Special/Reserved Values			

25. CCPU_NID_C_NEW

Name	Identity number of the country or region where is located the new reference balise group		
Description	Code used to identify the country or region in which the balise group is situated. These need not necessarily follow administrative or political boundaries.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
10 bits	0	1023	1
Special/Reserved Values			

26. CCPU_NID_C_OLD

Name	Identity number of the country or region where is located the current (old) reference balise group		
Description	Code used to identify the country or region in which the balise group is situated. These need not necessarily follow administrative or political boundaries.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
10 bits	0	1023	1
Special/Reserved Values			

27. CCPU_NID_OPERATIONAL

Name	Train Running Number		
Description	See subset 026, chapter 7, variable NID_OPERATIONAL		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
32 bits	0	9999 9999	Binary Coded Decimal

28. CCPU_NO_MOTION

Name	Movement state of train		
Description	Indicates if a movement of the train is detected or if a no mortion state can be considered.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Motion	
	1	No Motion	
	2	Unknown	
	3	Spare	

29. CCPU_RUNNING_DIRECTION_CHANGE_FOR_DATA

Name	Running direction change for data		
Description	That flag indicates if a modification of orientation has to be taken into account for the data supervision.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			

Special/Reserved Values	0	no running direction change for data supervision
	1	a running direction change occurred at this cycle for data supervision

30. CCPU_SB_COMMAND

Name	Service brake command		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Do_no_apply_SB	
	1	Apply_SB	
	2	Apply_SB_not_protected	
	3	spare	

31. CCPU_SB_MONITORING_STATE

Name	State of SB monitoring by CORE		
Description	Result of SB monitoring by CORE		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	NOT_RELEVANT (no monitoring running or running in order)	
	1	FAILED (monitoring running and failed)	

32. CCPU_START_EB_TESTS_ON_DEMAND

Name	EB tests on demand start		
Description	Triggers the EB tests on demand		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	NO_TEST : do not start brake tests (but do not stop them if already started)	
	1	start EB tests	
	2	start SB tests	
	3	spare	

33. CCPU_TRACTION_CUT_OFF

Name	Cut off traction command		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	False (=Release traction cut off command)	
	1	True (=Cut off traction)	

34. CCPU_TRAIN_LENGTH

Name	Train length deduced from validated train data. The train length takes the value "Unknown" if the train data are not validated or not correct.		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
12 bits	0	4094 [m]	1
Special/Reserved Values	4095	Unknown	

35. CCPU_TRAIN_MOVEMENT

Name	Direction of train movement in relation to the LRBG orientation		
Description	Indicates the running direction of the train, with respect to the active cab		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Backward	
	1	Forward	
	2	Unknown	
	3	Spare	

36. CCPU_V_TRAIN_NOMINAL

Name	Nominal train speed		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
15 bits	0	327.67 [m/s]	0.01
Special/Reserved Values			

37. CCPU_VIGIL_DISABLE_ORDER

Name	Order to disable the external driver vigilance device		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	False (do not disable the device)	
	1	True (disable the device)	

38. CCPU_VIGIL_RESET_ORDER

Name	Order to reset the external driver vigilance device		
Description	When the driver touches the MMI, this can be considered as a vigilance action by the external driver vigilance device		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

1 bit			
Special/Reserved Values	0	False (do not reset)	
	1	True (reset)	

39. CIRCUIT_BREAKER_COHERENCY

Name	State of the circuit breaker device		
Description	Information from the sensor of the circuit breaker state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	CIRCUIT_BREAKER_CLOSED_OK	
	1	CIRCUIT_BREAKER_CLOSED_NOT_OK	
	2	CIRCUIT_BREAKER_OPEN_OK	
	3	CIRCUIT_BREAKER_OPEN_NOT_OK	
	4	FAIL_STATE	
	5	INFORMATION_NOT_AVAILABLE	

40. D_DOORS_SECTION_END

Name	Distance to the end location of the doors control section		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

41. D_DOORS_SECTION_START

Name	Distance to the start location of the doors control section		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

42. D_GRADIENTS

Name	Distance to the start location of next gradient		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

43. D_TRACKCOND

Name	Track condition distance		
Description	The incremental distance to where the track conditions change.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

44. D_TRACKINIT

Name	Distance to start of empty profile		
Description	Distance to where initial states of the related track description in the packet shall be resumed		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

45. G_GRADIENTS

Name	Value of gradient of the given gradient segment		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
9 bits	-254	254	0.1 %

