



ERJU SYSTEM PILLAR

# **50 System Architecture Description Traffic CS**



# System Architecture Description Traffic CS

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**Approved by Reviewers**

Type of Approval	 Document Review
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**Approved by Approvers**

Type of Approval	 Document Approval
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1	Preamble	6
1.1	Purpose	6
1.2	Intended audience	6
1.3	Context of this document	6
1.4	Glossary	8
1.4.1	Terms and definitions	8
1.4.2	Abbreviations	8
2	Overview	9
2.1	Overall description	9
2.2	Architectural principles	9
2.3	Functional distribution	9
2.4	Geographical description	10
3	Subsystems	11
3.1	Subsystem Plan Execution System (PES)	11
3.1.1	Functions	12
3.1.2	States	19
3.1.3	Non-functional requirements	19
3.1.4	Installation spaces	19
3.2	Subsystem European Trackside Protection System (ETPS)	19
3.2.1	Functions	20
3.2.2	States	32
3.2.3	Non-functional requirements	32
3.2.4	Installation spaces	32
3.3	Subsystem Automatic Train Operation Trackside (ATO-TS)	32
3.3.1	Functions	33
3.3.2	States	38
3.3.3	Non-functional requirements	38
3.3.4	Installation spaces	38
4	System interfaces	39
4.1	External interfaces	39
4.2	Internal interfaces	45
4.2.1	SCI_CMD	45
5	System behaviour	47
5.1	Perform operational plan movement	47
5.2	Perform train movement	47
5.3	Grant movement permission	48
5.4	Release movement permission	51
5.5	Shorten movement permission	53
5.5.1	Shorten movement permission (Signaller request)	54
5.5.2	Shorten movement permission (General)	56
5.6	Set point position	58
5.6.1	Set point position (Operational plan)	58
5.6.2	Set point position (Signaller)	59




5.6.3 Set point position (General)	61
5.7 Activate usage restriction	63
5.8 Deactivate usage restriction	66
5.9 Execute end of mission	70
5.9.1 Execute end of mission - General	70
5.9.2 Execute end of mission - No communication remaining	72
5.9.3 Execute end of mission - ATO	73
6 Non-Functional System Requirement Breakdown	76
7 System data	77
7.1 Exchange items	77
7.2 Data classes	98
8 Appendix	99
8.1 References	99

DRAFT

# 1 Preamble


## 1.1 Purpose

This document describes the System Architecture as required per  SPPRAMSS-349 - [EN 50126-1:2017] phase 5 (architecture and apportionment of system requirements) for the Traffic CS system. It contains a general description of the system architecture to justify the architectural decisions. The goal is to convey a clear and overall understanding of the considered principles which led to the chosen architecture and to describe how the system architecture provides a solution to the system requirements.


## 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).

Note:

This documentation is not intended for a general audience. For a comprehensive understanding of Traffic CS, please refer to the Traffic CS System Concept  SPP-19049 - Traffic CS System Concept V1.0].



## 1.3 Context of this document

As shown in  [SPT2TRAFFIC-12802](#), the System Architecture Description of the Traffic CS system is based on the following inputs:

-  SPP-18107 - TCS\_System Definition Traffic CS\_V0.2]  
This document describes the capabilities to be provided by the Traffic CS system.



Note:

The traceability between the artefacts of the  SPP-18056 - System Definition CCS-System R1] and the System Architecture Description of the CCS-System is shown in  SPP-19877 - TCS\_Traceability Report System Architecture Description Traffic CS\_V0.4].

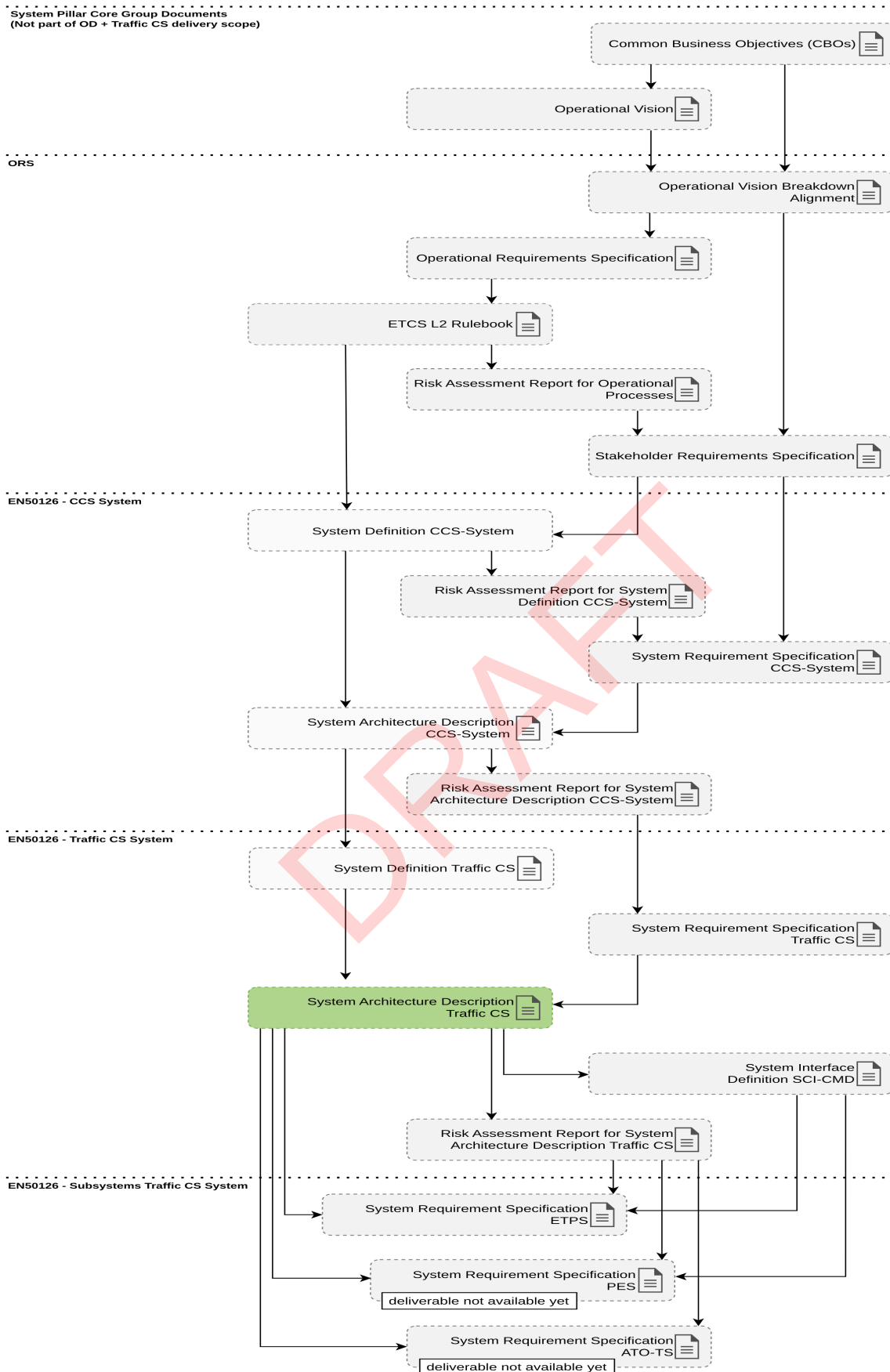
-  SPP-18108 - TCS\_System Requirement Specification Traffic CS\_V0.2]:  
This document contains the system requirements defined for the Traffic CS System. Due to the MBSE approach used within System Pillar, the system requirements contain mainly non-functional requirements. Functional requirements are covered by the capabilities defined in  SPP-18107 - TCS\_System Definition Traffic CS\_V0.2].

The System Architecture Description of the Traffic CS system contains the allocation of the capabilities and requirements defined by the input documents to the different System Level 5 systems. Therefore, the System Architecture Description of the Traffic CS system is an input document for:

- the subsequent Risk and Hazard Analysis
- the System Requirement Specifications of the identified System Level 5 systems

The  SPP-18355 - EET\_Systems Engineering Management Plan\_V4.0  explains in more detail the dependencies between the different documents.

 [SPT2TRAFFIC-12802](#) below shows the System Architecture Description of the Traffic CS system in the context of the overall document list (see also  SPP-19283 - Release Note ESPR1.0]).



ID	SPT2TRAFFIC-12802
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## 1.4 Glossary

### 1.4.1 Terms and definitions

Term	Definition
Single European Railway Area	Defining the fundamental design principles and process for adopting a functional architecture for rail as a system, with a focus on CCS, CMS and TMS supporting the implementation of the SERA (Single European Railway Area)


### 1.4.2 Abbreviations

Abbreviation	Definition
SERA	Single European Railway Area

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## 2 Overview

## 2.1 Overall description

 SPMS-4555 shows the decomposition of the Traffic CS system into its subsystems and the involved interfaces.

Note:

Further interface will be added in future releases of this document. At least the following interfaces will be added (list no Exhaustion):

- Handover Interface to adjacent ETPS

### [PAB] Traffic CS System [Architecture context description]

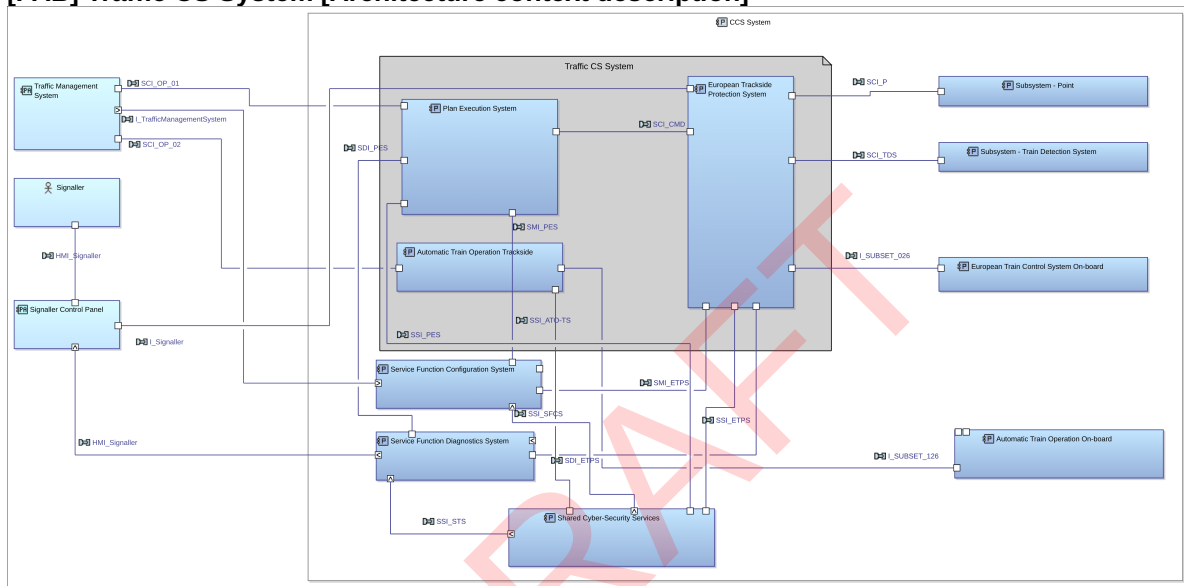


Figure 1 Diagram [PAB] Traffic CS System [Architecture context description]

ID	SPMS-4555
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## 2.2 Architectural principles

The architectural principles and the solution decisions made which led to the choice of the system architecture are described in detail in [SPP-18486 - Traffic CS - Major Design Decisions V1.0].

