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40 System Requirements Specification CCS System



System Requirements Specification CCS System

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Abstract	This document is the output of system requirement phase activities (phase 4) as specified in EN 50126-1:2017 for the CCS System. The objective of this document is to specify a comprehensive and identified set of requirements for the CCS System.
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1 Preamble

1.1 Purpose

This document is the output of system requirement phase activities (phase 4) as specified in [SPPRAMSS-349 - [EN 50126-1:2017]] for the SPMS-2098 - CCS System. The objective of this document is to specify a comprehensive and identified set of requirements for the SPMS-2098 - CCS System.

1.2 Intended audience

Domain experts involved in the tendering, development, verification, validation or assessment of the system under consideration (e.g. System Engineers, RAMSS Engineers, Developer, Tester, Assessors, etc).

1.3 Document context

As shown in SPP-19376 the System Requirement Specification CCS-System is based on the following inputs:

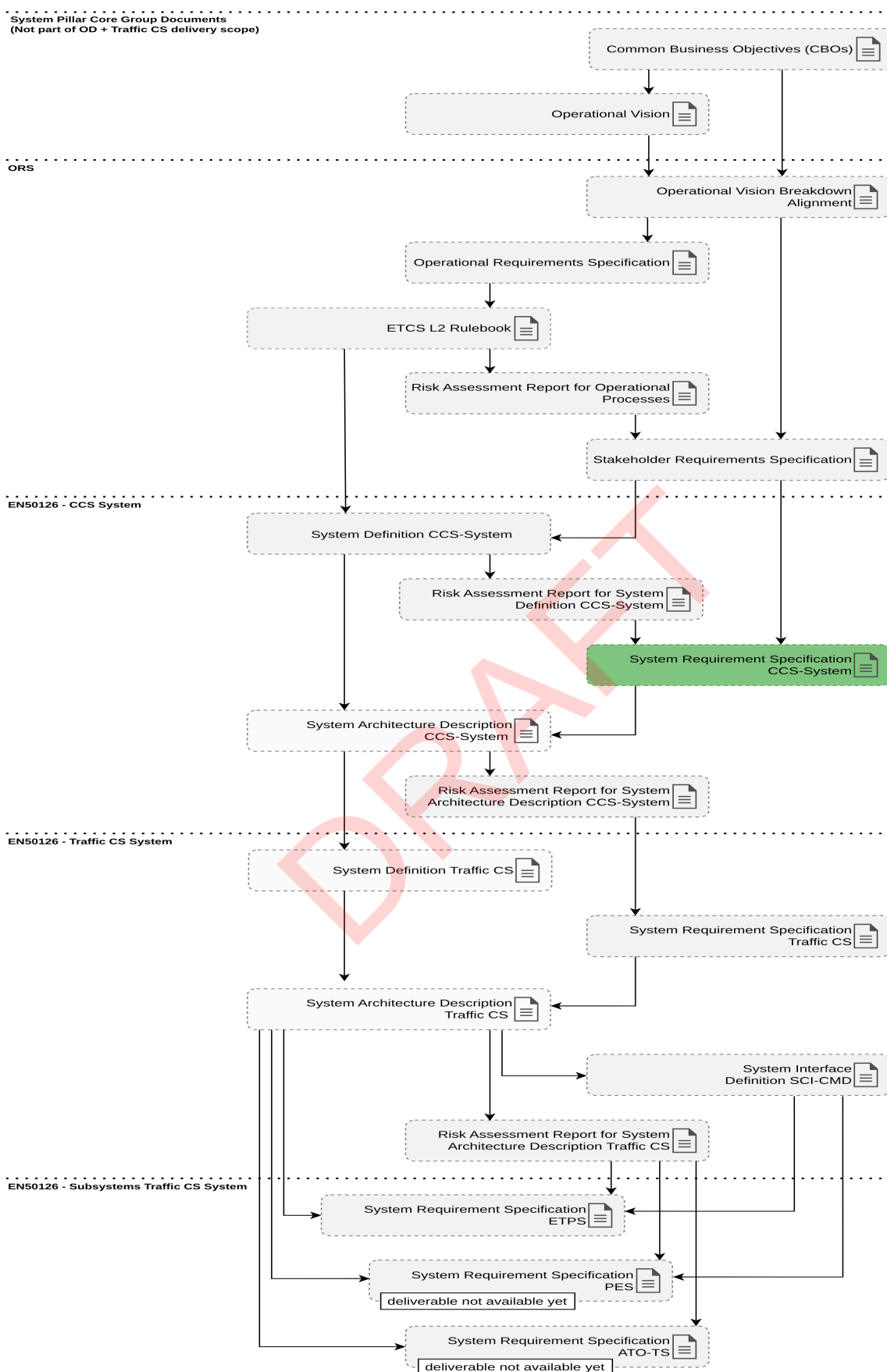
- [SPP-19163 - OD_Stakeholder Requirements Specification CCS System_V0.2]: This document contains all requirements to be fulfilled by the CCS system. Due to the MBSE approach used for the system engineering (see [SPP-18355 - EET_Systems Engineering Management Plan_V4.0]), these requirements can be traced directly from System Definition and to the System Architecture Description or via the System Requirement Specification CCS-System (this document). The System Requirement Specification CCS-System contains the Stakeholder Requirements which cannot be traced to an MBSE element (typically non-functional requirements).
- [SPP-19167 - TCS_Risk assessment report for the System Definition CCS_V0.2]: This document defines safety requirements and application conditions for the CCS system. Therefore, it is an input for the System Requirement Specification CCS-System.