46. TRACK_DESC_DELETION_LOCATION_ESTI

Name	Estimated distance to whom every track descriptions shall be truncated		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

47. TRACK_DESC_DELETION_LOCATION_MAX

Name	Maximum distance to whom every track descriptions shall be truncated		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

48. TRACK_DESC_DELETION_LOCATION_MIN

Name	Minimum distance to whom every track descriptions shall be truncated		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

49. D_TRACTION_MAX

Name	Distance to the start location of the track condition change of traction power		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

50. D_TRACTION_MIN

Name	Distance to the end location of the track condition change of traction power		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

51. LEVEL_CHANGE_ORIGIN

Name	**Level change origin**		
Description	Indicate the origin to which the level is inhibitid for		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits	0	2	0 = FOR_DRIVER 1 = FOR_TRACKSIDE 2 = FOR_DRIVER_AND_TRACKSIDE 3 = SPARE

52. L_PACKET

Name	Packet **length**		
Description	L_PACKET indicates the **length** of the packet in bits, including all bits of the packet header		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
13	0	8191	1 bit
Special/Reserved Values			

53. L_TRACKCOND

Name	**Length** for which the defined track condition is valid		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

54. M_TRACKCOND

Name	Type of track condition		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
4 bits			
Special/Reserved Values	0000	Non stopping area. Initial state: stopping permitted	
	0001	Tunnel stopping area. Initial state: no tunnel stopping area	
	0010	Sound horn. Initial state: no request for sound horn	
	0011	Powerless section – lower pantograph. Initial state: not powerless section	
	0100	Radio hole (stop supervising T_NVCONTACT). Initial state: supervise T_NVCONTACT	
	0101	Air tightness. Initial state: no request for air tightness	

	0110	Switch off regenerative brake. Initial state: regenerative brake on
	0111	Switch off eddy current brake for service brake. Initial state: eddy current brake for service brake on
	1000	Switch off magnetic shoe brake. Initial state: magnetic shoe brake on
	1001	Powerless section – switch off the main power switch. Initial state: not powerless section
	1010	Switch off eddy current brake for emergency brake. Initial state: eddy current brake for emergency brake on
	1011 –1111	Spare

55. M_TRACTION

Name	Traction System Type		
Description	It defines the traction system to be used on a specific line (diesel/electric/kind of power pickup etc.)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits			

56. N_GRADIENTS

Name	Number of iterations of a data set following this variable in a packet		
Description	If N_GRADIENTS is 0 then no data set is following.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
6 bits	0	50	integers

57. N_ITER

Name	Number of iterations of a data set following this variable in a packet		
Description	If N_ITER is 0 then no data set is following. Two nested levels of iterations can exist.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
5 bits	0	31	integers

58. N_ITER_EVENT

Name	Number of iterations of a data set following this variable in a packet		
Description	If N_ITER_EVENT is 0 then no data set is following. Two nested levels of iterations can exist.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
5 bits	0	31	integers

59. NID_NTC

Name	STM identity		
Description	One value of this variable represents the identity of an NTC reflecting each composition of national infrastructure.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	Numbers

60. NID_PACKET

Name	Packet identifier		
Description	This is used in the header for each packet, allowing the receiving equipment to identify the data that follows.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	Numbers

61. NID_STM

Name	STM identity		
Description	One value of this variable represents the identity of an STM equipment designed for operation on national infrastructures.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	Numbers

62. NID_STMSPECIFICSTATE

Name	Current specific behavior of a given STM.		
Description	Indicates a specific state of a STM (disconnected, temporary disconnected, again connected after temporary disconnection, STM not in correct mode)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	CONNECTED (after versions validation)	
	1	DISCONNECTED (at TIU request if no validation of the versions included in STM packet 1 or at STM request)	
	2	TEMPORARY_DISCONNECTED	
	3	CONNECTED_AGAIN (end of temporary disconnection)	
	4	FAILURE_REQUESTED (STM not in correct state, packet 15 lack,...)	
	5-7	Spare	

63.NID_STMSTATE

Name	Actual STM state		
Description	Tell the STM state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
4 bits			
Special/Reserved Values	0	NO_ORDER	
	1	Reserved (mapped to PO for consistency)	
	2	Configuration (CO)	
	3	Data Entry (DE)	
	4	Unconditional Cold Standby (U-CS)	
	5	Conditional Cold Standby (C-CS)	

