

# OCORA

Open CCS On-board Reference Architecture

## Addendum to SUBSET-119

ETCS On-Board to TCMS Interface

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Document ID: OCORA-TWS04-015

Version: 1.00

Date: 31.01.2025

# Revision History

Version	Change Description	Initials	Date of change
0.40	First official version, published in OCORA R5.	CG	22/11/2023
1.00	Introduced modifications: <ul style="list-style-type: none"> <li>• Unchanged content migrated to a different tool and environment.</li> <li>• Added the variable "selected language" in the driver information.</li> <li>• Added one operational condition value to variable OBU_TR_ETCS_OPCondition.</li> <li>• Added a new packet from OBU to RST "OBU Packet Data_Synch".</li> </ul> Version first published in OCORA R6.	CG	31/01/2025

# Table of Contents

1	Introduction	5
1.1	Purpose of the document	5
1.2	Applicability of the document	5
1.3	Context of the document	6
2	Additional requirements to SUBSET-119	6
2.1	Definition of the lower layers of the interface	6
2.2	Way of transmission for I/O variables	6
2.3	Additional variables to be transmitted	7
2.3.1	Odometry data	7
2.3.1.1	Speed	7
2.3.1.2	Acceleration	8
2.3.1.3	Distance	9
2.3.2	ETCS on-board diagnostic information	10
2.3.2.1	ETCS on-board Operational Condition	10
2.3.2.2	ETCS on-board Event Code	12
2.3.2.3	ETCS on-board Hardware version	13
2.3.2.4	ETCS on-board Software version	18
2.3.2.5	ETCS on-board Parametrisation file version	22
2.3.3	Driver information	26
2.4	Interface and packets definition	27
2.4.1	List of packets	27
2.4.2	Packets description	28
2.4.2.1	RST to OBU packet: Driver Information	28
2.4.2.2	OBU to RST packet: Odometry Data	30
2.4.2.3	OBU to RST packet: Condition and Event (2 packets)	31
2.4.2.4	OBU to RST packet: Hardware Version (2 packets)	32
2.4.2.5	OBU to RST packet: Software Version (2 packets)	34
2.4.2.6	OBU to RST packet: Parametrisation Version (2 packets)	36
2.4.2.7	OBU to RST packet: Data Synchronisation	38

# References

Reader's note: please be aware that the document ids in square brackets, e.g. [OCORA-BWS01-010], as per the list of referenced documents below, are used throughout this document to indicate the references to external documents. Wherever a reference to a TSI-CCS SUBSET is used, the SUBSET is referenced directly (e.g. SUBSET-026). OCORA always references to the latest available official version of the SUBSET, unless indicated differently.

[\[OCORA-BWS01-010\] – Release Notes](#)

[\[OCORA-BWS01-020\] – Glossary](#)

[\[OCORA-BWS01-040\] – Feedback Form](#)

[\[OCORA-BWS02-030\] - Technical Slide Deck](#)

[\[OCORA-TWS01-030\] – System Architecture](#)

[\[OCORA-TWS01-035\] – CCS-On-Board Architecture](#)

[\[OCORA-TWS02-030\] – OCORA Addendum to SUBSET-147](#)

[\[OCORA-TWS04-010\] - Functional Vehicle Adapter – Introduction](#)

[\[OCORA-TWS04-012\] - TCMS - Standard Communication Interface Specification](#)

[\[SUBSET-026\] – ERTMS/ETCS – System Requirements Specification](#)

[\[SUBSET-027\] – ERTMS/ETCS – FIS Juridical Recording](#)

[\[SUBSET-035\] – ERTMS/ETCS – Specific Transmission Module FFFIS](#)

[\[SUBSET-058\] – ERTMS/ETCS – FFFIS STM Application Layer](#)

[\[SUBSET-119\] – ERTMS/ETCS – Train Interface FFFIS](#)

[\[SUBSET-147\] – ERTMS Data Applications – FFFIS part: CCS Consist Network Communication Layers](#)

[\[Document 97E2675B\] – ODOMETER FFFIS](#)

# 1 Introduction

## 1.1 Purpose of the document

The purpose of this document is to define requirements that have not been considered or where different options have been documented in [\[SUBSET-119\]](#), this with the intention to get a standardised and unambiguous implementation of the integration between ETCS on-board and the rollingstock. The document is based on content elaborated in former phases of the OCORA collaboration, most content originates from the "TCMS - Standard Communication Interface Specification" [\[OCORA-TWS04-012\]](#) document. The [\[SUBSET-119\]](#) is a mandatory specification of the TSI-CCS 2023 release which aims at defining the standardised interface between the ETCS on-board and the rollingstock.

This OCORA Addendum is intended to be used in tenders for CCS on-board systems or one of its building blocks, either as part of a new rollingstock or as enhancement or replacement in existing legacy rollingstocks. This document is based on the architecture described in the System Requirements Specification [\[SUBSET-026\]](#).

If you are an organisation interested in developing CCS on-board building blocks according to OCORA design principles, the information provided in this document can be used as input for your development.

This document is addressed to experts in the CCS domain and to any other person, interested in the OCORA concepts for on-board CCS. The reader is invited to provide feedback to the OCORA collaboration. Feedback to this document and to any other OCORA documentation can be given by using the feedback form [\[OCORA-BWS01-040\]](#).