## 2.3 Functional distribution

 SPMS-4558 shows the function allocation to the different subsystems of Traffic CS.

## [PAB] Traffic CS System [Functions allocation]

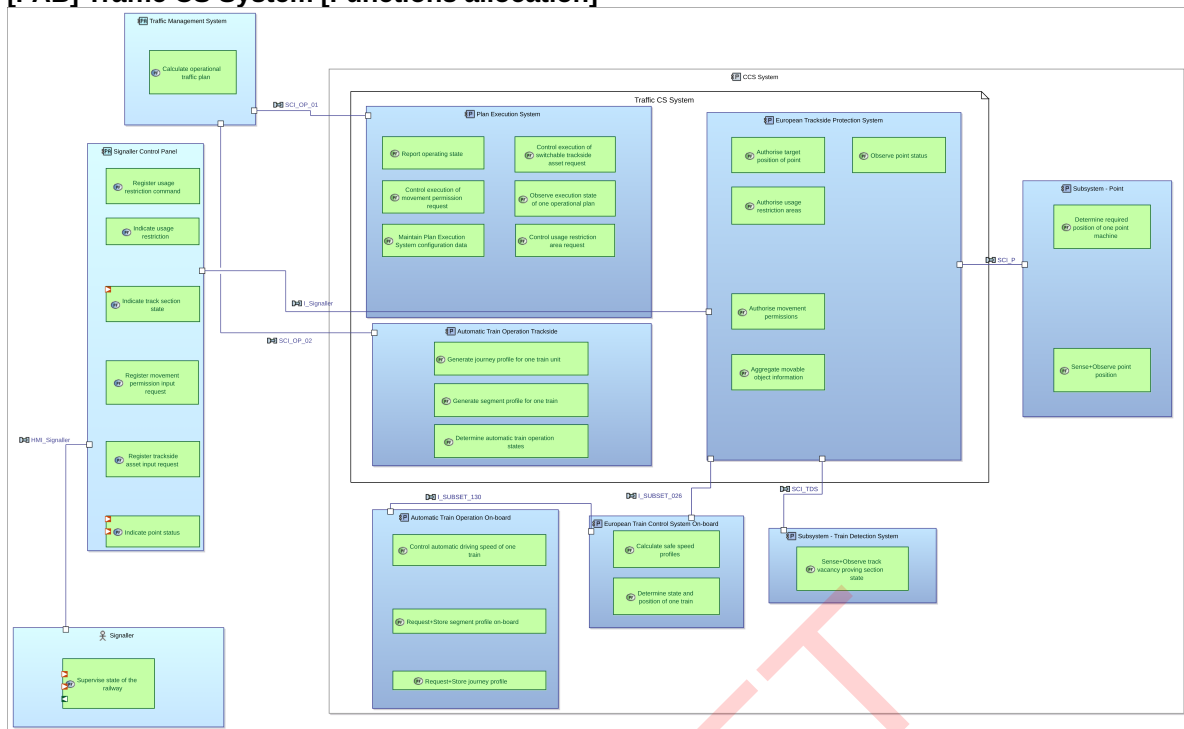


Figure 2 Diagram [PAB] Traffic CS System [Functions allocation]

ID	SPMS-4558
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## 2.4 Geographical description

Not applicable. Will be defined for each subsystem in other documentation.

## 3 Subsystems

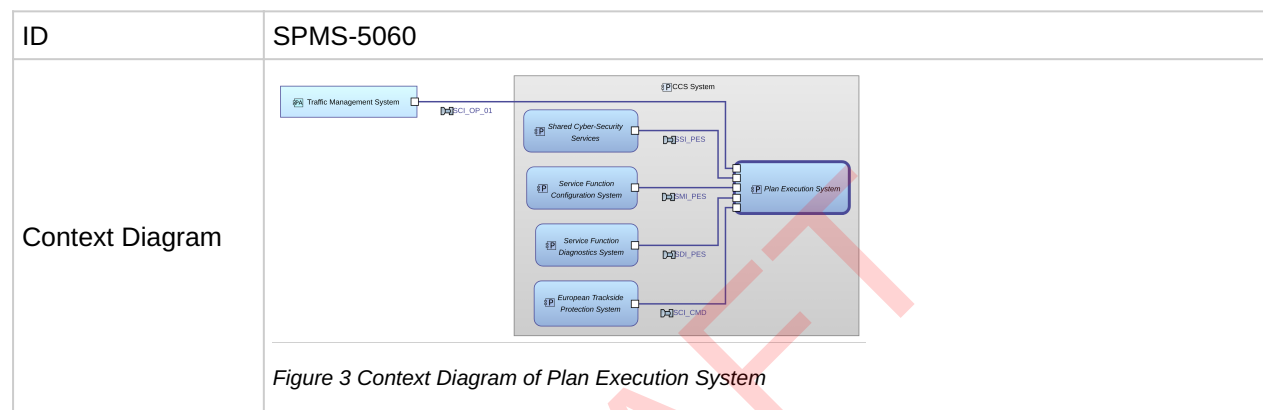
### 3.1 Subsystem Plan Execution System (PES)





































#### 3.1-1 - Plan Execution System

The Plan Execution System (PES) is the bridge between Traffic Management System (TMS) and the European Trackside Protection System (ETPS). It processes the Operational Plans provided by the TMS by deriving time-optimised Trackside Assets states and Movement Permission requests towards the ETPS and provides the Operating State within the area of control received from the ETPS to the TMS.

It has the following characteristics:


- implements Basic Safety Integrity Level functionalities



Allocated	<ul style="list-style-type: none"><li>•  SPMS-4877 - Control execution of switchable trackside asset request</li><li>•  SPMS-4878 - Control execution of movement permission request</li><li>•  SPMS-4880 - Observe execution state of one operational plan</li><li>•  SPMS-4922 - Maintain Plan Execution System configuration data</li><li>•  SPMS-5355 - Report operating state</li><li>•  SPMS-5723 - Control usage restriction area request</li></ul>																				
Interfaces	<table><tr><th>Interface</th><th>Direction</th><th>Partner</th></tr><tr><td>•  SPMS-6302 - SCI_OP_01</td><td>bidirectional</td><td>•  SPMS-5111 - Traffic Management System</td></tr><tr><td>•  SPMS-6308 - SCI_CMD</td><td>bidirectional</td><td>•  SPMS-5062 - European Trackside Protection System</td></tr><tr><td>•  SPMS-6712 - SDI_PES</td><td>bidirectional</td><td>•  SPMS-6295 - Service Function Diagnostics System</td></tr><tr><td>•  SPMS-6715 - SMI_PES</td><td>bidirectional</td><td>•  SPMS-6294 - Service Function Configuration System</td></tr><tr><td>•  SPMS-7930 - SSI_PES</td><td>bidirectional</td><td>•  SPMS-6696 - Shared Cyber-Security Services</td></tr></table>	Interface	Direction	Partner	•  SPMS-6302 - SCI_OP_01	bidirectional	•  SPMS-5111 - Traffic Management System	•  SPMS-6308 - SCI_CMD	bidirectional	•  SPMS-5062 - European Trackside Protection System	•  SPMS-6712 - SDI_PES	bidirectional	•  SPMS-6295 - Service Function Diagnostics System	•  SPMS-6715 - SMI_PES	bidirectional	•  SPMS-6294 - Service Function Configuration System	•  SPMS-7930 - SSI_PES	bidirectional	•  SPMS-6696 - Shared Cyber-Security Services		
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•  SPMS-7930 - SSI_PES	bidirectional	•  SPMS-6696 - Shared Cyber-Security Services																			

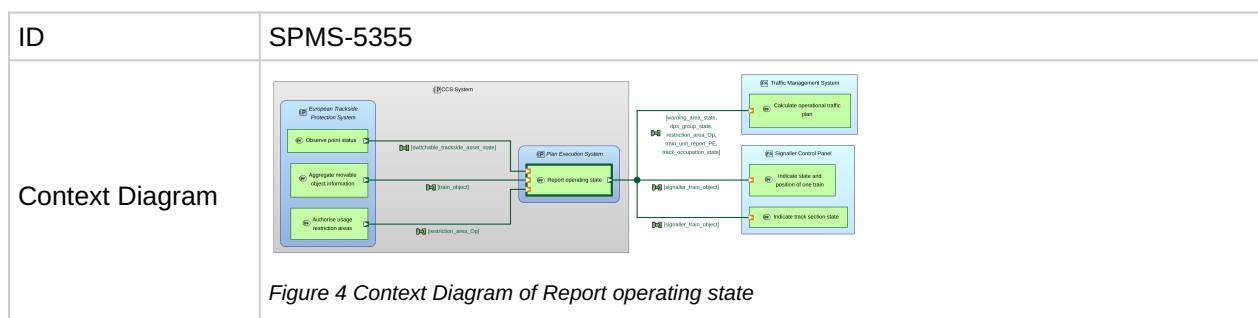
### 3.1.1 Functions

#### 3.1.1-1 - Report operating state





























This function is allocated to  SPMS-5060 - Plan Execution System.

This function reports:

- Status of all points
- Status of all level crossings
- Aggregated track occupancy information
- All movement permissions
- All usage restrictions, including temporary speed restrictions (TSRs)





Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6411 - Observed point status <ul style="list-style-type: none"> <li> SPMS-7747 - switchable_trackside_asset_state</li> </ul>	 SPMS-4888 - Observe point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-6334 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4871 - Aggregate movable object information	 SPMS-5062 - European Trackside Protection System
Output exchanges	 SPMS-6346 - Authorised usage restriction <ul style="list-style-type: none"> <li> SPMS-7822 - restriction_area_Op</li> </ul>	 SPMS-5724 - Authorise usage restriction areas	 SPMS-5062 - European Trackside Protection System
	Output exchanges	Target function	Function allocated to
	 SPMS-6416 - Reported operating state <ul style="list-style-type: none"> <li> SPMS-7820 - warning_area_state</li> <li> SPMS-7821 - dps_group_state</li> <li> SPMS-7822 - restriction_area_Op</li> <li> SPMS-7823 - train_unit_report_PE</li> <li> SPMS-5137 - track_occupation_state</li> </ul>	 SPMS-4875 - Calculate operational traffic plan	 SPMS-5111 - Traffic Management System
	 SPMS-7970 - Reported operating state <ul style="list-style-type: none"> <li> SPMS-7955 - signaller_train_object</li> </ul>	 SPMS-7141 - Indicate state and position of one train	 SPMS-6984 - Signaller Control Panel
	 SPMS-7971 - Reported operating state <ul style="list-style-type: none"> <li> SPMS-7955 - signaller_train_object</li> </ul>	 SPMS-4910 - Indicate track section state	 SPMS-6984 - Signaller Control Panel

### 3.1.1-2 - Observe execution state of one operational plan

This function is allocated to  SPMS-5060 - Plan Execution System.