	6	Hot Standby (HS)
	7	Data Available (DA)
	8	Failure (FA)
	9	Data Available_For_Test (DA_FOR_TEST)
	10	*Spare value*
	11	*Spare value*
	12	*Spare value*
	13	*Spare value*
	14	*Spare value*
	15	*Spare value*

64. NID_STMSTATEORDER

Name	STM state order		
Description	Tell the STM state ordered by the ERTMS/ETCS on-board		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
4 bits			
Special/Reserved Values	0	NO_ORDER	
	1	Reserved (mapped to PO for consistency)	
	2	Configuration (CO)	
	3	Data Entry (DE)	
	4	Unconditional Cold Standby (U-CS)	
	5	Conditional Cold Standby (C-CS)	
	6	Hot Standby (HS)	
	7	Data Available (DA)	
	8	Failure (FA)	
	9	Data Available_For_Test (DA_FOR_TEST)	
	10	*Spare value*	
	11	*Spare value*	
	12	*Spare value*	
	13	*Spare value*	
	14	*Spare value*	
	15	*Spare value*	

65. PANTOGRAPH_COHERENCY

Name	Coherency of the pantograph state according to currently expected state		
Description	Information computed only when pantograph is inside the track condition.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

3 bits			
Special/Reserved Values	0	PANTO_UP_OK	
	1	PANTO_UP_NOT_OK	
	2	PANTO_DOWN_OK	
	3	PANTO_DOWN_NOT_OK	
	4	INFO_NOT_AVAILABLE	

66. Q_LINK

Name	/		
Description	Qualifier indicating if the track conditions defined in the packet 1 or 5 are linked to the balise or not		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	not linked	
	1	linked	

67. Q_LOCATION_PRESENT

Name	/		
Description	Qualifier indicating if train location information is present in the packet or not		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	not present	
	1	present	

68. Q_SB_MODEL_PRESENT

Name	/		
Description	Qualifier for indicate if a SB model has been found or not		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	Model is not found	
	1	Model is found	

69. Q_SCALE

Name	Qualifier for the distance scale.		
Description	Qualifier to indicate the scale used for describing all distances inside the packet that contains Q_SCALE. Exception is made for variable CCPU_LRBG_ABSOLUTE_LOC that is always in [m]		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	10 cm scale	

	1	1 m scale
	2	10 m scale
	3	Spare

70. Q_SET_TARGET_SPEED

Name	Qualifier for presence of set target speed		
Description	Qualifier to tell if the packet contains the variable SET_TARGET_SPEED or not		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	variable SET_TARGET_SPEED is NOT present in the packet	
	1	variable SET_TARGET_SPEED is present in the packet	

71. Q_TRACKINIT

Name	Qualifier for resuming the initial states of the related track description of the packet.		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	No initial states to be resumed, profile to follow	
	1	Empty profile, initial states to be resumed	

72. SET_TARGET_SPEED

Name	set target speed		
Description	speed which is set by the driver (on an external cruise control system)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
16 bits	0 km/h	600 km/h	1 km/h
Special/Reserved Values	601- 2^16 - 1	spare	

73. TIU_ACC_COEF_SB_UNUSED

Name	Acceleration coefficient when the service brake is not present or not available.		
Description	Ponderation coefficient to be applied on maximum train acceleration when the service brake is not available.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
7 bits	0	1,00	0,01
Special/Reserved Values	1,01 to 1,27	Spare values, non significant.	

74. TIU_ACC_COEF_SB_USED

Name	Acceleration coefficient when the service brake is available.		
Description	Ponderation coefficient to be applied on maximum train acceleration acceleration when the service brake is available..		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

7 bits	0	1,00	0,01
Special/Reserved Values	1,01 to 1,27	Spare values, non significant.	

75. TIU_CUT_TRACT_DELAY

Name	Delay to cut off traction		
Description	Delay between the ordering of traction cut off and the effective cut off of the traction		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 s	25,5 s	0,1 s
Special/Reserved Values			

76. TIU_EB_TESTS_ON_DEMAND_RESULT

Name	EB tests on demand result		
Description	/		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	EB tests on demand not OK on both EV (fatal error(s) has been detected during EB tests on demand)	
	1	EB tests on demand not OK on EV1 (fatal error(s) has been detected during EB tests on demand)	
	2	EB tests on demand not OK on EV2 (fatal error(s) has been detected during EB tests on demand)	
	3	EB tests on demand OK	
	4	EB tests on demand aborted	
	5	Irrelevant	
	6	Reserved	
	7	Reserved	

77. TIU_L_TEXT

Name	**Length** of text string		
Description	L_TEXT defines the **length** of a text string (L_TEXT * X_TEXT)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
5 bits	0	31	1 Text String Element

78. TIU_L_TEXTDISPLAY

Name	**Length** on which a text shall be displayed		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	The display of the text shall not be distance limited.	