## 1.2 Applicability of the document

This document is applicable for integration of ETCS on-board into rollingstocks with a [\[SUBSET-119\]](#) compliant TCMS but also for legacy rollingstocks where the TCMS is not compliant to [\[SUBSET-119\]](#). In the latter case, the rollingstock (TCMS) shall implement a solution based on Functional Vehicle Adapter (FVA) and Wired I/O Control (WIOC) to communicate with the [\[SUBSET-119\]](#) compliant ETCS on-board. In this case, refer also to the document "Functional Vehicle Adapter – Introduction" [\[OCORA-TWS04-010\]](#). Furthermore, a protocol converter gateway for the lower OSI layers might be needed.

### 1.3 Context of the document

This document is published as part of an OCORA Release, together with the documents listed in the Release Notes [\[OCORA-BWS01-010\]](#). All abbreviations and terms used are defined in the Glossary [\[OCORA-BWS01-020\]](#).

## 2 Additional requirements to SUBSET-119

### 2.1 Definition of the lower layers of the interface

**OCORA-10354** - The interface between the ETCS on-board and the rollingstock shall be implemented with ECN serial interface as defined in chapter 4.6 of [\[SUBSET-119\]](#).

*Note:* The ETCS on-board shall directly implement this requirement. The rollingstock side shall also implement this interface. How the interface is implemented on the rollingstock side is a project specific solution: the TCMS directly provides an ECN serial interface, for legacy trains a solution based on a gateway (as indicated in [\[SUBSET-147\]](#)) or a Functional Vehicle Adapter (FVA) as described in document “Functional Vehicle Adapter – Introduction” [\[OCORA-TWS04-010\]](#) can be realised.

**OCORA-10355** - The interface between the ETCS on-board and the rollingstock shall be implemented including the definitions of the document "Addendum to SUBSET-147" [\[OCORA-TWS02-030\]](#).

*Note:* This is applicable to rollingstock implementing the ECN serial interface or to the Functional Vehicle Adapter (FVA) in case of legacy trains.

### 2.2 Way of transmission for I/O variables

**OCORA-10357** - The I/O variables of the interface between the ETCS on-board and the rollingstock shall only be transmitted via the mandatory interface (marked with “M”) as defined in table 2-1 of [\[SUBSET-119\]](#).

*Note:* The ETCS on-board shall directly implement this requirement. The rollingstock side shall also implement this interface. How the interface is implemented on the rollingstock side is a project specific solution: the TCMS directly provides the mandatory interface, for legacy rollingstocks a solution based on Functional Vehicle Adapter (FVA) and Wired I/O Control (WIOC) as described in document “Functional Vehicle Adapter – Introduction” [\[OCORA-TWS04-010\]](#) can be realised.

## 2.3 Additional variables to be transmitted

This chapter defines variables that have not been considered in [\[SUBSET-119\]](#).

### 2.3.1 Odometry data

This chapter defines variables in terms of odometry data where the source is the ETCS on-board. Rationale for the data: the information is published to the rollingstock to reduce to a minimum the number of odometer subsystems, and the information is used by the rollingstock to improve or replace the speed evaluation within the TCMS. Furthermore, it may be used to evaluate the exact position for track conditions.

*Note:* this is related to the function ID “F-ETCS-Out-19” of the document “TCMS - Standard Communication Interface Specification” [\[OCORA-TWS04-012\]](#).

#### 2.3.1.1 Speed

**OCORA-10358** - The ETCS on-board shall provide the current speed (as used by the ETCS on-board) to the TCMS.

The current speed to be provided as variable OBU\_TR\_Speed. The variable shall be encoded with 16 bits as defined for the “V\_EST” in [\[SUBSET-058\]](#).

Positive value indicates that current travel direction relative to the active cabin is forward. Negative value indicates that current travel direction relative to the active cabin is backward.

*Rationale for variable selection:* [\[SUBSET-026\]](#) defines V\_TRAIN for speed value with a limited resolution of 5 km/h, but no direction information is available. Therefore, an additional variable for the direction indication would have to be introduced. By using the V\_EST this information is included (positive or negative value) and the resolution is more appropriate. Furthermore, it is assumed that this variable is mostly already implemented in the ETCS on-board as it is defined for STM integration.

**OCORA-10362** - The ETCS on-board shall provide to the TCMS the current maximum speed based on the speed confidence interval (the highest possible current speed).

The current maximum speed to be provided as variable OBU\_TR\_Speed\_ConfMax. The variable shall be encoded with 16 bits as defined for the “V\_MAX” in [\[SUBSET-058\]](#).

Positive value indicates that current travel direction relative to the active cabin is forward. Negative value indicates that current travel direction relative to the active cabin is backward.

*Rationale for variable selection:* [\[SUBSET-026\]](#) defines V\_TRAIN for the speed value with a limited resolution of 5 km/h but no direction information is available. Therefore, an additional variable for the direction indication would have to be introduced. By using the V\_MAX this information is included (positive or negative value) and the resolution is more appropriate. Furthermore, it is assumed that this variable is mostly already implemented in the ETCS on-board as it is defined for STM integration.