This function reports events which reflect the execution state of one operational plan, e.g. that a train has reached its final destination according to the operational plan.

ID	SPMS-4880
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Context Diagram	<p>Figure 5 Context Diagram of Observe execution state of one operational plan</p>		
Input exchanges	<b>Input exchanges</b> <ul style="list-style-type: none"> <li>SPMS-6329 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li>SPMS-5119 - train_object</li> </ul> </li> <li>SPMS-7145 - Requested execution state of one operational plan <ul style="list-style-type: none"> <li>SPMS-7144 - operational_plan_execution_request</li> </ul> </li> </ul>	<b>Source function</b> <ul style="list-style-type: none"> <li>SPMS-4871 - Signal State</li> <li>SPMS-4875 - Signal State</li> </ul>	<b>Function allocated to</b> <ul style="list-style-type: none"> <li>SPMS-5060 - European Trackside Protection System</li> <li>SPMS-5111 - Traffic Management System</li> </ul>
Output exchanges	<b>Output exchanges</b> <ul style="list-style-type: none"> <li>SPMS-6400 - Observed execution state of one operational plan <ul style="list-style-type: none"> <li>SPMS-5138 - operational_plan_execution_report</li> </ul> </li> <li>SPMS-6443 - Responded movement permission <ul style="list-style-type: none"> <li>SPMS-5480 - shorten_movement_permission_response</li> </ul> </li> </ul>	<b>Target function</b> <ul style="list-style-type: none"> <li>SPMS-4875 - Signal State</li> <li>SPMS-4910 - Signal State</li> </ul>	<b>Function allocated to</b> <ul style="list-style-type: none"> <li>SPMS-5111 - Traffic Management System</li> <li>SPMS-6094 - Signal State</li> </ul>

### 3.1.1.3 - Maintain Plan Execution System configuration data

This function is allocated to SPMS-5060 - Plan Execution System.

This functions preloads, and activates preloaded system configuration version.

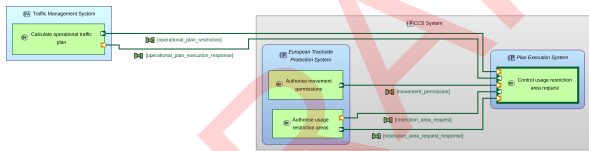
ID	SPMS-4922		
Context Diagram	<p>Figure 6 Context Diagram of Maintain Plan Execution System configuration data</p>		
Input exchanges	<b>Input exchanges</b> <p>No exchange items allocated on SPMS-7731 - Actual state of configuration data.</p>	<b>Source function</b> <ul style="list-style-type: none"> <li>SPMS-7663 - Maintain configuration data</li> </ul>	<b>Function allocated to</b> <ul style="list-style-type: none"> <li>SPMS-6294 - Service Function Configuration System</li> </ul>









Output exchanges	Output exchanges	Target function	Function allocated to
	No exchange items allocated on ➡ SPMS-6361 - Activated state of configuration data.	5F SPMS-4877 - Control execution of switchable trackside asset request	SPMS-5060 - Plan Execution System
	No exchange items allocated on ➡ SPMS-6362 - Activated state of configuration data.	5F SPMS-4878 - Control execution of movement permission request	SPMS-5060 - Plan Execution System
	No exchange items allocated on ➡ SPMS-7744 - Activated state of configuration data.	5F SPMS-7663 - Maintain configuration data	SPMS-6294 - Service Function Configuration System

### 3.1.1-4 - Control usage restriction area request


This function is allocated to SPMS-5060 - Plan Execution System.

This functions derives a time-based request for activation and deactivation of one usage restriction area or pre-defined usage restriction area according to the operational plan restriction, taking into account the status of all other usage restrictions and granted movement permissions.

ID	SPMS-5723		
Context Diagram	 <p>Figure 7 Context Diagram of Control usage restriction area request</p>		
Input exchanges	Input exchanges	Source function	Function allocated to
	➡ SPMS-6353 - Calculated operational traffic plan • ➡ SPMS-7756 - operational_plan_restriction	5F SPMS-4875 - Calculate operational traffic plan	SPMS-5111 - Traffic Management System
	➡ SPMS-6344 - Authorised usage restriction • ➡ SPMS-7801 - restriction_area_request_response	5F SPMS-5724 - Authorise usage restriction areas	SPMS-5062 - European Trackside Protection System
	➡ SPMS-6604 - Authorised movement permission • ➡ SPMS-2372 - movement_permission	5F SPMS-4883 - Authorise movement permissions	SPMS-5062 - European Trackside Protection System




































Output exchanges	Target function	Function allocated to
 SPMS-6424 - Requested usage restriction <ul style="list-style-type: none"> <li>  SPMS-7754 - restriction_area_request           </li> </ul>	 SPMS-5724 - SPMS-5062age restriction	 SPMS-5062age restriction
 SPMS-7890 - Responded operational traffic plan <ul style="list-style-type: none"> <li>  SPMS-5136 - operational_plan_execution_response           </li> </ul>	 SPMS-4875 - SPMS-5111	 SPMS-5111 - Traffic Management System

### 3.1.1-5 - Control execution of switchable trackside asset request


This function is allocated to  SPMS-5060 - Plan Execution System.

This function determines the optimal time to request a turnout of a point. It takes into account various input parameters, including the planned track path, the current position, the status and technical turnaround time of the point, the current position of the train and the usage restriction areas with restriction types, its expected speed profile and current movement authority as well as the estimated reaction time of the train driver.

[illegible]

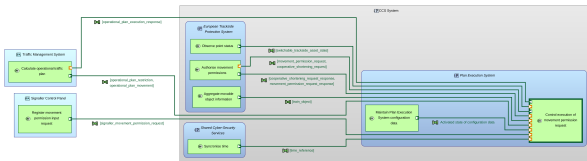























































































Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6430 - Response to point position request <ul style="list-style-type: none"> <li> SPMS-5191 - switchable_trackside_asset_request_response</li> </ul>	 SPMS-4903	 SPMS-5062 - Plan Execution System
	 SPMS-6436 - Synchronised current time <ul style="list-style-type: none"> <li> SPMS-2412 - time_reference</li> </ul>	 SPMS-4897	 SPMS-6606 - Shared Cyber
	 SPMS-6328 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4871	 SPMS-3062 - Electronic Train
	 SPMS-6409 - Observed point status <ul style="list-style-type: none"> <li> SPMS-7747 - switchable_trackside_asset_state</li> </ul>	 SPMS-4888	 SPMS-5062 - European Tra
	No exchange items allocated on  SPMS-6361 - Activated state of configuration data.	 SPMS-4922	 SPMS-5062 - Plan Execution System
	 SPMS-6414 - Registered input <ul style="list-style-type: none"> <li> SPMS-4926 - signaller_point_position_request</li> </ul>	 SPMS-4911	 SPMS-6606 - Signaller Com
	 SPMS-6347 - Calculated operational traffic plan <ul style="list-style-type: none"> <li> SPMS-2370 - operational_plan_movement</li> </ul>	 SPMS-4875	 SPMS-5119 - Operational Traffic
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6422 - Requested point position <ul style="list-style-type: none"> <li> SPMS-7746 - switchable_trackside_asset_request</li> </ul>	 SPMS-4903	 SPMS-5062 - Plan Execution System
	 SPMS-7828 - Registered input response <ul style="list-style-type: none"> <li> SPMS-7824 - signaller_point_position_request_response</li> </ul>	 SPMS-4913	 SPMS-6606 - Signaller Control










### 3.1.1-6 - Control execution of movement permission request

This function is allocated to  SPMS-5060 - Plan Execution System.

This functions derives a time-based request for a movement permission according to the operational traffic plan (this can include a request to shorten an existing movement permission). Thereby, it takes into account the position and status of the points (and the level crossings) for the planned movement.

This function is also able to reply to the submitter (TMS or Signaller) requesting a (shortened) movement permission by using i.a operating state information.

ID	SPMS-4878																										
Context Diagram	<div></div> <p>Figure 9 Context Diagram of Control execution of movement permission request</p>																										
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Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6421 - Requested movement permission <ul style="list-style-type: none"> <li> SPMS-4928 - movement_permission_request</li> <li> SPMS-7786 - cooperative_shortening_request</li> </ul>	 SPMS-4883 -	 SPMS-5062 - European Trackside Protection System
	 SPMS-6442 - Responded operational traffic plan <ul style="list-style-type: none"> <li> SPMS-5136 - operational_plan_execution_response</li> </ul>	 SPMS-4875 -	 SPMS-5114 - Traffic Management System

### 3.1.2 States

Will be provided in a future release.

### 3.1.3 Non-functional requirements

Will be provided in a future release.

### 3.1.4 Installation spaces

Will be provided in a future release.

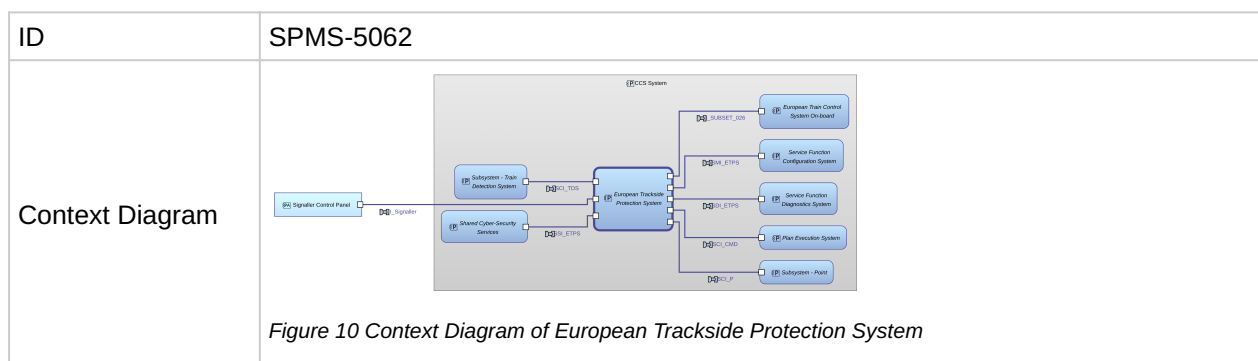
## 3.2 Subsystem European Trackside Protection System (ETPS)

























































### 3.2-1 - European Trackside Protection System

Implements the safety-critical functionality within Traffic CS to control all trackside elements connected to ETPS, for example points, level crossings, and to manage movement permissions for trains, whilst maintaining the safety of the railway.

ETPS acts as a gate keeper and evaluates if the commands received via SCI\_CMD interface can be implemented safely. Only if they can be implemented safely, the received commands are forwarded to the corresponding trackside element or the corresponding train.


In order to do this, ETPS maintains the Operating State for its area of control, containing all track occupancies and Movement Permissions within the area of control.