Note:

The traceability of the artefacts of the System Requirement Specification CCS-System is shown in [SPP-18404 - OD_Stakeholder Requirements Specification: Traceability Report_V0.2].

The [SPP-18355 - EET_Systems Engineering Management Plan_V4.0] explains in more detail the dependencies between the different documents.




SPP-19376 below shows the System Requirement Specification CCS-System in the context of the overall document list (see also [SPP-19283 - Release Note ESPR1.0]).



ID	SPP-19376
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1.4 Glossary

1.4.1 Terms and definitions

Term	Definition
Configuration Data	The (CCS/TMS) Configuration Data refers to a conglomerate of different configuration data required for CCS/TMS systems. These can be broadly classified as  SPT2TS-127773 - Application Configuration Data,  SPT2TS-127774 - System Configuration Data and  SPT2TS-127775 - Software Configuration Data. CCS/TMS Configuration Data is provided via the configuration interface to the CCS/TMS Systems. The configuration data is assumed static within a version and changes occur only when there is a version change or increase, opposite to dynamic data, which may change within a configuration version of the system.

1.4.2 Abbreviations

Abbreviation	Definition
ATO	Automatic Train Operation
ETCS	European Train Control System

2 Application Conditions



Will be provided in a further release.

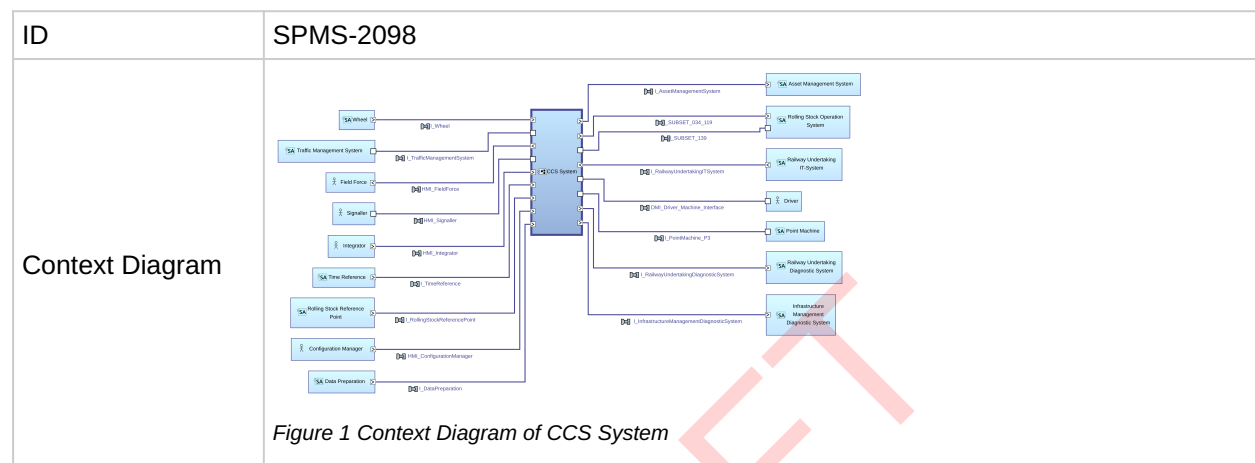
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3 System overview