**OCORA-10363** - The ETCS on-board shall provide to the TCMS the minimum current speed based on the speed confidence interval (the lowest possible current speed).

The current minimum speed to be provided as variable OBU\_TR\_Speed\_ConfMin. The variable shall be encoded with 16 bits as defined for the “V\_MIN” in [SUBSET-058].

Positive value indicates that current travel direction relative to the active cabin is forward. Negative value indicates that current travel direction relative to the active cabin is backward.

*Rationale for variable selection:* [SUBSET-026] defines V\_TRAIN for the speed value with a limited resolution of 5 km/h but no direction information is available. Therefore, an additional variable for the direction indication would have to be introduced. By using the V\_MIN this information is included (positive or negative value) and the resolution is more appropriate. Furthermore, it is assumed that this variable is mostly already implemented in the ETCS on-board as it is defined for STM integration.

### 2.3.1.2 Acceleration

**OCORA-10372** - The ETCS on-board shall provide the current acceleration to the TCMS.

The current acceleration to be provided as variable OBU\_TR\_Acceleration. The variable shall be encoded with 11 bits:

Variable Name	Size	Value		
OBU_TR_Acceleration	11 bits	<b>Minimum</b>	<b>Maximum</b>	<b>Resolution</b>
		-3 m/s <sup>2</sup>	3 m/s <sup>2</sup>	0.003 m/s <sup>2</sup>
		<b>Meaning</b>		
		Train acceleration in the longitudinal axis of the train.		
		The acceleration indication to be provided in positive and negative values. Positive value indicates positive acceleration, speed is increasing. Negative value indicates negative acceleration (deceleration), speed is dropping.		
		The first bit indicates the sign of the acceleration (1 = negative; 0 = positive)		
		10000000000	Not used	
		x1111101001 to x1111111111	Value out of range, not used	
		11111111111	Data not available	

Table 1 Definition of variable "Odometry data - Acceleration"



The variable OBU\_TR\_Acceleration shall be encoded as defined for the “A\_TRAIN” in document ODOMETER FFFIS [\[Document 97E2675B\]](#).

### 2.3.1.3 Distance

**OCORA-10369** - The ETCS on-board shall provide a measured distance counter to the TCMS.

The measured distance counter to be provided as variable OBU\_TR\_Dist\_Counter. The variable shall be encoded with 32 bits as defined for the “D\_EST” in [\[SUBSET-058\]](#).

Positive value indicates that travelled distance in terms of direction relative to the active cabin is forward. Negative value indicates that travelled distance in terms of direction relative to the active cabin is backward.

**OCORA-10364** - The ETCS on-board shall provide to the TCMS the maximum measured distance counter based on the distance confidence interval (the highest possible position of the rollingstock in the vehicle coordinates system).

The maximum measured distance counter to be provided as variable OBU\_TR\_Dist\_Counter\_Max.

The variable shall be encoded with 32 bits as defined for the “D\_MAX” in [\[SUBSET-058\]](#).

Positive value indicates that travelled distance in terms of direction relative to the active cabin is forward. Negative value indicates that travelled distance in terms of direction relative to the active cabin is backward.

It is expected that at times the confidence interval is reset by the ETCS on-board based on specific means in place. Distance computation can be implemented based on §12.3.1.7 of [\[SUBSET-035\]](#).

**OCORA-10365** - The ETCS on-board shall provide to the TCMS the minimum measured distance counter based on the distance confidence interval (the lowest possible position of the rollingstock in the vehicle coordinates system).

The minimum measured distance counter to be provided as variable OBU\_TR\_Dist\_Counter\_Min.

The variable shall be encoded with 32 bits as defined for the “D\_MIN” in [\[SUBSET-058\]](#).

Positive value indicates that travelled distance in terms of direction relative to the active cabin is forward. Negative value indicates that travelled distance in terms of direction relative to the active cabin is backward.

It is expected that at times the confidence interval is reset by the ETCS on-board based on specific means in place. Distance computation can be implemented based on §12.3.1.7 of [\[SUBSET-035\]](#).

### 2.3.2 ETCS on-board diagnostic information

This chapter defines variables in terms of ETCS on-board diagnostic information. The intention is to define a generic set of variables that can be implemented by all different suppliers.

Rationale for the data: The published diagnostic information is used by the rollingstock as diagnostic information that is centrally collected (and eventually displayed) for the whole rollingstock. The information can then be logged and / or used for specific operational processes.

Note: this chapter "[ETCS on-board diagnostic information](#)" is related to the function ID "F-ETCS-Out-22" of the document "TCMS - Standard Communication Interface Specification" [[OCORA-TWS04-012](#)].

This information is required to operate an ETCS on-board system. However, the information is currently missing in the [[SUBSET-119](#)].

#### 2.3.2.1 ETCS on-board Operational Condition

**OCORA-10371** - The ETCS on-board shall provide the operational condition information of the ETCS on-board indicating the severity of an active event or the currently executed process.