Allocated	<ul style="list-style-type: none"><li>•  SPMS-4871 - Aggregate movable object information</li><li>•  SPMS-4883 - Authorise movement permissions</li><li>•  SPMS-4888 - Observe point status</li><li>•  SPMS-4903 - Authorise target position of point</li><li>•  SPMS-4920 - Maintain European Trackside Protection System configuration data</li><li>•  SPMS-5724 - Authorise usage restriction areas</li><li>•  SPMS-6672 - Manage radio communication session with ETCS-OB</li><li>•  SPMS-7011 - Monitor+Store European Trackside Protection System asset state</li></ul>																													
Interfaces	<table><tr><th>Interface</th><th>Direction</th><th>Partner</th></tr><tr><td>•  SPMS-6310 - SCI_P</td><td>bidirectional</td><td>•  SPMS-5068 - Subsystem - Point</td></tr><tr><td>•  SPMS-6311 - SCI_TDS</td><td>bidirectional</td><td>•  SPMS-5070 - Subsystem - Train Detection System</td></tr><tr><td>•  SPMS-6308 - SCI_CMD</td><td>bidirectional</td><td>•  SPMS-5060 - Plan Execution System</td></tr><tr><td>•  SPMS-6306 - I_SUBSET_026</td><td>bidirectional</td><td>•  SPMS-5063 - European Train Control System On-board</td></tr><tr><td>•  SPMS-6705 - SDI_ETPS</td><td>bidirectional</td><td>•  SPMS-6295 - Service Function Diagnostics System</td></tr><tr><td>•  SPMS-6706 - SMI_ETPS</td><td>bidirectional</td><td>•  SPMS-6294 - Service Function Configuration System</td></tr><tr><td>•  SPMS-6985 - I_Signaller</td><td>bidirectional</td><td>•  SPMS-6984 - Signaller Control Panel</td></tr><tr><td>•  SPMS-7929 - SSI_ETPS</td><td>bidirectional</td><td>•  SPMS-6696 - Shared Cyber-Security Services</td></tr></table>			Interface	Direction	Partner	•  SPMS-6310 - SCI_P	bidirectional	•  SPMS-5068 - Subsystem - Point	•  SPMS-6311 - SCI_TDS	bidirectional	•  SPMS-5070 - Subsystem - Train Detection System	•  SPMS-6308 - SCI_CMD	bidirectional	•  SPMS-5060 - Plan Execution System	•  SPMS-6306 - I_SUBSET_026	bidirectional	•  SPMS-5063 - European Train Control System On-board	•  SPMS-6705 - SDI_ETPS	bidirectional	•  SPMS-6295 - Service Function Diagnostics System	•  SPMS-6706 - SMI_ETPS	bidirectional	•  SPMS-6294 - Service Function Configuration System	•  SPMS-6985 - I_Signaller	bidirectional	•  SPMS-6984 - Signaller Control Panel	•  SPMS-7929 - SSI_ETPS	bidirectional	•  SPMS-6696 - Shared Cyber-Security Services
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### 3.2.1 Functions

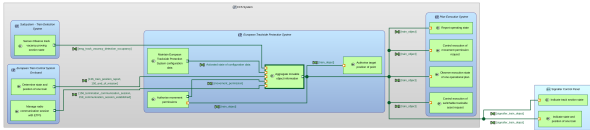































































#### 3.2.1-1 - Aggregate movable object information

































This function is allocated to  SPMS-5062 - European Trackside Protection System.

This function aggregates and stores information (e.g. position) submitted by different actors (e.g.,




Trackside Asset CS, Train CS) and output of other functions into an operational state representation of movable objects. The function includes occupancies NOT allocated to a train object as well. Movable objects are defined as trains and wagons that either submit localisation and/or additional data (such as speed and status) or that are localised by alternative technologies such as TTD systems.

ID	SPMS-4871																		
Context Diagram	<div></div> <p>Figure 11 Context Diagram of Aggregate movable object information</p>																		
Input exchanges	<table><thead><tr><th>Input exchanges</th><th>Source function</th><th>Function allocated to</th></tr></thead><tbody><tr><td><div> SPMS-6398 - Observed track vacancy proving section state<ul style="list-style-type: none"><li> SPMS-3269 - msg_track_vacancy_detection_occupancy</li></ul></div></td><td><div> SPMS-4901 - Sense+Observe track vacancy proving section state</div></td><td><div> SPMS-5070 - Subsystem -</div></td></tr><tr><td><div> SPMS-6412 - Observed state and position of one train<ul style="list-style-type: none"><li> SPMS-4948 - 136_train_position_report</li><li> SPMS-4953 - 150_end_of_mission</li></ul></div></td><td><div> SPMS-4874 - Determine state and position of one train</div></td><td><div> SPMS-5063 - European Tr</div></td></tr><tr><td><div>No exchange items allocated on  SPMS-6364 - Activated state of configuration data.</div></td><td><div> SPMS-4920 - Maintain European Trackside Protection System configuration data</div></td><td><div> SPMS-5062 - European Tr</div></td></tr><tr><td><div> SPMS-7953 - Authorised movement permission<ul style="list-style-type: none"><li> SPMS-7954 - movement_permission</li></ul></div></td><td><div> SPMS-4883 - Authorise movement permissions</div></td><td><div> SPMS-5062 - European Tr</div></td></tr><tr><td><div> SPMS-7969 - Provided communication session message<ul style="list-style-type: none"><li> SPMS-3291 - 156_termination_communication_session</li><li> SPMS-3294 - 159_communication_session_established</li></ul></div></td><td><div> SPMS-6671 - Manage radio communication session with ETPS</div></td><td><div> SPMS-5063 - European Tr</div></td></tr></tbody></table>	Input exchanges	Source function	Function allocated to	<div> SPMS-6398 - Observed track vacancy proving section state<ul style="list-style-type: none"><li> SPMS-3269 - msg_track_vacancy_detection_occupancy</li></ul></div>	<div> SPMS-4901 - Sense+Observe track vacancy proving section state</div>	<div> SPMS-5070 - Subsystem -</div>	<div> SPMS-6412 - Observed state and position of one train<ul style="list-style-type: none"><li> SPMS-4948 - 136_train_position_report</li><li> SPMS-4953 - 150_end_of_mission</li></ul></div>	<div> SPMS-4874 - Determine state and position of one train</div>	<div> SPMS-5063 - European Tr</div>	<div>No exchange items allocated on  SPMS-6364 - Activated state of configuration data.</div>	<div> SPMS-4920 - Maintain European Trackside Protection System configuration data</div>	<div> SPMS-5062 - European Tr</div>	<div> SPMS-7953 - Authorised movement permission<ul style="list-style-type: none"><li> SPMS-7954 - movement_permission</li></ul></div>	<div> SPMS-4883 - Authorise movement permissions</div>	<div> SPMS-5062 - European Tr</div>	<div> SPMS-7969 - Provided communication session message<ul style="list-style-type: none"><li> SPMS-3291 - 156_termination_communication_session</li><li> SPMS-3294 - 159_communication_session_established</li></ul></div>	<div> SPMS-6671 - Manage radio communication session with ETPS</div>	<div> SPMS-5063 - European Tr</div>
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Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6326 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4883 - Authorise movement permissions	 SPMS-5062 - European Trackside Protection System
	 SPMS-6327 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4878 - Control execution of movement permission request	 SPMS-5060 - Plan Execution System
	 SPMS-6328 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4877 - Control execution of switchable trackside asset request	 SPMS-5060 - Plan Execution System
	 SPMS-6329 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4880 - Observe execution state of one operational plan	 SPMS-5060 - Plan Execution System
	 SPMS-6330 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4903 - Authorise target position of point	 SPMS-5062 - European Trackside Protection System
	 SPMS-6332 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-7955 - signaller_train_object</li> </ul>	 SPMS-4910 - Indicate track section state	 SPMS-6984 - Signaller Control Panel
	 SPMS-6334 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-5355 - Report operating state	 SPMS-5060 - Plan Execution System
	 SPMS-7215 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-7955 - signaller_train_object</li> </ul>	 SPMS-7141 - Indicate state and position of one train	 SPMS-6984 - Signaller Control Panel

### 3.2.1-2 - Authorise movement permissions

This function is allocated to  SPMS-5062 - European Trackside Protection System.

This function performs a safe allocation of a track path for planned train movements, i.e.

- supervises and verifies that the required trackside assets are in the required position
- allocates track paths over trackside assets (locking state is shown by the observe point position)
- checks whether there are no conflicting track paths already allocated to other train movements nor usage restrictions already defined
- checks that the track path for planned train movement is clear

Note: The function also involves flank protection supervision that can be either ensured by trackside assets being part of the requested track path or by logic (if railway vehicle movements close to the train can be excluded).

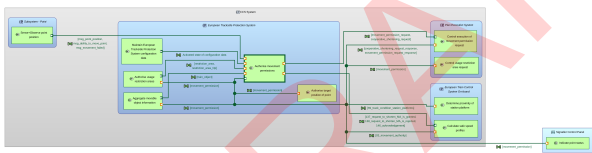
The function also releases track parts that are no longer planned to be used for train movement after checking the corresponding rules, e.g.,






























- releases allocated portion of track path which is overpassed and therefore no more occupied by the train
- ensures that allocated portion of track in front of the train will not be released if it is still to be used by the train
- releases allocated portion of track in rear of the train if it is no longer planned to be used.


































Note: The current assumption is that the function checks that all rules are fulfilled to either reserve or release a track path.

This function generates the authorisation and if relevant the track conditions for movement for one train inside the allocated track path and reports it to the train.


Note: Stopping is only a special case of a movement.

ID	SPMS-4883
Context Diagram	 <p>The diagram shows a central process box labeled 'Authorise movement permissions' with several external interfaces. On the left, there are interfaces for 'Request movement permissions' and 'Release movement permissions'. On the right, there are interfaces for 'Train movement' and 'Track status'. The diagram illustrates the flow of information and control between these components.</p> <p><i>Figure 12 Context Diagram of Authorise movement permissions</i></p>

Input exchanges	Input exchanges	Source function	Function allocated to	
	 SPMS-6421 - Requested movement permission <ul style="list-style-type: none"> <li> SPMS-4928 - movement_permission_request</li> <li> SPMS-7786 - cooperative_shortening_request</li> </ul>	 SPMS-4878 - Control execution of movement permission request	 SPMS-5060 - Plan Execution	
	 SPMS-6408 - Observed point position <ul style="list-style-type: none"> <li> SPMS-4933 - msg_point_position</li> <li> SPMS-4934 - msg_ability_to_move_point</li> <li> SPMS-4936 - msg_movement_failed</li> </ul>	 SPMS-4900 - Sense+Observe point position	 SPMS-5068 - Subsystem	
	 SPMS-6326 - Aggregated track occupancy and train status information <ul style="list-style-type: none"> <li> SPMS-5119 - train_object</li> </ul>	 SPMS-4871 - Aggregate movable object information	 SPMS-5062 - European Train	
	No exchange items allocated on  SPMS-6363 - Activated state of configuration data.	 SPMS-4920 - Maintain European Trackside Protection System configuration data	 SPMS-5062 - European Train	
	 SPMS-6434 - Responded train-specific authorisation <ul style="list-style-type: none"> <li> SPMS-4949 - 137_request_to_shorten_MA_is_granted</li> <li> SPMS-4950 - 138_request_to_shorten_MA_is_rejected</li> <li> SPMS-4951 - 146_acknowledgement</li> </ul>	 SPMS-4873 - Calculate safe speed profiles	 SPMS-5063 - European Train	
	 SPMS-7827 - Authorised usage restriction <ul style="list-style-type: none"> <li> SPMS-7755 - restriction_area</li> <li> SPMS-7822 - restriction_area_Op</li> </ul>	 SPMS-5724 - Authorise usage restriction areas	 SPMS-5062 - European Train	

Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6339 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-2372 - movement_permission</li> </ul>	 SPMS-4913 - Inserter point status	 SPMS-6004 - Signaller Control
	 SPMS-6340 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-2372 - movement_permission</li> </ul>	 SPMS-4903 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-6342 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-2372 - movement_permission</li> </ul>	 SPMS-5724 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-6604 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-2372 - movement_permission</li> </ul>	 SPMS-5723 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-6393 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-4945 - 03_movement_authority</li> </ul>	 SPMS-4873 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-6441 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-7787 - cooperative_shortening_request_response</li> <li> SPMS-7783 - movement_permission_request_response</li> </ul>	 SPMS-4878 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-7953 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-7954 - movement_permission</li> </ul>	 SPMS-4871 - Inserter point status	 SPMS-5062 - European Trackside Protection System
	 SPMS-7980 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-7979 - 69_track_condition_station_platforms</li> </ul>	 SPMS-7844 - Inserter point status	 SPMS-5062 - European Trackside Protection System

### 3.2.1-3 - Authorise target position of point

This function is allocated to  SPMS-5062 - European Trackside Protection System.