3.1 System context

CCS System



The  SPMS-2098 - CCS System is a vital framework in railway operations, ensuring the safe and efficient movement of trains. By utilising precise signalling and train protection mechanisms, it helps to prevent collisions and mitigate other operational risks. The  SPMS-2098 - CCS System enables seamless and secure train operations across diverse railway networks, prioritising safety and reliability.



3.2 System interfaces




The interfaces of the CCS-System are described in the following chapters.

3.2-2 - I_TrafficManagementSystem

The interface  SPMS-2200 - I_TrafficManagementSystem connects  SPMS-2097 - Traffic Management System with  SPMS-2098 - CCS System.




ID	SPMS-2200
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3.2-3 - HMI_FieldForce

The interface  SPMS-2199 - HMI_FieldForce connects  SPMS-6160 - Field Force with  SPMS-2098 - CCS System.

ID	SPMS-2199
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


3.2-4 - HMI_Signaller

The interface  SPMS-2198 - HMI_Signaller connects  SPMS-2090 - Signaller with  SPMS-2098 -

CCS System.


ID	SPMS-2198
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3.2-5 - I_RollingStockReferencePoint

The interface  SPMS-2196 - I_RollingStockReferencePoint connects  SPMS-2091 - Rolling Stock Reference Point with  SPMS-2098 - CCS System.




ID	SPMS-2196
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3.2-6 - I_Wheel

The interface  SPMS-2201 - I_Wheel connects  SPMS-2101 - Wheel with  SPMS-2098 - CCS System.

ID	SPMS-2201
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


3.2-7 - I_SUBSET_034_119

The interface  SPMS-2197 - I_SUBSET_034_119 connects  SPMS-2098 - CCS System with  SPMS-2094 - Rolling Stock Operation System.

This interface needs to be according to https://www.era.europa.eu/system/files/2023-09/index081_-_SUBSET-119_v400.pdf.

ID	SPMS-2197
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3.2-8 - I_SUBSET_139

The interface  SPMS-2195 - I_SUBSET_139 connects  SPMS-2098 - CCS System with  SPMS-2094 - Rolling Stock Operation System.

This interface needs to be according to https://www.era.europa.eu/system/files/2023-09/index088_-_SUBSET-139_v100.pdf.




ID	SPMS-2195
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3.2-9 - I_EnterpriseResourcePlanning

The external interface  SPMS-2193 - I_EnterpriseResourcePlanning connects the  SPMS-2098 - CCS System with a  SPMS-2105 - To be deleted Enterprise Resource Planning.

ID	SPMS-2193
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3.2-10 - DMI_Driver_Machine_Interface

The interface  SPMS-2204 - DMI_Driver_Machine_Interface connects  SPMS-2098 - CCS System with  SPMS-2096 - Driver.

This interface needs to be according to ERA_ERTMS_015560 (https://www.era.europa.eu/system/files/2023-12/index006_-_ERA_ERTMS_015560_v400.zip).

ID	SPMS-2204
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3.2-11 - I_PointMachine_P3

The interface  SPMS-2202 - I_PointMachine_P3 connects  SPMS-2098 - CCS System with

✖ SPMS-2100 - Point Machine.



ID	SPMS-2202
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3.2-12 - I_TimeReference

The interface  SPMS-6266 - I_TimeReference connects ✖ SPMS-6265 - Time Reference with  SPMS-2098 - CCS System.



ID	SPMS-6266
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3.2-13 - I_DataPreparation

The interface  SPMS-2205 - I_DataPreparation connects ✖ SPMS-2088 - Data Preparation with  SPMS-2098 - CCS System.



ID	SPMS-2205
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3.2-14 - HMI_ConfigurationManager

The interface  SPMS-2206 - HMI_ConfigurationManager connects ✖ SPMS-2103 - Configuration Manager with  SPMS-2098 - CCS System.