79. TIU_MAINTENANCE_EVENT_ID

Name	Current specific reason of an emergency or service braking.		
Description	Indicates a list of specific reason of a present braking		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	
Special/Reserved Values	0	Bowl EB Request	
	1	Reception_from_STM_Command_SB_Request	
	2	Reception_from_STM_Command_EB_Request	
	3	Bad Pneumatic Insertion_EB_Request	
	4	Protect_SB_by_EB_Request	
	5	EB_Failure_EB_Request	
	6	Use of Failed Port_SB_Request	
	7	Use of Failed Port_EB_Request (reserved)	
	8	Error Hamming on port_SB_Request	
	9	Error Hamming on port_EB_Request (reserved)	
	10	Monitoring result needs_SB_Request	
	11	Monitoring result needs_EB_Request	
	12 – 255	Spare	

80. TIU_MAX_ROT_MASS_PERCENT

Name	maximum rotating mass percentage		
Description	maximum rotating mass of the train, expressed as a percentage of the total weight of the train		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 %	25,5 %	0,1 %
Special/Reserved Values	/	/	

81. TIU_MIN_ROT_MASS_PERCENT

Name	minimum rotating mass percentage		
Description	minimum rotating mass of the train, expressed as a percentage of the total weight of the train		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 %	25,5 %	0,1 %
Special/Reserved Values	/	/	

82. TIU_MODEL_BEGIN_BRAKE

Name	Delay for beginning of application of brake		
Description	Delay between ordering a brake application, and when brake begins to be applied (more than 0%)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 s	25,5 s	0,1 s

Special/Reserved Values	/	/

83. TIU_MODEL_DECELER

Name	Brake model deceleration point		
Description	Coordinate on the Y axis (=train deceleration) of a point of the deceleration model		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 m/s²	2,55 m/s²	0,01 m/s²
Special/Reserved Values			

84. TIU_MODEL_FULL_BRAKE

Name	Delay for full application of brake		
Description	Delay between when the braking effort begins (>0%) and when the full braking effort is reached (100%)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
11 bits	0 s	120,0 s	0,1 s
Special/Reserved Values	/	/	

85. TIU_MODEL_SPEED

Name	Brake model speed point		
Description	Coordinate on the X axis (=train speed) of a point of the deceleration model		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-255	spare	

86. TIU_NOM_ROT_MASS_PERCENT

Name	nominal rotating mass percentage		
Description	nominal rotating mass of the train, expressed as a percentage of the total weight of the train		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0 %	25,5 %	0,1 %
Special/Reserved Values	/	/	

87. TIU_Q_TEXT

Name	Fixed message to be displayed.		
Description	TIU_Q_TEXT is a pointer to select a fixed text message from the defined table. The language selected by the driver for the MMI shall be used additionally as a qualifier to choose the appropriate language table.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits	0	255	
Special/Reserved Values	1	Emergency brake command error	
	3	Pneumatic insertion error	
	4	Service brake command error	

	5	Service brake release error
	6	Traction cut off error
	105 … 135	IO1_MONITORING_ERROR … IO31_MONITORING_ERROR
	139	PANTO_ACTION_NOT_OK_FOR_TRACK_CONDITION
	140	CIRCUIT_BREAKER_ACTION_NOT_OK_FOR_TRACK_CONDITION
	141	TRACTION_CUT_OFF_ACTION_NOT_OK_FOR_TRACK_CONDITION

88. TIU_Q_TEXTCLASS

Name	Class of message to be displayed.		
Description	Q_TEXTCLASS specifies the class of the text message included in the same packet (either plain or fixed message)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	00	Auxiliary Information	
	01	Important Information	
	10	Spare	
	11	Spare	

89. TIU_Q_TEXTCONFIRM

Name	Qualifies the need / reaction of text confirmation		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	00	No confirmation required	
	01	Continue display until confirmed	
	10	Apply service brake if not confirmed when end conditions reached	
	11	Spare	

90. TIU_Q_TEXTDISPLAY

Name	Qualifier for the combination of text message conditions		
Description	Q_TEXTDISPLAY defines whether the start/end conditions for text message are to be combined or not		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	No, display as soon as / until one of the conditions is fulfilled	
	1	Yes, display as soon as / until all conditions are fulfilled	