This function checks if the requested point position can be implemented safely and sends the related command if so. In case it can not be safely implemented the request is rejected.

ID	SPMS-4903
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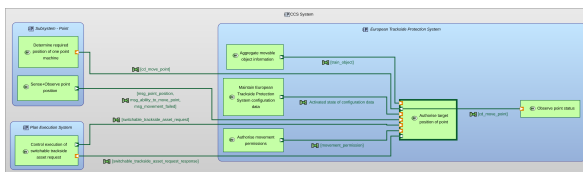












Context  
Diagram


Figure 13 Context Diagram of Authorise target position of point

Input  
exchanges

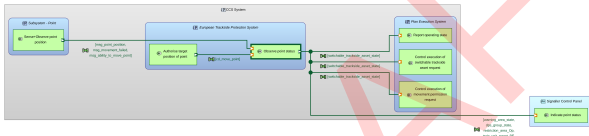










Input exchanges	Source function	Function allocated to
<b>SPMS-6422 - Requested point position</b> <ul style="list-style-type: none"> <li>SPMS-7746 - switchable_trackside_asset_request</li> </ul>	<b>SPMS-4877 - Control execution of switchable trackside asset request</b>	<b>SPMS-5060 - Plan Execution</b>
<b>SPMS-6385 - Observed point position</b> <ul style="list-style-type: none"> <li>SPMS-4933 - msg_point_position</li> <li>SPMS-4934 - msg_ability_to_move_point</li> <li>SPMS-4936 - msg_movement_failed</li> </ul>	<b>SPMS-4900 - Sense+Observe point position</b>	<b>SPMS-5068 - Subsystem - P</b>
<b>No exchange items allocated on SPMS-6368 - Activated state of configuration data.</b>	<b>SPMS-4920 - Maintain European Trackside Protection System configuration data</b>	<b>SPMS-5062 - European Trac</b>
<b>SPMS-6330 - Aggregated track occupancy and train status information</b> <ul style="list-style-type: none"> <li>SPMS-5119 - train_object</li> </ul>	<b>SPMS-4871 - Aggregate movable object information</b>	<b>SPMS-5062 - European Trac</b>
<b>SPMS-6340 - Authorised movement permission</b> <ul style="list-style-type: none"> <li>SPMS-2372 - movement_permission</li> </ul>	<b>SPMS-4883 - Authorise movement permissions</b>	<b>SPMS-5062 - European Trac</b>





















Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6357 - Commanded point position state <ul style="list-style-type: none"> <li> SPMS-4935 - cd_move_point</li> </ul>	 SPMS-4888	 SPMS-5068 - Sense+Observe point position
	 SPMS-7904 - Commanded point position state <ul style="list-style-type: none"> <li> SPMS-4935 - cd_move_point</li> </ul>	 SPMS-4888	 SPMS-5062 - European Trackside Protection System
	 SPMS-6430 - Response to point position request <ul style="list-style-type: none"> <li> SPMS-5191 - switchable_trackside_asset_request_response</li> </ul>	 SPMS-4878	 SPMS-5069 - Plan Execution

### 3.2.1-4 - Observe point status


This function is allocated to  SPMS-5062 - European Trackside Protection System.

This function observes the overall status of the point, including, End position, No end position.

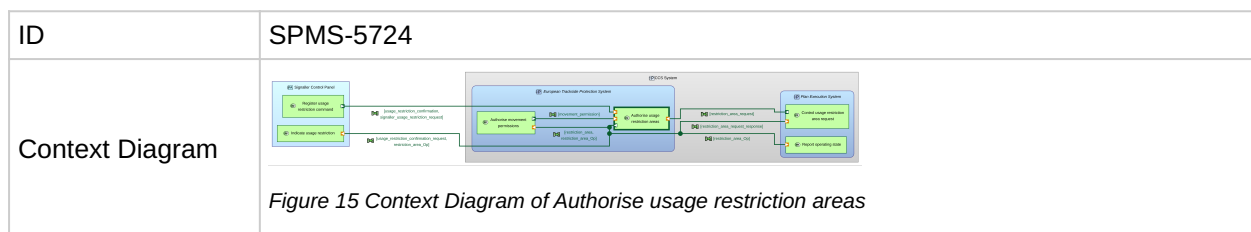
ID	SPMS-4888		
Context Diagram	 <p>Figure 14 Context Diagram of Observe point status</p>		
Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6384 - Observed point position <ul style="list-style-type: none"> <li> SPMS-4933 - msg_point_position</li> <li> SPMS-4936 - msg_movement_failed</li> <li> SPMS-4934 - msg_ability_to_move_point</li> </ul>	 SPMS-4900 - Sense+Observe point position	 SPMS-5068 - Subsystem - Point
	 SPMS-7904 - Commanded point position state <ul style="list-style-type: none"> <li> SPMS-4935 - cd_move_point</li> </ul>	 SPMS-4903 - Authorise target position of point	 SPMS-5062 - European Trackside Protection System

Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6409 - Observed point status <ul style="list-style-type: none"> <li>  SPMS-7747 - switchable_trackside_asset_state           </li> </ul>	 SPMS-4877 - Control execution of switchable trackside asset request	 SPMS-5060 - Plan Execution
	 SPMS-6410 - Observed point status <ul style="list-style-type: none"> <li>  SPMS-7747 - switchable_trackside_asset_state           </li> </ul>	 SPMS-4878 - Control execution of movement permission request	 SPMS-5060 - Plan Execution
	 SPMS-6411 - Observed point status <ul style="list-style-type: none"> <li>  SPMS-7747 - switchable_trackside_asset_state           </li> </ul>	 SPMS-5355 - Report operating state	 SPMS-5060 - Plan Execution
	 SPMS-6440 - observed point status <ul style="list-style-type: none"> <li>  SPMS-7820 - warning_area_state           </li> <li>  SPMS-7821 - dps_group_state           </li> <li>  SPMS-7822 - restriction_area_Op           </li> <li>  SPMS-7823 - train_unit_report_PE           </li> <li>  SPMS-5137 - track_occupation_state           </li> </ul>	 SPMS-4913 - Indicate point status	 SPMS-6984 - Signaller Control

### 3.2.1-5 - Authorise usage restriction areas

This function is allocated to  SPMS-5062 - European Trackside Protection System.


This function checks if the requested usage restriction area creation or deletion can be implemented safely and executes it if so. In case it cannot be safely implemented the request is rejected.



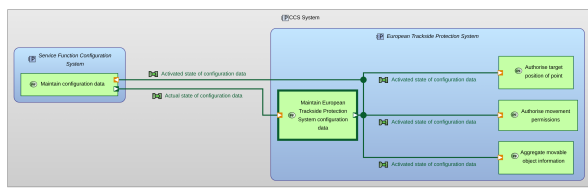















































Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6424 - Requested usage restriction <ul style="list-style-type: none"> <li> SPMS-7754 - restriction_area_request</li> </ul>	 SPMS-5723 - Control usage restriction area request	 SPMS-5060 - Plan Execution
	 SPMS-6342 - Authorised movement permission <ul style="list-style-type: none"> <li> SPMS-2372 - movement_permission</li> </ul>	 SPMS-4883 - Authorise movement permissions	 SPMS-5062 - European Trackside Protection System
	 SPMS-6426 - Requested usage restriction <ul style="list-style-type: none"> <li> SPMS-6458 - usage_restriction_confirmation</li> <li> SPMS-7983 - signaller_usage_restriction_request</li> </ul>	 SPMS-6591 - Register usage restriction command	 SPMS-6984 - Signaller Control
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6344 - Authorised usage restriction <ul style="list-style-type: none"> <li> SPMS-7801 - restriction_area_request_response</li> </ul>	 SPMS-5723 - Control usage restriction area request	 SPMS-5060 - Plan Execution
	 SPMS-6346 - Authorised usage restriction <ul style="list-style-type: none"> <li> SPMS-7822 - restriction_area_Op</li> </ul>	 SPMS-5355 - Control usage restriction area request	 SPMS-5060 - Plan Execution
	 SPMS-7827 - Authorised usage restriction <ul style="list-style-type: none"> <li> SPMS-7755 - restriction_area</li> <li> SPMS-7822 - restriction_area_Op</li> </ul>	 SPMS-4883 - Authorise movement permissions	 SPMS-5062 - European Trackside Protection System
	 SPMS-6452 - requested usage restriction to signaller <ul style="list-style-type: none"> <li> SPMS-6456 - usage_restriction_confirmation_request</li> <li> SPMS-7822 - restriction_area_Op</li> </ul>	 SPMS-5726 - Control usage restriction area request	 SPMS-6984 - Signaller Control
	<p>The following ports are not connected to any exchange:</p> <ul style="list-style-type: none"> <li>FOP 2</li> </ul>		


### 3.2.1-6 - Maintain European Trackside Protection System configuration data

This function is allocated to  SPMS-5062 - European Trackside Protection System.

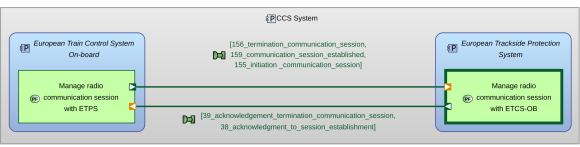
This function maintains the trackside attributes received from Digital Register and distributes them to internal functions of the trackside protection system.