ID	SPMS-2206
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3.2-15 - I_RailwayUndertakingITSystem

The interface  SPMS-5133 - I_RailwayUndertakingITSystem connects  SPMS-2098 - CCS System with ✖ SPMS-5084 - Railway Undertaking IT-System.



ID	SPMS-5133
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3.2-16 - I_AssetManagementSystem

The interface  SPMS-6229 - I_AssetManagementSystem connects  SPMS-2098 - CCS System with ✖ SPMS-6204 - Asset Management System.



ID	SPMS-6229
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3.2-17 - I_InfrastructureManagementDiagnosticSystem

The interface  SPMS-6230 - I_InfrastructureManagementDiagnosticSystem connects  SPMS-2098 - CCS System with ✖ SPMS-6202 - Infrastructure Management Diagnostic System.

ID	SPMS-6230
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3.2-18 - I_RailwayUndertakingDiagnosticSystem

The interface  SPMS-6231 - I_RailwayUndertakingDiagnosticSystem connects  SPMS-2098 - CCS System with ✖ SPMS-6203 - Railway Undertaking Diagnostic System.

ID	SPMS-6231
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3.2-19 - HMI_Integrator

The interface  SPMS-6516 - HMI_Integrator connects ✖ SPMS-6240 - Integrator with  SPMS-2098 -

CCS System.

ID	SPMS-6516
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3.3 System modes and states

Will be provided in further release.

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4 System requirements


4.1 Non-functional requirements

4.1-1 - In routine operation, CCS shall support the execution of requests without the need use ambiguous or verbal communication between other actors.

In routine operation, the CCS System shall support the execution of requests without the need to use unambiguous or verbal communication between other actors.


ID	SPP-24380
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4.1-2 - ATO GoA 3/4

The  SPMS-2098 - CCS System shall support automatic train operation in GoA 3/4 with ATO over ETCS.


ID	SPP-24423
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4.1-3 - In routine operation, CCS shall support the execution of requests without the need use ambiguous or verbal communication between other actors.

In routine operation, the  SPMS-2098 - CCS System shall support the execution of requests without the need to use unambiguous or verbal communication between other actors.


ID	SPP-24381
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4.1-4 - CCS shall use reference models, reference laboratories and automated compliance testing in accordance with the European approval procedure (CENELEC phases 6 to 9)

The  SPMS-2098 - CCS System shall use reference models, reference laboratories and automated compliance testing in accordance with the European approval procedure (CENELEC phases 6 to 9).


ID	SPP-24382
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4.1-5 - CCS system shall provide standardised interfaces

The  SPMS-2098 - CCS System shall provide standardised interfaces, enabling the connectivity of adapters (which are to be developed by the legacy party) from legacy side in order to avoid any customizations (e.g. to legacy national scenarios/requirements like Class B ATP systems) in the harmonized CCS systems and products.


ID	SPP-24383
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4.1-6 - CCS subsystems and their interfaces version compatibility

The  SPMS-2098 - CCS System subsystems and their interfaces shall have as little version dependency as possible in order to reduce adaptation efforts.

ID	SPP-24384
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4.1-7 - Enable implementation of Generic Applications with Safety Cases independent of Configuration Data

The  SPMS-2098 - CCS System shall enable the implementation of an 'Generic Application' based on 'Generic Products'. The 'Generic Application' shall have a full generic safety case in accordance with CENELEC 50126, that is independent of the Configuration Data (Infrastructure Data, Vehicle Data,

Parameter Data) utilised. This 'Generic Application' shall have no repercussion on the European type approvals of the used 'Generic Products' of the CCS system.


ID	SPP-24385
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4.1-8 - Enable implementation of Generic Products with Safety Cases independent of Configuration Data

The  SPMS-2098 - CCS System shall enable the implementation of 'Generic Products' for its subsystems. Each 'Generic Product' shall have a full generic product safety case in accordance with CENELEC 50126, that is independent of the Configuration Data (Infrastructure Data, Vehicle Data, Parameter Data) utilised.

