IFC Rail Project

Storyline (SL) Implementation Report (IR)

ERTMS System (ES)

Detailed Design Phase (DD)

SL-IR-ES-DD-SNCF

Contents

Room:	Railway Room	**Date:**	2021.11.11
Project/Activity:	IFC Rail Phase 2	**Test Leader:**	Achraf DSOUL
Document Title:	WP1: Storyline (SL) Implementation Report	**ID:**	SL-IR-ES-DD-SNCF
Version:	1.0	**Stakeholder:**	SNCF

1 Storyline documentation update

1.1 Updated Storyline Synthesis

Room:	**Railway Room**	Author: Domain Expert	
Project/Activity:	**IFC Rail Phase 2**	Verification: Technical Expert	**Florian HULIN**
Document Title:	**Storyline: ERTMS design**	Approbation: Test leader	**Achraf DSOUL**
Version:	**1.0**	PMO checker:	
Date:	**2021.11.11**	ID:	**SL-IR-ES-DD-SNCF**
Description (a)			

Project Phases (b)	☐ PL - Planning	☐ Build
	☐ ID - Intermediate design	☐ Operation & Maintenance
	☒ DD - Detailed design	☐ Dismiss

Use Cases (c)	☒ ECM - Existing Condition Modelling ☐ RDM - Railway Design Modelling ☐ RDM.DD - Feasibility Study for Railway ☐ RDM.RIDM - Railway Intermediate Design Modelling ☒ RDM.RDDM - Railway Detailed Design Modelling ☒ ICM - Interference and Coordination Management ☒ 3DV - 3D Visualization ☐ QTO - Quantity Take-Off ☐ INMP - Handover from Builder to Maintainer (Information Needed for Maintenance Perspective)

Domains	☐ Track (*)	
	☒ Signalling (*)	ETCS level 2 (European Train Control System)
	☐ Energy (*)	"Power supply system" has been withdrawn
	☒ Telecom (*)	GSM-R (Global System for Mobile communications-Railway)
	☐ Alignment (*)	
	☐ Other (*)	

Tested Concepts (d)	The following concepts haven't been tested due to the lack of time: ▪ Spatial structure inside technical rooms. ▪ System functional breakdown of power supply system for telecom/signaling active equipment installed in technical rooms. Because of lack of technical solutions and the level of complexity, these concepts were withdrawn from the storyline testing program: ▪ Space management and cables arrangement inside cables ducts. ▪ Wireless connectivity provided by Base Transceiver Stations (BTS) and remote units (repeaters) within the GSM-R radio coverage area.

Test Leader TL (e)	**Achraf DSOUL**
Domain Experts DE (e)	**Energy Domain:** Judicael DEHOTIN**,** Marco LANNAIOLI **Signalling Domain:** Liliane BAS, Gael FRANQUET, Gaetan MARTON, Franco TOMASSONI**,** Christophe HEDE, Ludovic AUBRY, Loic City MENDES. **CS/SE Domain:** Edouard CHABANIER. **Telecom Domain:** Sondès KAROUI, Giovanni GUGLIELMI, Nello AIELLO, Davide CORTELLESSA, Achraf DSOUL
Technical Experts TE (e)	**Florian Hulin**
Software Vendors SW (e)	**ACCA Software & RailCOMPLETE**
Test Dataset (e)	**SNCF**

(a) 2 lines description (b) chose maxi 1 phase and 4 use cases (c) list only domains for the test (d) indicate Covered Unit Test Topics (e) specify names and companies

(*) *specify further sub-disciplines*

1.2 Updated Storyline Description

Description of the Business case	There are no changes compared to the storyline documentation.
Duration	The design phase of the ERTMS deployment project usually lasts more than 2 years but as mentioned in the storyline documentation it depends on the project specifications, technical constraints, project site requirements, etc.
Aim	No changes compared to the storyline documentation.
In Scope	Computer-base interlocking (CBI) is no longer in the storyline scope Telecom transmission equipment, including modems and IP switches, become part of the storyline scope
Out of Scope	No changes compared to the storyline documentation.