The ETCS on-board operational condition to be provided as variable OBU\_TR\_ETCS\_OPCondition. The variable shall be encoded as follows:

Variable Name	Size	Meaning	
OBU_TR_ETCS_OPCondition	4 bits	0	Unknown
		1	Initialising
		2	Auto test
		3	Updating
		4	Maintenance mode
		5	Running (OK)
		6	Warning issue
		7	Error issue
		8	Critical issue
		9	Shutting down
		10..15	Spare values

Table 2 Definition for variable "ETCS on-board operational condition"

The "ETCS on-board Operational Condition" value is indicated according to the event or process with the highest severity.

*Note-1:* the ETCS on-board of the different suppliers might not provide all the “ETCS on-board Operational Condition” variable values as defined here. Each specific ETCS on-board shall only provide the operational condition values that are available by default from the product. The supplier to provide a description of the implemented operational condition values.

*Note-2:* the “ETCS on-board Operational Condition” variable is not intended for use in safety relevant functions.

Definition of the different component operational conditions:

Operational Condition information	Definition
Unknown	On-board component operational condition is not known, or the on-board component is in an operational condition that has not been defined in this table.
Initialising	On-board component is starting up, initialising, possibly performing some internal tests, and will soon come into operation (if no issue persists). The on-board component is not operational yet and has only reduced communication capability.
Auto test	On-board component is performing some automated tests and will soon come into operation (if no issue persists). The on-board component is not operational but has the full communication capability available.
Updating	On-board component is busy while installing one or more new configuration item The on-board component is not operational and might only have a reduced communication capability.
Maintenance mode	On-board component is in maintenance mode, it will come into operation once it exits the maintenance mode. The on-board component is not operational and might only have a reduced communication capability.
Running (OK)	On-board component works normally, no misbehaviour or anomaly has been detected.

Operational Condition information	Definition
Warning issue	<p>On-board component has detected an abnormal operation of a component within itself. The on-board component continues to function but there is a medium-to-low impact on operations (non-critical). This includes that for the on-board component to function it may include the use of a procedural workaround.</p> <p>Service measures should be initiated. If no action is taken, an operation might fail in the future.</p>
Error issue	<p>On-board component has detected the failure of a component within itself. The on-board component continues to function but there is a high impact to at least portions of operations (on-board component use is severely reduced) and no procedural workaround exists.</p> <p>Service measures must be initiated.</p>
Critical issue	<p>On-board component has detected the catastrophic failure of a component within itself. The on-board component does no longer function and halts operations, no procedural workaround exists.</p> <p>Substitution of a line replaceable unit (LRU) and its repair in the workshop is required.</p>
Shutting down	<p>On-board component is shutting down.</p> <p>The on-board component is no longer operational and has only a reduced communication capability.</p>

*Table 3 Definition of the different component operational conditions*

### 2.3.2.2 ETCS on-board Event Code

**OCORA-10374** - The ETCS on-board shall provide a numerical value that corresponds to an event code for the whole ETCS on-board subsystem. The meaning of the event code (each value) is specific to the installed equipment. The supplier of the equipment has the freedom to make use of the 8 variables in the way that best suits to him (technically the one variable of size 256 bits had to be split into 8 smaller variables). The supplier must provide the documentation describing the specific meaning of each event code.

The ETCS on-board event code to be provided as variable OBU\_TR\_Event\_Code\_n. The variable shall be encoded as follows:

Variable Name	Size	Meaning	
OBU_TR_Event_Code_1	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_2	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_3	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_4	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_5	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_6	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_7	32 bits	0.. 4'294'967'295	Project specific
OBU_TR_Event_Code_8	32 bits	0.. 4'294'967'295	Project specific

Table 4 Definition of variable "ETCS on-board event code"

The "ETCS on-board Event Code" variables can be used in different manners:

- Each numerical value has a specific meaning.
- The variable can be regarded as a bit field where each bit is specific for a component.
- The variable can be regarded as a bit field, where a specific number of bits are grouped for a specific component. This group of bits has then a specific meaning for the particular component.
- A combination of the above variants is thinkable, where the assignment is distributed over the different variables.
- Other possible use of the available variables.

### 2.3.2.3 ETCS on-board Hardware version

**OCORA-10376** - The ETCS on-board shall provide the version(s) of the hardware for the different Line Replaceable Unit (LRU) components running within the ETCS on-board. The supplier of the equipment must provide the description how his LRU component discloses the hardware version by means of this variable. Furthermore, the supplier must document the version of each supplied LRU hardware component.

The ETCS on-board hardware version to be provided as variable OBU\_TR\_ETCS\_HW\_Version\_n. The variable shall be encoded as follows:

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_1	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 5 Definition for variable "ETCS on-board Hardware Version - 1"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_2	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 6 Definition for variable "ETCS on-board Hardware Version - 2"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_3	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 7 Definition for variable "ETCS on-board Hardware Version - 3"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_4	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 8 Definition for variable "ETCS on-board Hardware Version - 4"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_5	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 9 Definition for variable "ETCS on-board Hardware Version - 5"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_6	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 10 Definition for variable "ETCS on-board Hardware Version - 6"



Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_7	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 11 Definition for variable "ETCS on-board Hardware Version - 7"

Variable Name	Size	Meaning	
OBU_TR_ETCS_HW_Version_8	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 12 Definition for variable "ETCS on-board Hardware Version - 8"

The definition allows to disclose the hardware version for up to 8 different line replaceable unit components within the ETCS on-board. The numerical values and the ASCII character of each “ETCS on-board Hardware Version” variable (variables 1 to 8) can be compiled into the following format: “xxx.yyy.zzz/A”.