ID	SPP-24386
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4.1-9 - Allow configuration of Generic Application according to local needs within predefined limits


The  SPMS-2098 - CCS System shall allow to define a 'Generic Application', in accordance with

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CENELEC 50126, that can be configured according to local needs (combination of subsystems + system parametrisation) within predefined limits.


ID	SPP-24387
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4.1-10 - Integration of external devices

The  SPMS-2098 - CCS System shall support the integration of external devices during system operation.


ID	SPP-24388
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4.1-11 - Upgradeability of adjacent systems

The  SPMS-2098 - CCS System shall support the upgradeability of adjacent systems during system operation.


ID	SPP-24389
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4.1-12 - Adherence to operational procedures

The  SPMS-2098 - CCS System shall ensure compliance with established operational procedures and rules during the supervision of operational production.


ID	SPP-24390
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4.1-13 - Compliance with safety-critical principles

The  SPMS-2098 - CCS System shall ensure that operational production adheres to safety-critical principles throughout the supervision process.


ID	SPP-24391
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4.1-14 - Independence from pre-engineered safety critical logic

The  SPMS-2098 - CCS System shall perform safety supervision independently of any pre-engineered safety critical logic models, such as fixed block sections.


ID	SPP-24393
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4.1-15 - Integration of external devices

The  SPMS-2098 - CCS System shall facilitate the integration of external devices with minimal manual configuration and testing requirements.


ID	SPP-24394
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4.1-16 - Decoupling of hardware and software components

The  SPMS-2098 - CCS System shall ensure the decoupling of hardware and software components to allow independent life cycles, utilising virtualisation, standard communication buses, and standardised software-hardware interfaces. This will also ensure continuous supply improvement and avoid obsolescence issues.


ID	SPP-24395
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4.1-17 - CCS shall support the separation between the central system and decentralised lineside devices

The  SPMS-2098 - CCS System shall support the separation between the central system and decentralised lineside devices.


ID	SPP-24396
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4.1-18 - Use standard hardware components

The  SPMS-2098 - CCS System shall use standard hardware components and ensure safety by software measures.


ID	SPP-24397
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4.1-19 - CCS shall be designed in such a way that specified components can be replaced and interconnected without the need to re-approve other components

The  SPMS-2098 - CCS System shall be designed in such a way that specified components can be replaced and interconnected without the need to re-approve other components.


ID	SPP-24398
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4.1-20 - CCS shall implement an architecture based on standardised interfaces to facilitate independent safety cases and approval processes for each subsystem

The  SPMS-2098 - CCS System shall implement an architecture based on standardised interfaces to facilitate independent safety cases and approval processes for each subsystem.


ID	SPP-24399
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4.1-21 - CCS shall follow modular design principles

The  SPMS-2098 - CCS System shall follow modular design principles.


ID	SPP-24400
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4.1-22 - Usage of FRMCS and GSM-R

The  SPMS-2098 - CCS System shall support use of FRMCS and GSM-R as the radio connection to vehicles.

ID	SPP-24401
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4.1-23 - CCS shall provide diagnostic information based on the generic part of the EULYNX/EU-Rail System Pillar standardised diagnostic interface, called SDI-xx.

The  SPMS-2098 - CCS System shall provide diagnostic information based on the generic part of the EULYNX/EU-Rail System Pillar standardised diagnostic interface, called SDI-xx.

ID	SPP-24402
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4.1-24 - CCS shall acquire system configuration data from a centralised service via a standardised interface, based on EULYNX SMI-xx.

The  SPMS-2098 - CCS System shall acquire system configuration data from a centralised service via a

standardised interface, based on EULYNX SMI-xx. Examples for this system configuration data: software updates, configuration values

ID	SPP-24403
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4.1-25 - CCS shall avoid as much as possible exported Safety-Related Application Conditions

When implementing safety relevant functions, the SPMS-2098 - CCS System shall avoid as much as possible exported Safety-Related Application Conditions.

ID	SPP-24404
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4.1-26 - CCS shall implement an architecture based on standardized interfaces to enable the integration of components from multiple suppliers

The SPMS-2098 - CCS System shall implement an architecture based on standardized interfaces to enable the integration of components from multiple suppliers.