ID	SPMS-4920																	
Context Diagram	<div></div> <p>Figure 16 Context Diagram of Maintain European Trackside Protection System configuration data</p>																	
Input exchanges	<table><tr><th>Input exchanges</th><th>Source function</th><th>Function allocated to</th></tr><tr><td>No exchange items allocated on  SPMS-7732 - Actual state of configuration data.</td><td> SPMS-7663 - Maintain configuration data</td><td> SPMS-6294 - Service Function Configuration System</td></tr></table>	Input exchanges	Source function	Function allocated to	No exchange items allocated on  SPMS-7732 - Actual state of configuration data.	 SPMS-7663 - Maintain configuration data	 SPMS-6294 - Service Function Configuration System											
Input exchanges	Source function	Function allocated to																
No exchange items allocated on  SPMS-7732 - Actual state of configuration data.	 SPMS-7663 - Maintain configuration data	 SPMS-6294 - Service Function Configuration System																
Output exchanges	<table><tr><th>Output exchanges</th><th>Target function</th><th>Function allocated to</th></tr><tr><td>No exchange items allocated on  SPMS-6363 - Activated state of configuration data.</td><td> SPMS-4883 - Authorise movement permissions</td><td> SPMS-5062 - European Trackside Protection System</td></tr><tr><td>No exchange items allocated on  SPMS-6364 - Activated state of configuration data.</td><td> SPMS-4871 - Aggregate movable object information</td><td> SPMS-5062 - European Trackside Protection System</td></tr><tr><td>No exchange items allocated on  SPMS-6368 - Activated state of configuration data.</td><td> SPMS-4903 - Authorise target position of point</td><td> SPMS-5062 - European Trackside Protection System</td></tr><tr><td>No exchange items allocated on  SPMS-7743 - Activated state of configuration data.</td><td> SPMS-7663 - Maintain configuration data</td><td> SPMS-6294 - Service Function Configuration System</td></tr></table>			Output exchanges	Target function	Function allocated to	No exchange items allocated on  SPMS-6363 - Activated state of configuration data.	 SPMS-4883 - Authorise movement permissions	 SPMS-5062 - European Trackside Protection System	No exchange items allocated on  SPMS-6364 - Activated state of configuration data.	 SPMS-4871 - Aggregate movable object information	 SPMS-5062 - European Trackside Protection System	No exchange items allocated on  SPMS-6368 - Activated state of configuration data.	 SPMS-4903 - Authorise target position of point	 SPMS-5062 - European Trackside Protection System	No exchange items allocated on  SPMS-7743 - Activated state of configuration data.	 SPMS-7663 - Maintain configuration data	 SPMS-6294 - Service Function Configuration System
Output exchanges	Target function	Function allocated to																
No exchange items allocated on  SPMS-6363 - Activated state of configuration data.	 SPMS-4883 - Authorise movement permissions	 SPMS-5062 - European Trackside Protection System																
No exchange items allocated on  SPMS-6364 - Activated state of configuration data.	 SPMS-4871 - Aggregate movable object information	 SPMS-5062 - European Trackside Protection System																
No exchange items allocated on  SPMS-6368 - Activated state of configuration data.	 SPMS-4903 - Authorise target position of point	 SPMS-5062 - European Trackside Protection System																
No exchange items allocated on  SPMS-7743 - Activated state of configuration data.	 SPMS-7663 - Maintain configuration data	 SPMS-6294 - Service Function Configuration System																

### 3.2.1-7 - Manage radio communication session with ETCS-OB


This function is allocated to  SPMS-5062 - European Trackside Protection System.

This function manages (i.e. establishes/maintains/terminates) a communication session with one ETCS onboard which is reporting inside the ETPS territory.

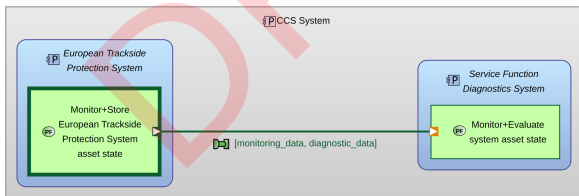





ID	SPMS-6672		
Context Diagram	 <p>Figure 17 Context Diagram of Manage radio communication session with ETCS-OB</p>		

Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6683 - Provided communication session message <ul style="list-style-type: none"> <li> SPMS-3291 - 156_termination_communication_session</li> <li> SPMS-3294 - 159_communication_session_established</li> <li> SPMS-3289 - 155_initiation_communication_session</li> </ul>	 SPMS-6671 - Manage radio communication session with ETPS	 SPMS-5063 - European Train Control System On-board
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6682 - Provided communication session message <ul style="list-style-type: none"> <li> SPMS-3293 - 39_acknowledgement_termination_communication_session</li> <li> SPMS-3292 - 38_acknowledgment_to_session_establishment</li> </ul>	 SPMS-6671 - Manage radio communication session with ETPS	 SPMS-5063 - European Train Control System On-board

### 3.2.1-8 - Monitor+Store European Trainside Protection System asset state

This function is allocated to  SPMS-5062 - European Trainside Protection System.

This function monitors and stores the state of  SPMS-2823 - Traffic CS System, in order to provide asset conditions continuously.

ID	SPMS-7011		
Context Diagram	 <p>Figure 18 Context Diagram of Monitor+Store European Trainside Protection System asset state</p>		
Input exchanges	No inputs defined for this function.		
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-7023 - Monitoring and diagnostic data <ul style="list-style-type: none"> <li> SPMS-6988 - monitoring_data</li> <li> SPMS-6989 - diagnostic_data</li> </ul>	 SPMS-7009 - Monitor+Evaluate system asset state	 SPMS-6295 - Service Function Diagnostics System

### 3.2.2 States

Will be provided in a future release.

### 3.2.3 Non-functional requirements

Will be provided in a future release.

### 3.2.4 Installation spaces

Will be provided in a future release.






## 3.3 Subsystem Automatic Train Operation Trackside (ATO-TS)

### 3.3-1 - Automatic Train Operation Trackside

The Automatic Train Operation Trackside subsystem (ATO-TS) implements all ATO specific functionalities needed by the trackside of the CCS System (i.e. Traffic Control And Supervision). It is the bridge between Traffic Management System (TMS), the Automatic Train Operation On-board subsystem (ATO-OB) and shared services such as the digital register.

It has the following characteristics:

- implements Basic Safety Integrity Level functionalities
- encapsulates ATO specific optional functionality

ID	SPMS-5058
Context Diagram	 <p>The diagram shows the ATO-TS subsystem as a central component. It is connected to the Traffic Management System (TMS) via the interface DBECL_OP_02. It also interacts with the Shared Cyber-Security Services (SCSS) through the interface DBECL_OP_01. The ATO-TS is part of the CCS System and is connected to the Automatic Train Operation On-board (ATO-OB) via the interface DBECL_OP_03. The ATO-TS also interacts with the Shared Cyber-Security Services (SCSS) through the interface DBECL_OP_01.</p> <p><i>Figure 19 Context Diagram of Automatic Train Operation Trackside</i></p>
Allocated	<ul style="list-style-type: none"> <li>•  SPMS-4879 - Generate journey profile for one train unit</li> <li>•  SPMS-4881 - Determine automatic train operation states</li> <li>•  SPMS-4915 - Generate segment profile for one train</li> <li>•  SPMS-7218 - Manage communication with one ATO-OB</li> </ul>

Interfaces	Interface	Direction	Partner
	<ul style="list-style-type: none"> <li>SPMS-6304 - SCI_OP_02</li> </ul>	bidirectional	<ul style="list-style-type: none"> <li>SPMS-5111 - Traffic Management System</li> </ul>
	<ul style="list-style-type: none"> <li>SPMS-6307 - I_SUBSET_126</li> </ul>	bidirectional	<ul style="list-style-type: none"> <li>SPMS-5057 - Automatic Train Operation On-board</li> </ul>
	<ul style="list-style-type: none"> <li>SPMS-7931 - SSI_ATO-TS</li> </ul>	bidirectional	<ul style="list-style-type: none"> <li>SPMS-6696 - Shared Cyber-Security Services</li> </ul>

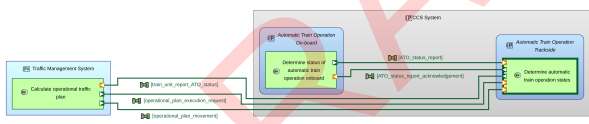
### 3.3.1 Functions









#### 3.3.1-1 - Determine automatic train operation states

This function is allocated to SPMS-5058 - Automatic Train Operation Trackside.


This function reports:

- the automatic operating state
- events which reflect the execution state of one operational plan performed under automatic train operation.


ID	SPMS-4881		
Context Diagram	 <p>Figure 20 Context Diagram of Determine automatic train operation states</p>		
Input exchanges	<b>Input exchanges</b>	<b>Source function</b>	<b>Function allocated to</b>
	<ul style="list-style-type: none"> <li>SPMS-6402 - Provided ATO status report</li> <li>SPMS-4962 - ATO_status_report</li> </ul>	SPMS-4909 - SPMS-5057 - Automatic Train Operation	SPMS-5058 - Automatic Train Operation Trackside
	<ul style="list-style-type: none"> <li>SPMS-6349 - Calculated operational traffic plan</li> <li>SPMS-7753 - operational_plan_movement</li> </ul>	SPMS-4875 - SPMS-5111 - Traffic Management System	SPMS-5058 - Automatic Train Operation Trackside
	<ul style="list-style-type: none"> <li>SPMS-7659 - Requested execution state of one operational plan</li> <li>SPMS-7144 - operational_plan_execution_request</li> </ul>	SPMS-4875 - SPMS-5111 - Traffic Management System	SPMS-5058 - Automatic Train Operation Trackside



































Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6401 - Observed execution state of one operational plan from automatic train operation <ul style="list-style-type: none"> <li>  SPMS-7658 - train_unit_report_ATO_status </li> </ul>	 SPMS-4875 - Automatic Train Operation Trackside	 SPMS-5111 - Automatic Train Operation Trackside
	 SPMS-7253 - Acknowledged ATO status report <ul style="list-style-type: none"> <li>  SPMS-4963 - ATO_status_report_acknowledgement </li> </ul>	 SPMS-4909 - Automatic Train Operation Trackside	 SPMS-5057 - Automatic Train Operation Trackside

### 3.3.1-2 - Generate journey profile for one train unit


This function is allocated to  SPMS-5058 - Automatic Train Operation Trackside.

This function generates a non-safety time-table from the operational plan movement. This time-table is only operational plan and time dependant.