Example of one compiled ETCS on-board LRU component hardware version variable: 34.8.25/F

### 2.3.2.4 ETCS on-board Software version

**OCORA-10378** - The ETCS on-board shall provide the version(s) of the software for the different Line Replaceable Unit (LRU) components running within the ETCS on-board. The supplier of the equipment must provide the description how his LRU component discloses the software version by means of this variable. Furthermore, the supplier must document the version of each released LRU component software.

The ETCS on-board software version to be provided as variable OBU\_TR\_ETCS\_SW\_Version\_n.  
The variable shall be encoded as follows:

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_1	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 13 Definition for variable "ETCS on-board Software Version - 1"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_2	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 14 Definition for variable "ETCS on-board Software Version - 2"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_3	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 15 Definition for variable "ETCS on-board Software Version - 3"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_4	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 16 Definition for variable "ETCS on-board Software Version - 4"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_5	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 17 Definition for variable "ETCS on-board Software Version - 5"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_6	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 18 Definition for variable "ETCS on-board Software Version - 6"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_7	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 19 Definition for variable "ETCS on-board Software Version - 7"

Variable Name	Size	Meaning	
OBU_TR_ETCS_SW_Version_8	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 20 Definition for variable "ETCS on-board Software Version - 8"

The definition allows to disclose the software version for up to 8 different line replaceable unit components within the ETCS on-board. The numerical values and the ASCII character of each "ETCS on-board Software Version" variable (variables 1 to 8) can be compiled into the following format: "xxx.yyy.zzz/A".

Example of one compiled ETCS on-board LRU component software version variable: 2.23.16/B

### 2.3.2.5 ETCS on-board Parametrisation file version

**OCORA-10380** - The ETCS on-board shall provide the version(s) of the parametrisation file (configuration) for the different Line Replaceable Unit (LRU) components running within the ETCS on-board. The parametrisation file (configuration) version information exposes the version of the parametrisation file that is currently being applied by the software of the different LRU components of the ETCS on-board. The parametrisation file defines all configurable parameters of the specific component. The supplier of the equipment must provide the description how his component discloses the parametrisation file version by means of this variable. Furthermore, the supplier must document the version of each released LRU component parametrisation file (configuration).

The ETCS on-board parametrisation file version to be provided as variable

OBU\_TR\_ETCS\_Cfg\_Version\_n. The variable shall be encoded as follows:

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_1	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 21 Definition for variable "ETCS on-board Parametrisation File Version - 1"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_2	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 22 Definition for variable "ETCS on-board Parametrisation File Version - 2"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_3	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 23 Definition for variable "ETCS on-board Parametrisation File Version - 3"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_4	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 24 Definition for variable "ETCS on-board Parametrisation File Version - 4"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_5	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 25 Definition for variable "ETCS on-board Parametrisation File Version - 5"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_6	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> "-" (decimal=45, hex=2D), if the ASCII character is not used.

Table 26 Definition for variable "ETCS on-board Parametrisation File Version - 6"



Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_7	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 27 Definition for variable "ETCS on-board Parametrisation File Version - 7"

Variable Name	Size	Meaning	
OBU_TR_ETCS_Cfg_Version_8	32 bits	0..7	xxx major version <i>Reserved value:</i> 127, if the major version is not used.
		8..15	yyy minor version <i>Reserved value:</i> 127, if the minor version is not used.
		16..23	zzz patch version <i>Reserved value:</i> 127, if the patch version is not used.
		24..31	1 ASCII character <i>Reserved value:</i> “-“ (decimal=45, hex=2D), if the ASCII character is not used.

Table 28 Definition for variable "ETCS on-board Parametrisation File Version - 8"

The definition allows to disclose the parametrisation file (configuration) version for up to 8 different line replaceable unit components within the ETCS on-board. The numerical values and the ASCII character of each “ETCS on-board Parametrisation File Version” variable (variables 1 to 8) can be compiled into the following format: “xxx.yyy.zzz/A”.

Example of one compiled ETCS on-board LRU component parametrisation file version variable:  
15.48.3/H

*Note:* not all equipment from the different suppliers makes use of a parametrisation file (configuration). In case no parametrisation file (configuration) is used, then the version of the parametrisation inserted by other means into the component shall be provided. In case no parametrisation version is managed, then in all sections the reserved values for “not used” shall be

applied.

### 2.3.3 Driver information

**OCORA-10382** - The ETCS on-board shall import the operational driver identifier number from the TCMS.

The driver identifier number to be imported as variable TR\_OBU\_Driver\_ID\_n. The variable shall be encoded with 128 bits as defined for the "DRIVER\_ID" in [\[SUBSET-027\]](#) .

The 128 bits allow to define 16 alphanumeric characters in ISO 8859-1 (also known as Latin Alphabet #1).

Due to the length (128 bits) of the DRIVER\_ID variable, this is split for transmission into 4 smaller variables (32 bits each): TR\_OBU\_Driver\_ID\_1 to TR\_OBU\_Driver\_ID\_4. At receiver the 4 variables shall be merged again to the original variable DRIVER\_ID.