ID	SPP-24405
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4.1-27 - CCS shall ensure decoupled lifecycles for its components to simplify asset management

The SPMS-2098 - CCS System shall ensure decoupled lifecycles for its components in order to simplify asset management.

ID	SPP-24406
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4.1-28 - CCS shall follow a generic safety approach in encapsulating safety relevant functions within building blocks with a separate safety approvals

The SPMS-2098 - CCS System shall follow a generic safety approach in encapsulating safety relevant functions within building blocks, allowing for separate safety approvals.

ID	SPP-24407
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4.1-29 - CCS Hardware, Software and Engineering Data shall be independently upgradeable to minimize engineering efforts and reduce deployment time.

The SPMS-2098 - CCS System Hardware, Software and Engineering Data shall be independently upgradeable in order to minimize engineering efforts and reduce deployment time.


ID	SPP-24408
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4.1-30 - CCS shall be based on Generic Products that can be configured using openly available configuration parameters to address varying application needs

The SPMS-2098 - CCS System shall be based on Generic Products that can be configured using openly available configuration parameters to address varying application needs.


ID	SPP-24409
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4.1-31 - CCS shall be adaptable to local performance requirements by ensuring the scalability of its software components

The  SPMS-2098 - CCS System shall be adaptable to local performance requirements by ensuring the scalability of its software components and their configuration and installation procedures.


ID	SPP-24410
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4.1-32 - CCS shall support scalable PRAMSS targets

The  SPMS-2098 - CCS System shall support scalable PRAMSS target requirements (range of acceptable target values).


ID	SPP-24411
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4.1-33 - Execution of Safety Supervision based on predefined procedures

The  SPMS-2098 - CCS System shall execute safety supervision based on predefined procedures, as functional logic and rules, using real-time data related to configurations, track usage, and asset conditions.


ID	SPP-24412
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4.1-34 - Minimum required Configuration Data implementation

The  SPMS-2098 - CCS System shall be implemented using only the minimum required set of configuration data necessary for operation.


ID	SPP-24413
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4.1-35 - Reduction of engineering complexity

The  SPMS-2098 - CCS System shall be designed to standardise the implementation of internal components and interfaces, minimising unnecessary complexity and variant implementations.


ID	SPP-24414
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4.1-36 - Upgradeability of Internal Components

The  SPMS-2098 - CCS System shall support the upgradeability of internal components during system operation.


ID	SPP-24415
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4.1-37 - Support for mixed fleet operation

The  SPMS-2098 - CCS System shall support the mixed operation of trains, including those with and without train integrity monitoring systems.


ID	SPP-24416
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4.1-38 - Management of variable System Capabilities

The  SPMS-2098 - CCS System shall automatically manage varying and changing system capabilities, including pre-defined degraded modes of supervised infrastructure and trains, while maintaining safety, production capacity, and automation at the highest achievable level.

ID	SPP-24417
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4.1-39 - Support Backward compatibility within the Target System architecture


The  SPMS-2098 - CCS System shall support backward compatibility between the subsystems of the

target system architecture where technically and economically justifiable.

Note: for Traffic CS this would be an enhanced feature to be technically and economically assessed


ID	SPP-24418
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4.1-40 - Implement standardised interfaces without hindering of innovation

The  SPMS-2098 - CCS System shall implement standardised interfaces which ensure backward compatibility between systems and subsystems, while allowing different implementations of core functions to ensure innovation.


ID	SPP-24419
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4.1-41 - CCS shall reduce engineering complexity

The  SPMS-2098 - CCS System shall design the internal components and internal and external interfaces in such a way that they can be implemented in a standardised way and without unnecessary variants implementation, support of isolated cases or unneeded complexity.

ID	SPP-24420
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4.1-42 - CCS designed to reduce OPEX


The  SPMS-2098 - CCS System shall be designed to reduce Opex by prioritising simplification, standardization and automation of Opex processes as far as this is economically justifiable.

Note:

- Opex includes efforts for the following processes: railway operation, railway maintenance, railway migration of CCS system (trackside and trainside), railway engineering as well as system operation, system maintenance and system development and management of system life cycle.


ID	SPP-24421
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4.1-43 - CCS shall base the information exchange to/from subsystem component on standard communication interfaces that shall be defined up to the physical layer.