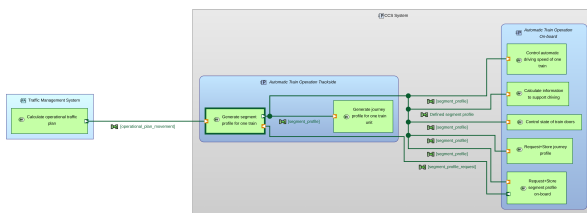
























ID	SPMS-4879
Context Diagram	 <p>Figure 21 Context Diagram of Generate journey profile for one train unit</p>

Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-6348 - Calculated operational traffic plan <ul style="list-style-type: none"> <li> SPMS-2370 - operational_plan_movement</li> <li> SPMS-5548 - operational_plan_restriction</li> </ul>	 SPMS-4875 - Calculate operational traffic plan	 SPMS-5111 - Traffic Management System
	 SPMS-6437 - Synchronised current time <ul style="list-style-type: none"> <li> SPMS-2412 - time_reference</li> </ul>	 SPMS-4897 - Synchronise time	 SPMS-6696 - Shared Cyber-Security Services
	 SPMS-6419 - Requested journey profile <ul style="list-style-type: none"> <li> SPMS-4957 - journey_profile_request</li> <li> SPMS-4959 - journey_profile_acknowledgement</li> </ul>	 SPMS-4917 - Request+Store journey profile	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-6360 - Defined segment profile <ul style="list-style-type: none"> <li> SPMS-4961 - segment_profile</li> </ul>	 SPMS-4915 - Generate segment profile for one train	 SPMS-5058 - Automatic Train Operation Trackside
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6392 - Generated journey profile <ul style="list-style-type: none"> <li> SPMS-4958 - journey_profile</li> </ul>	 SPMS-4872 - Control automatic driving speed of one train	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-7735 - Generated journey profile <ul style="list-style-type: none"> <li> SPMS-4958 - journey_profile</li> </ul>	 SPMS-4917 - Request+Store journey profile	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-7865 - Generated journey profile <ul style="list-style-type: none"> <li> SPMS-4958 - journey_profile</li> </ul>	 SPMS-7838 - Calculate information to support driving	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-7866 - Generated journey profile <ul style="list-style-type: none"> <li> SPMS-4958 - journey_profile</li> </ul>	 SPMS-7843 - Control state of train doors	 SPMS-5057 - Automatic Train Operation On-board
























### 3.3.1-3 - Generate segment profile for one train

This function is allocated to  SPMS-5058 - Automatic Train Operation Trackside.


This function generates the segment profile for automatic driving module based on when the request from the ATO onboard is sent.

ID	SPMS-4915											
Context Diagram												
	Figure 22 Context Diagram of Generate segment profile for one train											
Input exchanges	<table><tr><th>Input exchanges</th><th>Source function</th><th>Function allocated to</th></tr><tr><td> SPMS-6423 - Requested segment profile<ul style="list-style-type: none"><li> SPMS-4960 - segment_profile_request</li></ul></td><td> SPMS-4914 - Request+Store segment profile on-board</td><td> SPMS-5057 - Automatic Train Operation On-board</td></tr><tr><td> SPMS-6350 - Calculated operational traffic plan<ul style="list-style-type: none"><li> SPMS-7753 - operational_plan_movement</li></ul></td><td> SPMS-4875 - Calculate operational traffic plan</td><td> SPMS-5111 - Traffic Management System</td></tr></table>	Input exchanges	Source function	Function allocated to	 SPMS-6423 - Requested segment profile <ul style="list-style-type: none"><li> SPMS-4960 - segment_profile_request</li></ul>	 SPMS-4914 - Request+Store segment profile on-board	 SPMS-5057 - Automatic Train Operation On-board	 SPMS-6350 - Calculated operational traffic plan <ul style="list-style-type: none"><li> SPMS-7753 - operational_plan_movement</li></ul>	 SPMS-4875 - Calculate operational traffic plan	 SPMS-5111 - Traffic Management System		
Input exchanges	Source function	Function allocated to										
 SPMS-6423 - Requested segment profile <ul style="list-style-type: none"><li> SPMS-4960 - segment_profile_request</li></ul>	 SPMS-4914 - Request+Store segment profile on-board	 SPMS-5057 - Automatic Train Operation On-board										
 SPMS-6350 - Calculated operational traffic plan <ul style="list-style-type: none"><li> SPMS-7753 - operational_plan_movement</li></ul>	 SPMS-4875 - Calculate operational traffic plan	 SPMS-5111 - Traffic Management System										

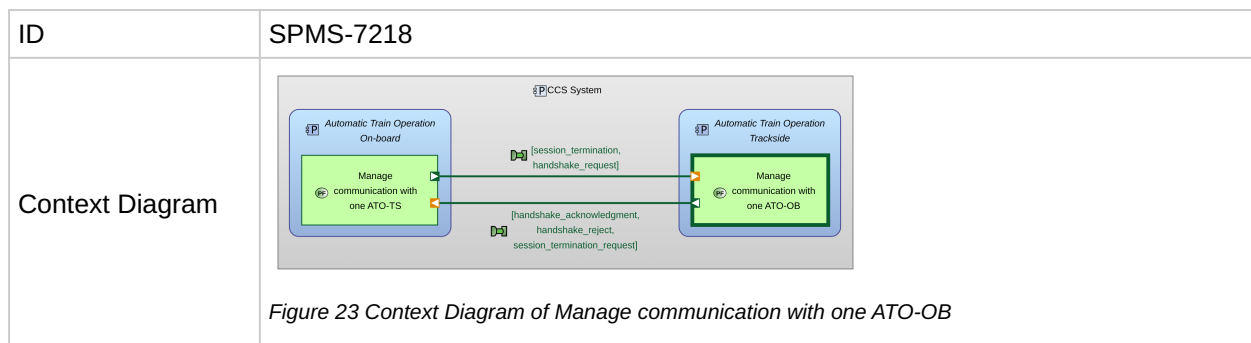













Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-6359 - Defined segment profile <ul style="list-style-type: none"> <li>  SPMS-4961 - segment_profile </li> </ul>	 SPMS-4914 - Request+Store segment profile on-board	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-6360 - Defined segment profile <ul style="list-style-type: none"> <li>  SPMS-4961 - segment_profile </li> </ul>	 SPMS-4879 - Generate journey profile for one train unit	 SPMS-5058 - Automatic Train Operation Trackside
	 SPMS-7733 - Defined segment profile <ul style="list-style-type: none"> <li>  SPMS-4961 - segment_profile </li> </ul>	 SPMS-4872 - Control automatic driving speed of one train	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-7734 - Defined segment profile <ul style="list-style-type: none"> <li>  SPMS-4961 - segment_profile </li> </ul>	 SPMS-4917 - Request+Store journey profile	 SPMS-5057 - Automatic Train Operation On-board
	<p>No exchange items allocated on</p>  SPMS-7862 - Defined segment profile.	 SPMS-7838 - Calculate information to support driving	 SPMS-5057 - Automatic Train Operation On-board
	 SPMS-7863 - Defined segment profile <ul style="list-style-type: none"> <li>  SPMS-4961 - segment_profile </li> </ul>	 SPMS-7843 - Control state of train doors	 SPMS-5057 - Automatic Train Operation On-board

### 3.3.1-4 - Manage communication with one ATO-OB

This function is allocated to  SPMS-5058 - Automatic Train Operation Trackside.

This function manages (i.e. establishes/maintains/terminates) a communication session with an ATO-onboard which is reporting inside the ATO-trackside territory.



Input exchanges	Input exchanges	Source function	Function allocated to
	 SPMS-7220 - Provided ATO communication session message <ul style="list-style-type: none"> <li> SPMS-4965 - session_termination</li> <li> SPMS-4954 - handshake_request</li> </ul>	 SPMS-7217 - Manage communication with one ATO-TS	 SPMS-5057 - Automatic Train Operation On-board
Output exchanges	Output exchanges	Target function	Function allocated to
	 SPMS-7947 - Provided ATO communication session message <ul style="list-style-type: none"> <li> SPMS-4955 - handshake_acknowledgment</li> <li> SPMS-4956 - handshake_reject</li> <li> SPMS-4964 - session_termination_request</li> </ul>	 SPMS-7217 - Manage communication with one ATO-TS	 SPMS-5057 - Automatic Train Operation On-board

### 3.3.2 States

Will be provided in a future release.

### 3.3.3 Non-functional requirements

Will be provided in a future release.

### 3.3.4 Installation spaces

Will be provided in a future release.

## 4 System interfaces

### 4.1 External interfaces

This section describes the external system and human actors interacting with the Traffic CS system and the interfaces of the Traffic CS system to these external systems and the human actors.

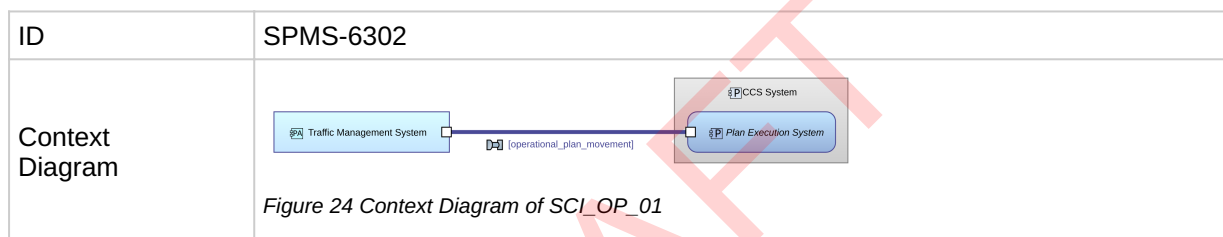
#### 4.1-2 - Traffic Management System

Traffic Management System covers the management and the planning level.

Traffic Management is responsible for all planning activities including producing an operational plan, based upon the operational state and operational events. A conflict free operational plan would be sent to Traffic Control and Supervision usually at the beginning of a service day. Change of planning can be done for the next minutes up to the next year. A plan includes regular or incidence-related commands for infrastructure users (e.g. trains, construction sites), including measures to correct deviations or to stabilize the traffic flow in short term.

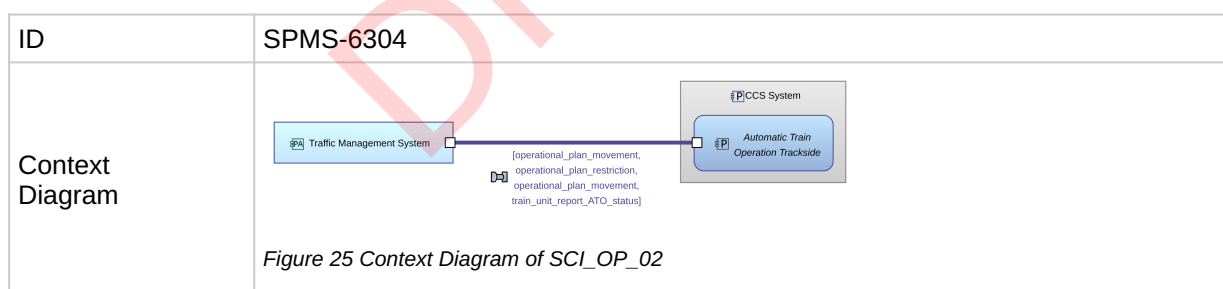
##### 4.1-2.1 - SCI\_OP\_01

The interface SPMS-6302 - SCI\_OP\_01 connects SPMS-5111 - Traffic Management System with SPMS-5060 - Plan Execution System.



##### 4.1-2.2 - SCI\_OP\_02

The interface SPMS-6304 - SCI\_OP\_02 connects SPMS-5111 - Traffic Management System with SPMS-5058 - Automatic Train Operation Trackside.