91. TIU_SAFETYFAIL_DETECT

Name	Safety failure detected
Description	/

Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	False : no safety failure is detected	
	1	True : a safety failure(s) is(are) detected	
	2	Irrelevant : no diagnostic to be expected (diagnostic function is inhibited)	
	3	Spare	

92. TIU_T_I_P

Name	T_i_p		
Description	parameter used by the Core in the braking curve calculation		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
13 bits	0	600 s	0,1 s
Special/Reserved Values	/		

93. TIU_T_P

Name	T_p		
Description	parameter used by the Core in the braking curve calculation		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
13 bits	0	600 s	0,1 s
Special/Reserved Values	/		

94. TIU_T_RSMA

Name	T_rsma		
Description	parameter used by the Core in the braking curve calculation		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
13 bits	0	600 s	0,1 s
Special/Reserved Values	/		

95. TIU_T_TEXTDISPLAY

Name	Time until when a text shall be displayed		
Description			
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
10 bits	0	1022 s	1 s
Special/Reserved Values	1023	Display of text not limited by time.	

96. TIU_T_W

Name	T_w
Description	parameter used by the Core for the braking curve calculation

Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
13 bits	0	600 s	0,1 s
Special/Reserved Values	/	/	

97. TIU_TRAIN_MAX_ACC

Name	Maximum train acceleration		
Description	Maximum acceleration that the train is able to reach		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
10 bits	0 m/s²	10,23 m/s²	0,01 m/s²
Special/Reserved Values	/	/	

98. TIU_X_TEXT

Name	Text String Element		
Description	Text strings are used to transmit plain text messages. Each element of a text string contains a single character encoded as ISO 8859-1, also known as Latin Alphabet #1.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
8 bits			
Special/Reserved Values			

99. V_TIU_COLD_MOVE_STATE

Name	State of the cold movement		
Description	Information from the sensor of train movement used when the onboard is powered off		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	No movement	
	1	Detected movement	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

100. V_TIU_COLD_MOVE_STATE_FILTERED

Name	Filtered state of the cold movement		
Description	Information from the sensor of train movement used when the onboard is powered off		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	No movement	
	1	Detected movement	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

101. V_TIU_COMMANDING_EB

Name	.		
Description	TIU informs the Core that TIU is commanding EB		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	Do_no_apply_EB	
	1	Apply_EB	

102. V_TIU_COMMANDING_SB

Name			
Description	TIU informs the Core that TIU is commanding SB.		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
1 bit			
Special/Reserved Values	0	Do_no_apply_SB	
	1	Apply_SB	

103. V_TIU_DESKS_STATE

Name	Desks state		
Description	Information from the sensor of the desk(s) state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	Desk_A_open_only	
	1	Desk_B_open_only	
	2	Desk_A_and_desk_B_open	
	3	No_desk_open	
	4-5	Spare values	
	6	Fail_state (of the sensor)	
	7	Information_not_available	

104. V_TIU_DESKS_STATE_FILTERED

Name	Filtered desks state		
Description	Information from the sensor of the desk(s) state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	Desk_A_open_only	
	1	Desk_B_open_only	
	2	Desk_A_and_desk_B_open	

	3	No_desk_open
	4-5	Spare values
	6	Fail_state (of the sensor)
	7	Information_not_available

105. V_TIU_DIRCONT_STATE

Name	Direction controller state		
Description	Information from the sensor of the direction controller state of the active cab		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	Neutral	
	1	Forward	
	2	Backward	
	3-5	Spare values	
	6	Fail_state (of the sensor)	
	7	Information_not available	

106. V_TIU_DIRCONT_STATE_FILTERED

Name	Filtered direction controller state		
Description	Information from the sensor of the direction controller state of the active cab		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	Neutral	
	1	Forward	
	2	Backward	
	3-5	Spare values	
	6	Fail_state (of the sensor)	
	7	Information_not available	

107. V_TIU_DRIVEREM_STATE

Name	State of the driver emergency		
Description	Information from the sensor of the driver emergency (=emergency button)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	00	Emergency_button_pushed	
	01	Emergency_button_released	
	10	Fail_state (of the emergency button)	

	11	Information_not_available

108. V_TIU_DRIVEREM_STATE_FILTERED

Name	Filtered state of the driver emergency		
Description	Information from the sensor of the driver emergency (=emergency button)		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	00	Emergency_button_pushed	
	01	Emergency_button_released	
	10	Fail_state (of the emergency button)	
	11	Information_not_available	