Information exchange to/from subsystem components within interoperable configurations of the defined modular functional system architecture shall be specified in function and form - i.e. the standard communication interface shall be defined up to the physical layer and it shall constitute a FFFIS - Form Fit Functional Interface Specification (see definition in  SPT2OD-6831).


ID	SPP-24422
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4.1-44 - Implementation of TSI

The  SPMS-2098 - CCS System shall implement the TSI (Technical Specifications for Interoperability) in order to enable cutting edge technologies, harmonised operational processes and operational rules and to support a Single European Railway Area (SERA).


ID	SPP-24424
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4.1-45 - CCS shall be flexible enabling an efficient and affordable migration

The  SPMS-2098 - CCS System shall be flexible and able to manage full or partial supervision of shunting, train manoeuvres, yellow fleet and stabling during migration.


ID	SPP-24425
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4.1-46 - CCS shall support technical and operational interoperability

The  SPMS-2098 - CCS System shall support technical and operational interoperability ensuring compatibility among subsystems operating with different system versions.

ID	SPP-24426
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4.1-47 - Scalable, modular, multi-layered and standardised CCS architecture


The  SPMS-2098 - CCS System shall implement a scalable, modular, multi-layered and standardised architecture that relies on a robust and comprehensive architecture framework.

Notes:

- Subsystems and interfaces within the CCS system are defined during the phase logical architecture of SEMP and will take into account SPT2 architecture guidelines such as "ARC-D2.3 Granularity Concepts and Principles".
- The requirement is to be refined with concrete concepts in further work.

ID	SPP-24427
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4.1-48 - CCS shall achieve increased standards of reliability, precision and safety

The  SPMS-2098 - CCS System shall ensure higher levels of reliability, precision and safety of the operations in normal and degraded modes regardless of the type of operation (automated, semi-automated or manual).


ID	SPP-24429
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4.1-49 - CCS shall be designed to use ETCS L2 without non-harmonised, optical signals.

Traffic CS shall be designed to use ETCS L2 without non-harmonised, optical signals.


ID	SPP-24430
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4.1-50 - CCS shall allow manoeuvres with cab-signalling (with no light signals) or using harmonised dwarf light signals.

The  SPMS-2098 - CCS System shall allow manoeuvres with cab-signalling (with no light signals) or using harmonised dwarf light signals.


ID	SPP-24431
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4.1-51 - CCS shall support trains equipped with ETCS Baseline 3 (ETCS Level 2 only). This means CCS will implement ETCS System Version 2 on the trackside. The implemented ETCS System Versions can be raised over time

The  SPMS-2098 - CCS System shall support trains equipped with ETCS Baseline 3 and above (ETCS Level 2 only). This means Traffic CS will initially implement ETCS System Version 2. The implemented ETCS System Versions can be raised over time.

ID	SPP-24432
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4.1-52 - CCS shall support the integration of complementary sensor information and data sources that enable the supervision of vehicles as well as trackside personnel and rail customers.

The  SPMS-2098 - CCS System shall support the integration of complementary sensor information and data sources that enable the supervision of trackbound and non-trackbound vehicles (e.g. excavator,

crane) as well as trackside personnel and rail customers (e.g. passenger counters at the platform) to enable the comprehensive and continuous supervision of the railway operation.


ID	SPP-24433
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4.1-53 - CCS shall allow movements from any point A to any point B without restrictions, if a route is available and is physically feasible.

The  SPMS-2098 - CCS System shall allow movements from any point A to any point B without restrictions, if a route is available and is physically feasible..


ID	SPP-24434
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4.1-54 - CCS shall deploy and use future sensor technology, based on defined Standard Interfaces) with no impact on the Traffic CS safety logic

The  SPMS-2098 - CCS System shall deploy and use future sensor technology, based on defined Standard Interfaces) with no impact on the Traffic CS safety logic


ID	SPP-24435
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4.1-55 - CCS shall implement functionalities that allow the use and combination of different types of sensor technologies and information

The  SPMS-2098 - CCS System shall implement functionalities that allow the use and combination of different types of sensor technologies and information, in order to increase system availability limiting degraded situation occurrences due to sensor faults.