Specific Detailed Process Map for this Storyline

[process map that defines realistic exchange scenarios between software applications; reference to general processes defined in the IFC Rail Requirements analysis report Chapter 2 : IFC Rail Process Map also called High-level Reference Process Map (HLRP)]

No changes compared to the Process Map version indicated in the storyline documentation

HLRP	ES nbr	From	To	Note [optional]
N.a	**SLES-DD-ECM_RDM-ES1_Sub1**	Track designer	Signaling designer	This exchange scenario has been simplified to not include data exchanges with energy designers
	SLES-DD-ECM_RDM-ES1_Sub2	Energy designer		
N.a	**SLES-DD-ECM_RDM-ES2_Sub1**	Signaling designer	Telecom designer	This exchange scenario has been simplified to not include data exchanges with Infra domain specialists
	SLES-DD-ECM_RDM-ES2_Sub2	Infra specialist		
N.a	**SLES-DD-ICM-ES3**	All railway designers & Infra specialist	Telecom designer & Signaling designer	No changes compared to the storyline documentation
N.a	**SLES-DD-RDM-ES4**	Telecom designer	Signaling designer	
N.a	**SLES-DD-3DV-ES5_Sub1**	Signaling designer	Project Manager	
	SLES-DD-3DV-ES5_Sub2	Telcom designer		

2 Exchange Scenario (ES) and Tests

2.1 Exchange Scenario: SLES-DD-ECM_RDM-ES1

2.1.1 Updated Exchange Scenario

Id	**SLES-DD-ECM_RDM-ES1**
Exchange Scenario Description *[please describe the ES and define In/Out of Scope topics]*	
No changes compared to the storyline documentation except that the position of the overhead contact lines and their supporting system were not taking into consideration to place the ERTMS signs.	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• Geometry and positioning requirements for the Exchange Scenario 1 are described in an excel file that is available at the following link: https://app.box.com/s/riugg8nrmz8efydzz8tq0x2fwoory2iu *(Check the 2 Excel sheets: "Geometry Requirements" & "Placement Requirements")*	
Spatial requirements *[General description of spatial element requirements => specific on Excel sheets]*	
• The Spatial requirements for the Exchange Scenario 1 are described in the same Excel file indicated above *(Check the 2 Excel sheets: "Spatial Requirements")*	
Physical and functional requirements *[General description of physical elements, functional elements and important information => specific on Excel sheets]*	
These requirements were not specified in a dedicated file, but they were defined in the dataset documentation.	
Covered Unit Test: to be filled by Technical Expert(s)	
ID	Unit Test
The covered unit tests have not been modified compared to the storyline documentation.	

2.1.2 ES Test description and results

Test Completion (Specify level of completion and if reserves/punchlist opened, additional TS works….)
The test of ERTMS signs and Eurobalises placement, while taking into consideration the poisoning constraints, has been completed.
Test Team and Test Leader Satisfaction (Specify the Box/Github links to find the test results or documents….)
The test implementation results are in accordance with what we have specified in the test program. They have been validated by the test team.
Tests and Results Archives (Specify the Box/Github links to find the test results or documents….)
• Links to the IFC models indicating the Eurobalises and the ERTMS signs placement (while taking into consideration the placement constraints): **RailCOMPLETE production** ✓ **RailCOMPLE Solution with property set (no subgrade_sleepers).ifc** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/RailCOMPLETE/RailCOMPLE%20Solution%20with%20property%20set%20(no%20subgrade_sleepers).ifc ✓ **Solution Using BulidingElementProxy - Acca Viewer Compatible.ifc** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/RailCOMPLETE/Solution%20Using%20BulidingElementProxy%20-%20Acca%20Viewer%20Compatible.ifc ✓ **RailCOMPLE Solution with property set .ifc** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/RailCOMPLETE/RailCOMPLE%20Solution%20with%20property%20set%20.ifc **ACCA Software production** ✓ **ACCA - ERTMS - LPS.ifc** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20LPS.ifc

2.2 Updated Exchange Scenario: SLES-DD-ECM_RDM-ES2

2.2.1 Updated Exchange Scenario

Id	**SLES-DD-ECM_RDM-ES2**
Exchange Scenario Description *[please describe the ES and define In/Out of Scope topics]*	
No changes compared to the storyline documentation.	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• Geometry and positioning requirements for the Exchange Scenario 2 are described in an excel file that is available at the following link: https://app.box.com/s/riugg8nrmz8efydzz8tq0x2fwoory2iu *(Check the 2 Excel sheets: "Geometry Requirements" & "Placement Requirements")*	
Spatial requirements *[General description of spatial element requirements => specific on Excel sheets]*	
• The Spatial requirements for the Exchange Scenario 2 are described in the same Excel file indicated above *(Check the 2 Excel sheets: "Spatial Requirements")*	
Physical and functional requirements *[General description of physical elements, functional elements and important information => specific on Excel sheets]*	
These requirements were not specified in a dedicated file, but they were defined in the dataset documentation.	
Covered Unit Test: to be filled by Technical Expert(s)	
ID	Unit Test
The unit test: "*Terrain & overview on the existing tunnel and bridges"* is not covered by this Exchange Scenario.	