*Rationale for the data:* The driver identifier number is used by the TCMS for identification of the driver: driving permission, immobilizer, driver's logbook, seat adjustment, etc. Furthermore, in TSI OPE it is defined that the driver identifier shall be recorded (independent definition from the ETCS juridical recording).

The ETCS on-board uses the driver identifier number for the purpose of juridical recording. Publishing this information from TCMS to ETCS on-board prevents the driver from having to enter his ID twice: in the TCMS and in the ETCS on-board.

*Note:* this variable is related to the function ID "F-ETCS-In-19" of document "TCMS - Standard Communication Interface Specification" [\[OCORA-TWS04-012\]](#).

**OCORA-10401** - The ETCS on-board shall import the selected driver language (driver language identifier) from the TCMS.

The selected driver language to be provided as variable TR\_OBU\_NID\_DRV\_LANG. The variable shall be encoded with 16 bits as defined for the "NID\_DRV\_LANG" in [\[SUBSET-058\]](#).

The variable is an identifier of the language where the first letter of the language code is written in the first byte, the second letter in the second byte. The language code is defined according to ISO 639-1.

## 2.4 Interface and packets definition

The interface between ETCS on-board and the rollingstock is defined in [\[SUBSET-119\]](#).

Accordingly, all variables are transmitted in packets.

The packets on the serial bus shall provide for each variable a specific validity bit to be set at source side.

A variable has its validity bit set to false if it is not used on the source side i.e. the variable is spare (the part of a packet is not used) or the variable value is not trustable due to a problem on the source side.

Variables not provided from the defined source shall be marked as not used by setting the related validity bit to FALSE at source side.

### 2.4.1 List of packets

**OCORA-10385** - The following packets are used for the communication between ETCS on-board and the rollingstock (RST):

Packet Name	Database ID	Source	Sink	Maximum cycle time ECN [ms]	Data Class [SUBSET-147]
TR Packet Driver_Information	Configurable	RST	OBU	200	Process Data
OBU Packet Odometry_Data	Configurable	OBU	RST	100	Process Data
OBU Packet Condition_and_Event_1	Configurable	OBU	RST	200	Process Data
OBU Packet Condition_and_Event_2	Configurable	OBU	RST	200	Process Data
OBU Packet Hardware_Version_1	Configurable	OBU	RST	200	Process Data
OBU Packet Hardware_Version_2	Configurable	OBU	RST	200	Process Data
OBU Packet Software_Version_1	Configurable	OBU	RST	200	Process Data
OBU Packet Software_Version_2	Configurable	OBU	RST	200	Process Data
OBU Packet Parametrisation_Version_1	Configurable	OBU	RST	200	Process Data
OBU Packet Parametrisation_Version_2	Configurable	OBU	RST	200	Process Data
OBU Packet Data_Synch	Configurable	OBU	RST	200	Process Data

Table 29 Packet overview

## 2.4.2 Packets description

### 2.4.2.1 RST to OBU packet: Driver Information

**OCORA-10388** - The definition of the "TR Packet Driver\_Information" sent from the rollingstock to ETCS on-board related to driver information is as follows:






Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	TR_OBU_Driver_ID_1	First 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
4	0	TR_OBU_Driver_ID_2	Second 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
8	0	TR_OBU_Driver_ID_3	Third 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
12	0	TR_OBU_Driver_ID_4	Forth 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
16	0	TR_OBU_NID_DRV_LANG	Identifier of selected driver language.	UINT16	 OCORA-10401
18	0	Spare 1		INT32	
22	0	Spare 2		INT32	
26	0	Validity	Validity of value of variables contained in bytes 0 to 22 of the packet.  The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 22.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 30 RST to OBU packet: Driver Information

**Note:** based on the already in [\[SUBSET-119\]](#) defined source for the train running number, the TCMS is also regarded as the central source for distribution of the driver identifier and the language selected by the driver.

**Note:** for driver convenience, if the cabin radio system (voice) also acquires driver identifier and driver selected language from the TCMS as central source, then the cabin radio system can use the here defined packet.

### 2.4.2.2 OBU to RST packet: Odometry Data

**OCORA-10390** - The definition of the odometry data packet sent from the ETCS on-board to the rollingstock is as follows:





Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_Speed	Current speed in 1 cm/s.	INT16	 OCORA-10358
2	0	OBU_TR_Speed_ConfMax	Maximum speed in 1 cm/s (based on confidence interval).	INT16	 OCORA-10362
4	0	OBU_TR_Speed_ConfMin	Minimum speed in 1 cm/s (based on confidence interval).	INT16	 OCORA-10363
6	0	OBU_TR_Dist_Counter	Distance counter in 1 cm.	INT32	 OCORA-10369
10	0	OBU_TR_Dist_Counter_Max	Maximum distance counter in 1 cm (based on confidence interval).	INT32	 OCORA-10364
14	0	OBU_TR_Dist_Counter_Min	Minimum distance counter in 1 cm (based on confidence interval).	INT32	 OCORA-10365
18	0	OBU_TR_Acceleration	Current acceleration in 0.003 m/s <sup>2</sup> .	11 bits	 OCORA-10372
19	3	Padding		5 bits	
20	0	Spare 1		INT32	
24	0	Spare 2		INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 8.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 31 OBU to RST packet: Odometry Data