ID	SPP-24436
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4.1-56 - CCS shall be based on standardized products and configurations

The  SPMS-2098 - CCS System shall be based on standardized products and configurations to minimize site-specific engineering efforts and project-specific adaptations.


ID	SPP-24437
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4.1-57 - CCS shall minimize the number of configuration parameters for Generic and Specific Applications

The  SPMS-2098 - CCS System shall minimize the number of configuration parameters for Generic and Specific Applications


ID	SPP-24438
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4.1-58 - Dynamic track path determination

The  SPMS-2098 - CCS System shall support the ability for the trackside CCS to dynamically segmentate and allocate track paths to performed planned operations in the most track capacity-optimal manner in relation to the real time operating state of the network and its assets.

ID	SPP-24439
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4.1-59 - CCS shall allow the definition of specific application configuration(s) for supporting the supervision of operational production of all types of infrastructure needs and users

The  SPMS-2098 - CCS System shall allow the definition of specific application configuration(s) for supporting the supervision of the operational production of all types of infrastructure needs and users

ID	SPP-24440
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4.2 Functional requirements

Will be provided in further release.

4.3 Lifecycle aspects

Will be provided in further release.







Note:

The following type of requirements will be provided in this section:

- **Policy and regulation:**
Requirements from organizational policies and business practices that will affect the operation or performance of the system. In addition, requirements from relevant external regulations shall be listed here. Examples of requirements include multilingual support, labour policies and protection of personnel information.
- **Development, certification and validation:**
Requirements that are relevant to the system development process (also including standardisation initiatives) and further ones that must be met to obtain the certification according to the applicable standards, e.g. tests to be performed, organisation that will be responsible for certification.
- **Manufacturing and assembly:**
Requirements for health and safety criteria, including those basic to the design of the system, with respect to equipment characteristics, methods of operation and environmental influences such as toxic systems and electromagnetic radiation.
- **Commissioning:**
Define the system requirements that are necessary to perform a safe and reliable commissioning.
- **System life cycle sustainment:**
Outline of quality activities, such as review and measurement collection and analysis, to help realize a quality system. Life cycle sustainment also includes provision of facilities needed to provide operational and depot-level support, spares, sourcing and supply, provisioning, technical documentation and data, support-personnel training, initial cadre training and initial contractor-logistics support.
- **Packaging, handling, shipping and transportation:**
Requirements imposed on the system to make certain that it can be packaged, handled, shipped, transported and stored within its intended operational context.
- **Adaptability:**
Requirements that demand flexibility for future adjustments. For example, if the system will require future network bandwidth, the applicable hardware should be specified with extra card slots to accommodate new network cards as demand increases.
- **Longevity:**
Requirements regarding minimum total life expectancy, required operational session duration or planned utilization rate. This is as opposed to the topic availability which would mean requirements for uptime within the expected service life and probability of failure.
- **Decommissioning and disposal:**
Requirements that are necessary to perform a safe and reliable decommissioning and disposal.

5 Appendix

5.1 References

Id	Description	Reference
[ SPP-18362 - EET_Requirements Management Plan Version_1.0]	For System Pillar the plan describes a strategy for traceability between requirements levels, architecture elements and application conditions. Further the type of requirements and their related workflows are defined.	Link
[ SPP-19163 - OD_Stakeholder Requirements Specification CCS System_V0.2]	Stakeholder Requirements Specification	Link
[ SPP-18404 - OD_Stakeholder Requirements Specification: Traceability Report_V0.2]	Shows the linking between the Stakeholder Requirements and the CCS System.	Link
[ SPP-19283 - Release Note ESPR1.0]	This Release Note describes the scope of the ESPR1.0.	Link
[ SPP-19167 - TCS_Risk assessment report for the System Definition CCS_V0.2]	This document provides the results of the risk assessment of the CCS System (according to CENELEC Phase 3, see PRAMS Plan CP 3).	Link
[EN 50126-1:2017">  SPPRAMSS-349 - EN 50126-1:2017]	Railway Applications – The Specification and Demonstration of Reliability,	-

Id	Description	Reference
	Availability, Maintainability and Safety (RAMS) - Part 1: Generic RAMS Process	

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