2.2.2 ES Test description and results

Test Completion (Specify level of completion and if reserves/punchlist opened, additional TS works….)
We couldn't address all the topics included in this Exchange Scenario. Indeed, this topic has been withdrawn from the scope due to its complexity: ▪ Wireless connectivity and representation of GSMR radio coverage area. Furthermore, the linear placement of GSMR repeaters (i.e. remote units) and the representation of the transport network, which connects the BTS clusters to their base station controller (BSC), were not included in the IFC model because of the lack of time. Other than that, the test of the other topics covered by the ES2 has been completed.
Test Team and Test Leader Satisfaction (Specify the Box/Github links to find the test results or documents….)
The implementation test results of the ES2 have met the test requirements. The test team is satisfied with the quality of the IFC model that has been produced. It is important to mention that the participating Software Vendors couldn't implement the linear placement BTS sites as spatial structure elements and not assemblies. However, the concept of linear placement of spatial structures is supported by the IFC schema and is doesn't present any issue.

Tests and Results Archives (Specify the Box/Github links to find the test results or documents….)
• There is 1 IFC file that was produced by ACCA Software. It includes the Base Transceiver Stations linear placement, the functional decomposition of the GSMR base station subsystem and the wired transmission network that is used. Here is the link to this file: ✓ **ACCA - ERTMS - LP & Wired Network.zip** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20LP%20%26%20Wired%20Network.zip

2.3 Updated Exchange Scenario: SLES-DD-ICM-ES3

2.3.1 Updated Exchange Scenario

Id	**SLES-DD-ICM-ES3**
Exchange Scenario Description *[please describe the ES and define In/Out of Scope topics]*	
Due to the multitude and the complexity of the topics covered by this Exchange Scenario, it turns out that they would be hard and time consuming for the implementation test. Consequently, the scope of this exchange scenario has been narrowed in order to deal only with the cables laying infrastructure. However, it should be noted that, from a business standpoint, the exchange scenario description has not changed compared to the storyline documentation.	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• Geometry and positioning requirements for the Exchange Scenario 3 are described in an excel file that is available at the following link: https://app.box.com/s/riugg8nrmz8efydzz8tq0x2fwoory2iu *(Check the 2 Excel sheets: "Geometry Requirements" & "Placement Requirements")*	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• The Spatial requirements for the Exchange Scenario 3 are described in the same Excel file indicated above *(Check the 2 Excel sheets: "Spatial Requirements")*	
Physical and functional requirements *[General description of physical elements, functional elements and important information => specific on Excel sheets]*	
The physical requirements were not specified in a dedicated file, but they were defined in the dataset documentation. ES3 does not require any functional element or information.	
Covered Unit Test: to be filled by Technical Expert(s)	
ID	Unit Test
The covered unit tests have not been modified compared to the storyline documentation.	

2.3.2 ES Test description and results

Test Completion (Specify level of completion and if reserves/punchlist opened, additional TS works….)
As indicated in the previous section, the test scope of this exchange scenario has been narrowed and only the linear placement of cables laying infrastructure (cables ducts and manholes) has been addressed including the 3D representation and properties assignments. The tests have been completed compared to this new scope.
Test Team and Test Leader Satisfaction (Specify the Box/Github links to find the test results or documents….)
The test implementation results are in accordance with our business requirements. They have been validated by the test team.
Tests and Results Archives (Specify the Box/Github links to find the test results or documents….)
• There is 1 IFC file that was produced by ACCA Software. It is the same IFC file as that of the ES2. Here is the link to this file: ✓ **ACCA - ERTMS - LP & Wired Network.zip** https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20LP%20%26%20Wired%20Network.zip