### 2.4.2.3 OBU to RST packet: Condition and Event (2 packets)

**OCORA-10392** - The definition of the "OBU Packet Condition\_and\_Event\_1" sent from the ETCS on-board to rollingstock related to condition and event is as follows:








Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_OPCondition	ETCS on-board operational condition information.	ENUM	 OCORA-10371
0	3	Padding		4 bits	
1	0	OBU_TR_Event_Code_1	ETCS on-board event code.	UINT32	 OCORA-10374
5	0	OBU_TR_Event_Code_2	ETCS on-board event code.	UINT32	 OCORA-10374
9	0	OBU_TR_Event_Code_3	ETCS on-board event code.	UINT32	 OCORA-10374
13	0	OBU_TR_Event_Code_4	ETCS on-board event code.	UINT32	 OCORA-10374
17	0	OBU_TR_Event_Code_5	ETCS on-board event code.	UINT32	 OCORA-10374
21	0	OBU_TR_Event_Code_6	ETCS on-board event code.	UINT32	 OCORA-10374
25	0	Spare 1	Spare variable as trailer needs to start at 4-byte alignment.	INT8	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 25.0 is in bit 7.	UINT16	[SUBSET-119]
28	0	Trailer	Trailer as defined in SS-119.		[SUBSET-119]

Table 32 OBU to RST packet: Condition and Event Nr. 1

The definition of the "OBU Packet Condition\_and\_Event\_2" sent from the ETCS on-board to rollingstock related to condition and event is as follows:



Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_Event_Code_7	ETCS on-board event code.	UINT32	 OCORA-10374
4	0	OBU_TR_Event_Code_8	ETCS on-board event code.	UINT32	 OCORA-10374
8	0	Spare 1		INT32	
12	0	Spare 2		INT32	
16	0	Spare 3		INT32	
20	0	Spare 4		INT32	
24	0	Spare 5		INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 33 OBU to RST packet: Condition and Event Nr. 2

#### 2.4.2.4 OBU to RST packet: Hardware Version (2 packets)

**OCORA-10396** - The definition of the "OBU Packet Hardware\_Version\_1" is as follows:









Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_HW_Version_1	Hardware version of the LRU number 1.	UINT32	 OCORA-10376
4	0	OBU_TR_ETCS_HW_Version_2	Hardware version of the LRU number 2.	UINT32	 OCORA-10376
8	0	OBU_TR_ETCS_HW_Version_3	Hardware version of the LRU number 3.	UINT32	 OCORA-10376
12	0	OBU_TR_ETCS_HW_Version_4	Hardware version of the LRU number 4.	UINT32	 OCORA-10376
16	0	OBU_TR_ETCS_HW_Version_5	Hardware version of the LRU number 5.	UINT32	 OCORA-10376
20	0	OBU_TR_ETCS_HW_Version_6	Hardware version of the LRU number 6.	UINT32	 OCORA-10376
24	0	Spare 1	Spare variable as trailer needs to start at 4-byte alignment.	INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet.  The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 34 OBU to RST packet: Hardware Version Nr. 1

The definition of the "OBU Packet Hardware\_Version\_2" is as follows:



Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_HW_Version_7	Hardware version of the LRU number 7.	UINT32	 OCORA-10376
4	0	OBU_TR_ETCS_HW_Version_8	Hardware version of the LRU number 8.	UINT32	 OCORA-10376
8	0	Spare 1		INT32	
12	0	Spare 2		INT32	
16	0	Spare 3		INT32	
20	0	Spare 4		INT32	
24	0	Spare 5		INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet.  The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 35 OBU to RST packet: Hardware Version Nr. 2

#### 2.4.2.5 OBU to RST packet: Software Version (2 packets)

**OCORA-10398** - The definition of the "OBU Packet Software\_Version\_1" is as follows:







Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_SW_Version_1	Software version of the LRU number 1.	UINT32	 OCORA-10378
4	0	OBU_TR_ETCS_SW_Version_2	Software version of the LRU number 2.	UINT32	 OCORA-10378
8	0	OBU_TR_ETCS_SW_Version_3	Software version of the LRU number 3.	UINT32	 OCORA-10378
12	0	OBU_TR_ETCS_SW_Version_4	Software version of the LRU number 4.	UINT32	 OCORA-10378
16	0	OBU_TR_ETCS_SW_Version_5	Software version of the LRU number 5.	UINT32	 OCORA-10378
20	0	OBU_TR_ETCS_SW_Version_6	Software version of the LRU number 6.	UINT32	 OCORA-10378
24	0	Spare 1	Spare variable as trailer needs to start at 4-byte alignment.	INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet.  The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 36 OBU to RST packet: Software Version Nr. 1

The definition of the "OBU Packet Software\_Version\_2" is as follows:



Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_SW_Version_7	Software version of the LRU number 7.	UINT32	 OCORA-10378
4	0	OBU_TR_ETCS_SW_Version_8	Software version of the LRU number 8.	UINT32	 OCORA-10378
8	0	Spare 1		INT32	
12	0	Spare 2		INT32	
16	0	Spare 3		INT32	
20	0	Spare 4		INT32	
24	0	Spare 5		INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 37 OBU to RST packet: Software Version Nr. 2

#### 2.4.2.6 OBU to RST packet: Parametrisation Version (2 packets)

**OCORA-10400** - The definition of the "OBU Packet Parametrisation\_Version\_1" is as follows:







Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_Cfg_Version_1	Parametrisation version of the LRU number 1.	UINT32	 OCORA-10380
4	0	OBU_TR_ETCS_Cfg_Version_2	Parametrisation version of the LRU number 2.	UINT32	 OCORA-10380
8	0	OBU_TR_ETCS_Cfg_Version_3	Parametrisation version of the LRU number 3.	UINT32	 OCORA-10380
12	0	OBU_TR_ETCS_Cfg_Version_4	Parametrisation version of the LRU number 4.	UINT32	 OCORA-10380
16	0	OBU_TR_ETCS_Cfg_Version_5	Parametrisation version of the LRU number 5.	UINT32	 OCORA-10380
20	0	OBU_TR_ETCS_Cfg_Version_6	Parametrisation version of the LRU number 6.	UINT32	 OCORA-10380
24	0	Spare 1	Spare variable as trailer needs to start at 4-byte alignment.	INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet.  The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 38 OBU to RST packet: Parametrisation Version Nr. 1

The definition of the "OBU Packet Parametrisation\_Version\_2" is as follows:








Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	OBU_TR_ETCS_Cfg_Version_7	Parametrisation version of the LRU number 7.	UINT32	 OCORA-10380
4	0	OBU_TR_ETCS_Cfg_Version_8	Parametrisation version of the LRU number 8.	UINT32	 OCORA-10380
8	0	Spare 1		INT32	
12	0	Spare 2		INT32	
16	0	Spare 3		INT32	
20	0	Spare 4		INT32	
24	0	Spare 5		INT16	
26	0	Validity	Validity of value of variables contained in bytes 0 to 24 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 24.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119.		<a href="#">[SUBSET-119]</a>

Table 39 OBU to RST packet: Parametrisation Version Nr. 2

#### 2.4.2.7 OBU to RST packet: Data Synchronisation

**OCORA-10463** - The definition of the "OBU Packet Data\_Synch" is as follows:

Byte Offset	Bit Offset	Variable Name	Variable / Description	Data Type	Reference
0	0	TR_OBU_Driver_ID_1	First 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
4	0	TR_OBU_Driver_ID_2	Second 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
8	0	TR_OBU_Driver_ID_3	Third 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
12	0	TR_OBU_Driver_ID_4	Forth 32 bits of DRIVER_ID.	UINT32	 OCORA-10382
16	0	TR_OBU_NID_DRV_LANG	Identifier of selected driver language.	UINT16	 OCORA-10401
18	0	TR_OBU_NID_OPERATIONAL	Train Running Number.	UINT32	<a href="#">[SUBSET-119]</a>
22	0	Spare 1		INT32	
26	0	Validity	Validity of variables contained in bytes 0 to 22 of the packet. The validity of the variable with offset 0.0 is in bit 0. The validity of the variable with offset 22.0 is in bit 6.	UINT16	<a href="#">[SUBSET-119]</a>
28	0	Trailer	Trailer as defined in SS-119		<a href="#">[SUBSET-119]</a>

*Table 40 OBU to RST packet: Data Synchronisation*

**Note:** this packet is intended for driver convenience, it allows synchronisation of data coming from different sources. To the driver it provides the freedom to select the language, enter the driver identifier or the train running number either in the TCMS or in the ETCS on-board. The central source is defined being the TCMS (aligned with train running number as described in [\[SUBSET-119\]](#)), the TCMS then distributes the data to all different consumers.

The solution could be implemented as follows:

- If driver selects a language, enters the driver identifier or the train running number into the TCMS then it is directly adopted in the source (TCMS) and from there distributed to the different consumers (e.g. the ETCS on-board).
- If driver selects a language, enters the driver identifier or the train running number into the ETCS on-board, then this entry overrules the data from TCMS for a period of 3 seconds (it is assumed that within this time period the TCMS adopts the content from the here defined

packet and provides the same content as data back to the ETCS on-board): the ETCS on-board adopts the new entry.

Simultaneously the ETCS on-board shall send the newly selected language, or entered driver identifier, or entered train running number data to the TCMS by means of the "OBU Packet Data\_Synch". By default the validity indications in this packet are set to "invalid". When a new value is provided to the ETCS on-board then the validity indication for the correspondent variable, that is updated in the ETCS on-board, is changed to "valid" and the specific value is provided in the here defined packet. The validity indication is changed to "valid" for a period of 1 second, after this time the validity indication is reset to "invalid".

After 3 seconds from entry confirmation the ETCS on-board shall return to use the selected language, driver identifier and train running number data received with packets "TR Packet 2" (defined in [\[SUBSET-119\]](#)) and "TR Paket Driver\_Information". the validity indications are set to "invalid".

*Note:* this solution is also applicable in case the ETCS on-board receives a new train running number from the RBC.