109. V_TIU_EB_STATE

Name	State of the emergency brake		
Description	Information from the sensor of the emergency brake state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	EB_not_applied	
	1	EB_applied	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

110. V_TIU_EB_STATE_FILTERED

Name	Filtered state of the emergency brake		
Description	Information from the sensor of the emergency brake state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	EB_not_applied	
	1	EB_applied	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

111. V_TIU_INTEGRITY_STATE

Name	State of the train integrity		
Description	Information from the sensor of the train integrity state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Train_integrity_not_OK	

	1	Train_integrity_OK
	2	Fail_state (of the sensor)
	3	Information_not_available

112. V_TIU_INTEGRITY_STATE_FILTERED

Name	Filtered state of the train integrity		
Description	Information from the sensor of the train integrity state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Train_integrity_not_OK	
	1	Train_integrity_OK	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

113. V_TIU_ISOLATION_STATE

Name	State of isolation switch		
Description	Information from the sensor of the isolation switch state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Isolated	
	1	Not_Isolated	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

114. V_TIU_ISOLATION_STATE_FILTERED

Name	Filtered state of isolation switch		
Description	Information from the sensor of the isolation switch state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Isolated	
	1	Not_Isolated	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

115. V_TIU_SB_STATE

Name	State of the service brake		
Description	Information from the sensor of the service brake state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***

2 bits			
Special/Reserved Values	0	SB_not_applied	
	1	SB_applied	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

116. V_TIU_SB_STATE_FILTERED

Name	Filtered state of the service brake		
Description	Information from the sensor of the service brake state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	SB_not_applied	
	1	SB_applied	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

117. V_TIU_SLEEPING_STATE

Name	State of the remote control connection		
Description	Information from the sensor of the remote control connection		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Go_to_sleeping	
	1	Do_not_go_to_sleeping	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

118. V_TIU_SLEEPING_STATE_FILTERED

Name	Filtered state of the remote control connection		
Description	Information from the sensor of the remote control connection		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Go_to_sleeping	
	1	Do_not_go_to_sleeping	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

119. V_TIU_TILTING_STATE

Name	State of the tilting device

Description	Information from the sensor of the tilting device state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Tilting_system_is_active	
	1	Tilting_system_is_passive	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

120. V_TIU_TILTING_STATE_FILTERED

Name	Filtered state of the tilting device		
Description	Information from the sensor of the tilting device state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Tilting_system_is_acitve	
	1	Tilting_system_is_passive	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

121. V_TIU_TRACTION_CUT_OFF_STATE

Name	State of the traction cut off		
Description	Information from the sensor of the traction cut off state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Traction cut off is disabled	
	1	Traction cut off is enabled	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

122. V_TIU_TRACTION_CUT_OFF_STATE_FILTERED

Name	Filtered state of the traction cut off		
Description	Information from the sensor of the traction cut off state		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Traction cut off is disabled	
	1	Traction cut off is enabled	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

123. V_TIU_TRACTION_STATUS

Name	Traction status calculated by TIU ASW		
Description	Information deduced from traction and/or braking type		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
3 bits			
Special/Reserved Values	0	null	
	1	positive	
	2	negative	
	3	not_null	
	4	Fail_state	
	5	Information_not_available	
	6-7	Spare	

124. V_TIU_VIGIL_ACTION_STATE

Name	State of the driver vigilance		
Description	Information from the sensor of the driver vigilance		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Driver_reaction	
	1	No_driver_reaction	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

125. V_TIU_VIGIL_ACTION_STATE_FILTERED

Name	Filtered state of the driver vigilance		
Description	Information from the sensor of the driver vigilance		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	Driver_reaction	
	1	No_driver_reaction	
	2	Fail_state (of the sensor)	
	3	Information_not_available	

126. V_TIU_VIGIL_DISABLE_STATE

Name	State of the external vigilance system		
Description	Information from the sensor of the driver vigilance		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			

Special/Reserved Values	0	External vigilance system active
	1	External vigilance system not active
	2	Fail_state (of the sensor)
	3	Information_not_available

127. V_TIU_VIGIL_DISABLE_STATE_FILTERED

Name	Filtered state of the external vigilance system		
Description	Information from the sensor of the driver vigilance		
Length of variable	***Minimum Value***	***Maximum Value***	***Resolution/formula***
2 bits			
Special/Reserved Values	0	External vigilance system active	
	1	External vigilance system not active	
	2	Fail_state (of the sensor)	
	3	Information_not_available	