2.4 Updated Exchange Scenario: SLES-DD-RDM-ES4

2.4.1 Updated Exchange Scenario

Id	**SLES-DD-RDM-ES4**
Exchange Scenario Description *[please describe the ES and define In/Out of Scope topics]*	
No changes compared to the storyline documentation. *(Due to the lack of time, this exchange scenario has not been tested)*	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• Geometry and positioning requirements for the Exchange Scenario 4 are described in an excel file that is available at the following link: https://app.box.com/s/riugg8nrmz8efydzz8tq0x2fwoory2iu *(Check the 2 Excel sheets: "Geometry Requirements" & "Placement Requirements")*	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
• The Spatial requirements for the Exchange Scenario 4 are described in the same Excel file indicated above *(Check the 2 Excel sheets: "Spatial Requirements")*	
Physical and functional requirements *[General description of physical elements, functional elements and important information => specific on Excel sheets]*	
These requirements were not specified in a dedicated file, but they were defined in the dataset documentation.	
Covered Unit Test: to be filled by Technical Expert(s)	
ID	Unit Test
The covered unit tests have not been modified compared to the storyline documentation.	

2.4.2 ES Test description and results

Test Completion (Specify level of completion and if reserves/punchlist opened, additional TS works….)
Due to the lack of time and the low priority of this Exchange Scenario, it has not been tested.
Test Team and Test Leader Satisfaction (Specify the Box/Github links to find the test results or documents….)
No IFC files have been produced
Tests and Results Archives (Specify the Box/Github links to find the test results or documents….)
No IFC files have been produced

2.5 Updated Exchange Scenario: SLES-DD-3DV-ES5

2.5.1 Updated Exchange Scenario

Id	**SLES-DD-3DV-ES5**
Exchange Scenario Description *[please describe the ES and define In/Out of Scope topics]*	
Instead of providing a 3D model of the whole ERTMS system including the surrounding environment and the railway tracks model, we have adopted a different approach consisting of representing separately the ERTMS equipment, which means that each of these equipment has its own IFC model representing its geometry and properties. This approach has allowed the software vendors to focus on the geometry requirements of each ERTMS equipment and to have a clearer vision of the ERTMS system architecture, which helped them to be prepared for the other exchange scenarios tests because the ES5 was the second to test after ES1. These ERTMS equipment have been removed from the ES5 scope: ▪ Base station controller ▪ Lineside casing elements and technical rooms	
Geometry and positioning requirements *[General description / concepts => specific on Excel sheets]*	
The geometry/positioning requirements for ES5 were not specified in a dedicated file, but they were defined in the dataset documentation.	
Spatial requirements *[General description of spatial element requirements => specific on Excel sheets]*	
The spatial requirements for ES5 were not specified in a dedicated file, but they were defined in the dataset documentation.	
Physical and functional requirements *[General description of physical elements, functional elements and important information => specific on Excel sheets]*	
The physical/functional requirements for ES5 were not specified in a dedicated file, but they were defined in the dataset documentation.	
Covered Unit Test: to be filled by Technical Expert(s)	
ID	Unit Test
The unit test: "*Terrain & overview on the existing tunnel and bridges"* is not covered by this Exchange Scenario.	

2.5.2 ES Test description and results

Test Completion (Specify level of completion and if reserves/punchlist opened, additional TS works….)
The tests have been completed for this Exchange Scenario.
Test Team and Test Leader Satisfaction (Specify the Box/Github links to find the test results or documents….)
The test implementation results are in accordance with our business requirements. They have been validated by the test team.
Tests and Results Archives (Specify the Box/Github links to find the test results or documents….)

RailCOMPLETE production

IFC model representing the 3D geometry and the specific properties assigned to the Eurobalises and ERTMS signs:

- ✓ **RailCOMPLE Solution with property set .ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/RailCOMPLETE/RailCOMPLE%20Solution%20with%20property%20set%20.ifc

ACCA Software production

IFC model representing the 3D geometry and the specific properties assigned to the Eurobalises and ERTMS signs:

- ✓ **ACCA - ERTMS - LPS.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20LPS.ifc

IFC model (3D representation & Properties assignment) of GSMR Base Transceiver Station:

- ✓ **ACCA - ERTMS - BTS.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20BTS.ifc

IFC model (3D representation & Properties assignment) of GSMR repeater (remote unit):

- ✓ **ACCA - ERTMS - Remote Unit.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20Remote%20Unit.ifc

IFC model (3D representation & Properties assignment) of IP switch:

- ✓ **ACCA - ERTMS - Switch 48 Ports.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20Switch%2048%20Ports.ifc

IFC model (3D representation & Properties assignment) of racks and sub-racks:

- ✓ **ACCA - ERTMS - Rack 48U.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20Rack%2048U.ifc
- ✓ **ACCA - ERTMS - Subrack 6U.ifc**
  https://github.com/IFCRail/IFC-Rail-Unit-Test/blob/master/8_Storylines%20Test%20(SL)/SL11_System%20ERTMS%20%2B%20Design%20of%20Technical%20Rooms%20and%20Wired%20Network/IFC%20files%20from%20implementers/ACCA/ACCA%20-%20ERTMS%20-%20Subrack%206U.ifc

3 Supporting Files and Storyline Archives

3.1 Exchange Requirements (ER)

The Exchange Requirements are available in BOX at the following link:
https://app.box.com/s/54sg92a3vwh4gomjmk2731ob6asnt58a

3.2 SL Data archives

Storyline Documentation

The documentation of the ERTMS Design storyline is archived in the following BOX directory:

- Storyline documentation : https://app.box.com/s/zg89mu5o5qa4la9jokuqveyg2n7nwune

Storyline Datasets

The storyline datasets are archived in BOX at the following link:

- ERTMS Datasets: https://app.box.com/s/3xreipfz96i40cy62ef5r711777mx9i9

Unit tests pushed in GITHUB

Among the 8 unit tests covered by the storyline, only 2 have been considered as priority 1, which are:

Unit test title	ID	Link to the unit test folder in GITHUB
BTS functional breakdown	UT_SYS_4	https://github.com/IFCRail/IFC-Rail-Unit-Test/tree/UT_SYS_4/5_System%20Breakdown%20and%20Usage%20(SYS)/UT_SYS_4
BTS Cluster Wired Network	UT_PCC_2	https://github.com/IFCRail/IFC-Rail-Unit-Test/tree/master/6_Port%20and%20Connectivity%20(PCC)/UT_PCC_2

Storyline test meetings with SVs

The meeting materials for the storyline test regular meetings with software vendors and their recordings are available in the following BOX directory:

- Meetings with Software Vendors: https://app.box.com/folder/136354686762

Workshops of the requirements teams

The meeting materials for the collaboration workshops of the requirements team are available in the following BOX directory:

- Collaboration workshops - Requirements team: https://app.box.com/folder/150586714365

3.3 Test Dataset(s)

All the Test Datasets utilized in this Storyline to achieve the SL Tests.

Dataset Title	Dataset description	Dataset links
BTS cluster of Cannes-Grasse railway line	The datasets are provided to support the linear placement of 4 Base Transceiver Stations (BTS) located along the railway line of Cannes la Bocca-Grasse. It includes the alignment of the tracks in landXML format and the 3D representation of the 4 BTS in IFC, RVT and DWG formats.	▪ Link to the dataset documentation: https://app.box.com/s/e979aftcdkijhacwf47m7di6fr9nxkrj ▪ All the dataset files are available at this link: https://app.box.com/s/h3saj3qlr9qv1tnjkhbul8tmckymfc38
Linear span placement of cables ducts in Cannes-Grasse railway line	The provided datasets allow software vendors to provide a 3D representation of the cables laying infrastructure of Cannes la Bocca-Grasse railway line. They consist of: ▪ library representing the 2D profiles of the main cables ducts and manholes that are used by SNCF. ▪ The alignments of Cannes la Bocca-Grasse railway line in LandXML. ▪ PPT file that indicates the positions of the cable ducts and manholes according to the track centerline. ▪ 3D model of the cables laying infrastructure of Cannes la Bocca-Grasse railway line in DWG format. ▪ Excel file that lists the properties to be assigned to cables ducts and manholes.	▪ Documentation for linear span placement of cables ducts: https://app.box.com/s/2m7ibx9d6hzxhn5wzsd7iry52t9rlkex ▪ Placement requirements of cables laying infrastructure along Cannes-Grasse railway line: https://app.box.com/s/z9xmhxeat5kmjwobpca61pjve698fvz3 ▪ Cables ducts and manholes library: https://app.box.com/s/059j7k40rpd0c9twmoyqrpqtsosrx3he ▪ 3D model of the cables laying infrastructure of Cannes-Grasse railway line: https://app.box.com/s/31duwxmsryifo18fqfunda09fw5kysgr ▪ Properties of cables ducts and manholes: https://app.box.com/s/6q74bhyv6y2huogato5kn3wutrjr3rit
Linear placement of Eurobalises and ERTMS signs	The provided datasets describe the positioning constraints that should be taken not consideration before positioning the Eurobalises and the ERTMS signs. These constraints are provided in PDF files. To save time during the storyline test, we have used the implementation test results of the Subgrade Renewal storyline, where an IFC model of railway tracks has been produced, to obtain the alignment data and use it directly as the linear reference to position our lineside signaling equipment. The positions to be tested for Eurobalises and ERTMS signs are described in a PPT file.	▪ Documentation of the positioning constraints of Eurobalises: https://app.box.com/s/06hqv4p6wztmhfz522xmamlnwbbj52pf ▪ Documentation of the ERTMS signs placement: https://app.box.com/s/8wd6d39vi9ozpeuak4qv5z8zjrbyd3f6 ▪ Positioning requirements of Eurobalises and ERTMS signs https://app.box.com/s/498fwjg5lrvjmgsrzmlnehdzs6afdniw ▪ IFC file representing the railway line where the signaling equipment have been positioned: https://app.box.com/s/7ttapzuvbdovu7475d8nszjp6z5peqgx

3D representation of signaling equipment	The datasets include IFC files that support the 3D representation of the signaling lineside equipment (Eurobalises and ERTMS signs) and a list of properties to be assigned. It is important to mention that the provided IFC files do not conform to the IFC 4.3 schema and the goal was to make them in accordance with this schema.	▪ IFC files representing the 3D geometry of Eurobalises and ERTMS signs: https://app.box.com/s/ncyublu0xgw7wgq5lylamwhjxaocuim5 ▪ List of the specific properties of Eurobalises and ERTMS signs: https://app.box.com/s/v8jowez10x364xa5vvask8rn6kdedx7i
3D representation of telecom equipment	The 3D representation of the telecom equipment that are involved in this storyline has been provided in different formats: DWG, RVT, RFA and IFC. the provided IFC files do not conform to the IFC 4.3 schema and the goal was to make them in accordance with this schema. The standardized general and specific properties of telecom equipment were also provided in Excel file.	▪ Dataset documentation: https://app.box.com/s/3za453u9sjaabp5f3nd4q078zzj1ixi3 ▪ 3D models of telecom casing elements: https://app.box.com/s/f5v61tgs7axt3fxdyrpdvthxrvfrb1ur ▪ 3D models of IP transmission equipment: https://app.box.com/s/ef8le5yygjr7zpn6axwryw2a74jbl0v9 ▪ 3D models of BTS and repeaters: https://app.box.com/s/qjyhia514udieb3naojvg1ekv5itsymc ▪ Properties of telecom equipment: https://app.box.com/s/yr1bstkjvknufv2ex9q12gc715hth1b9 ▪ IFC models of the telecom equipment: https://app.box.com/s/bipe79kopj0dw4obh6seyq7ddjygc6b4
Wired ports	The provided datasets support the topic of wired port by illustrating the wired transmission network used in the GSM-R base station subsystem on the one hand, and the connection interface of the wired transmission equipment on the other.	▪ Link to the dataset documentation: https://app.box.com/s/vlb4ec1gnw4h6x3jepqd714hwfihuti0 ▪ All the dataset files are available at this link: https://app.box.com/s/h0gb02dbsrdilfj6pcxkkx5824i629hu
System functional breakdown of GSMR base station subsystem	The provided datasets mainly consist of PDF files that describe the functional decomposition of the GSMR base station subsystem.	▪ Link to the dataset documentation: https://app.box.com/s/1vpcvhothyeiemo0u65v8lxsu9c3sl1m ▪ All the dataset files are available at this link: https://app.box.com/s/5ms6qltvutq867fout3ril81vwjj4nsw

4 Appendices

4.1 Storyline backlog

In this storyline, 3 topics haven't been addressed contrary to what was initially planned before the storyline test. They are, therefore, put in backlog. However, these topics have been well documented, and their documentations are available in the following BOX directories:

1. **Wireless connectivity and radio coverage representation for GSMR**
   - ✓ Documentations and datasets are available in the following directory: https://app.box.com/s/6l2uxbgpdld8v6p5l8zrek2oy2nry1or
2. **Power supply system for signaling/telecom active equipment in technical buildings**
   - ✓ Documentation is available at following link: https://app.box.com/s/wqxsnq34t6w2r4niubu2rih4im9c855t
3. **Space management inside technical rooms**
   - ✓ Documentations and datasets are available in the following directory: https://app.box.com/s/8vjmxwdxix0riyv1v11ins6ctqb0k4p0