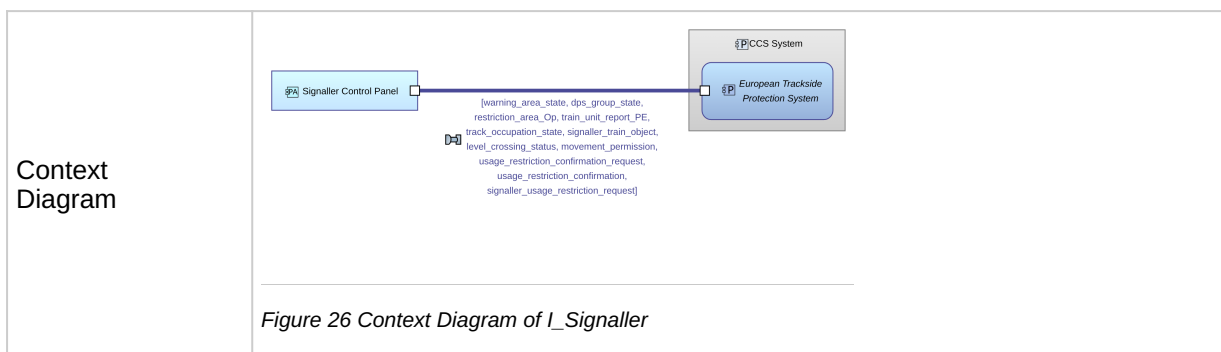
#### 4.1-3 - Signaller Control Panel

The control panel permits the Signaller to interact with the system, receiving and transmitting commands and information.

##### 4.1-3.1 - I\_Signaller

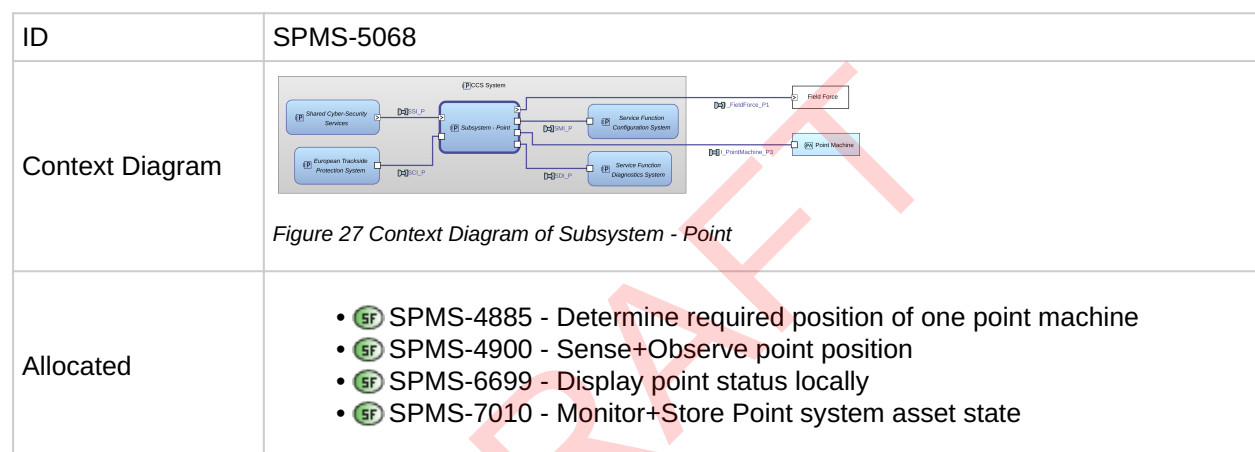
The interface SPMS-6985 - I\_Signaller connects SPMS-6984 - Signaller Control Panel with SPMS-5062 - European Trackside Protection System.




















#### 4.1-4 - Subsystem - Point

The Subsystem - Point is used to control and monitor the Point machines of moveable elements.

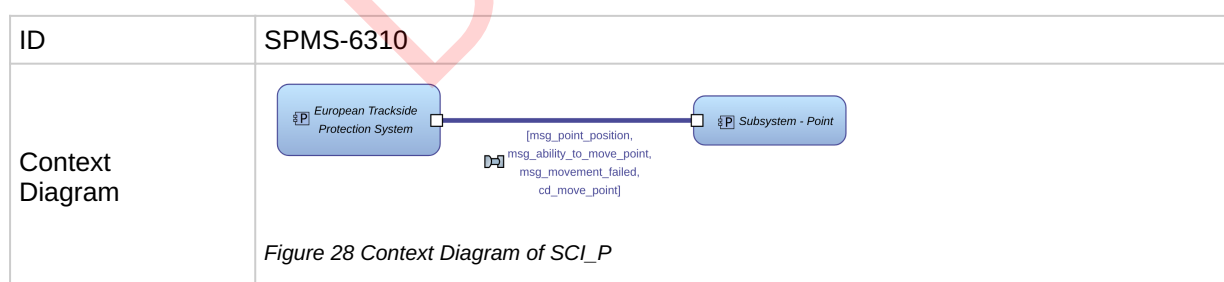


Interfaces	Interface	Direction	Partner
	•  SPMS-6298 - I_PointMachine_P3	bidirectional	•  SPMS-5107 - Point Machine
	•  SPMS-6310 - SCI_P	bidirectional	•  SPMS-5062 - European Trackside Protection System
	•  SPMS-6312 - SDI_P	bidirectional	•  SPMS-6295 - Service Function Diagnostics System
	•  SPMS-6707 - SMI_P	bidirectional	•  SPMS-6294 - Service Function Configuration System
	•  SPMS-6716 - SSI_P	incoming from	•  SPMS-6696 - Shared Cyber-Security Services
	•  SPMS-6711 - I_FieldForce_P1	outgoing to	•  SPMS-7321 - Field Force

#### 4.1-4.1 - SCI\_P

The interface  SPMS-6310 - SCI\_P connects  SPMS-5062 - European Trackside Protection System with  SPMS-5068 - Subsystem - Point.

See: [\[SPP-18533 - Interface specification SCI-P v4.2\]](#).



#### 4.1-5 - European Train Control System On-board












<https://www.era.europa.eu>, SUBSET-026

ID	SPMS-5063
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









Context Diagram

Figure 29 Context Diagram of European Train Control System On-board

Allocated

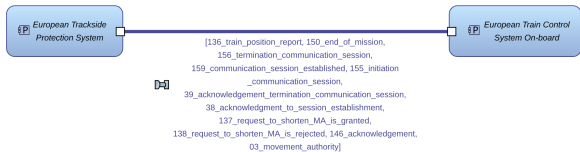
-  SPMS-4873 - Calculate safe speed profiles
-  SPMS-4874 - Determine state and position of one train
-  SPMS-6665 - Determine 1D train front end position in relation to reference location
-  SPMS-6666 - Measure+Estimate 1D speed of one train front end
-  SPMS-6667 - Measure+Estimate 1D acceleration of one train
-  SPMS-6668 - Measure+Estimate 1D distance since last reset of odometry
-  SPMS-6671 - Manage radio communication session with ETPS
-  SPMS-7012 - Monitor+Store ETCS-OB system asset state
-  SPMS-7844 - Determine proximity of station platform
-  SPMS-7849 - Supervise compliance of speed profiles of one train
-  SPMS-7852 - Supervise standstill of one train

Interfaces

Interface	Direction	Partner
•  SPMS-6300 - I_SUBSET_034_119	outgoing to	•  SPMS-5108 - Rolling Stock Operation System
•  SPMS-6306 - I_SUBSET_026	bidirectional	•  SPMS-5062 - European Trackside Protection System
•  SPMS-6684 - I_TBD	bidirectional	•  SPMS-5072 - Advance Safe Train Positioning
•  SPMS-6701 - I_SUBSET_130	bidirectional	•  SPMS-5057 - Automatic Train Operation On-board
•  SPMS-6703 - I_TBD	bidirectional	•  SPMS-5073 - Multi Display System
•  SPMS-6702 - I_SUBSET_26_36	incoming from	•  SPMS-6695 - Eurobalise
•  SPMS-7660 - SDI_ETCSOB	outgoing to	•  SPMS-6295 - Service Function Diagnostics System

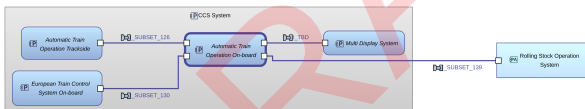
#### 4.1-5.1 - I\_SUBSET\_026









The interface I\_SUBSET\_026 connects SPMS-5062 - European Trackside Protection System with SPMS-5063 - European Train Control System On-board.  
See [SPPRAMSS-324 - [SUBSET-026]].

ID	SPMS-6306
Context Diagram	 <p>Figure 30 Context Diagram of I_SUBSET_026</p>




#### 4.1-6 - Automatic Train Operation On-board

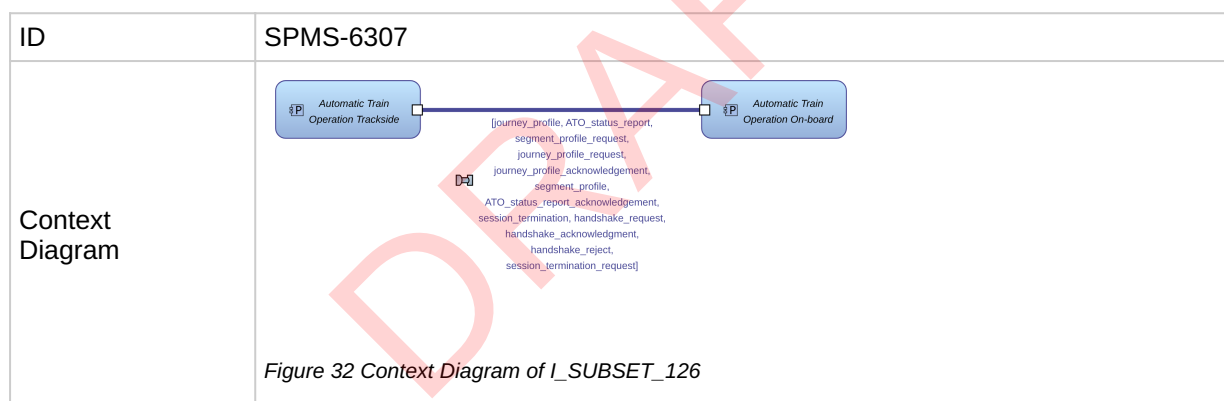
ATO-OB is the on-board component of ERTMS/ATO defined in the clause 5.1.1.2 of SUBSET-125 v1.0.0:ERTMS/ATO provides a set of non-safety functions related to speed control, accurate stopping, door opening and closing, and other functions traditionally assigned to a driver, while the safety of operation is still ensured by ETCS with regards to the speed and distance limits and also by other safe systems. SUBSET-125 version 1.0.0.

ID	SPMS-5057
Context Diagram	 <p>Figure 31 Context Diagram of Automatic Train Operation On-board</p>
Allocated	<ul style="list-style-type: none"> <li>SPMS-4872 - Control automatic driving speed of one train</li> <li>SPMS-4909 - Determine status of automatic train operation onboard</li> <li>SPMS-4914 - Request+Store segment profile on-board</li> <li>SPMS-4917 - Request+Store journey profile</li> <li>SPMS-7217 - Manage communication with one ATO-TS</li> <li>SPMS-7838 - Calculate information to support driving</li> <li>SPMS-7843 - Control state of train doors</li> </ul>

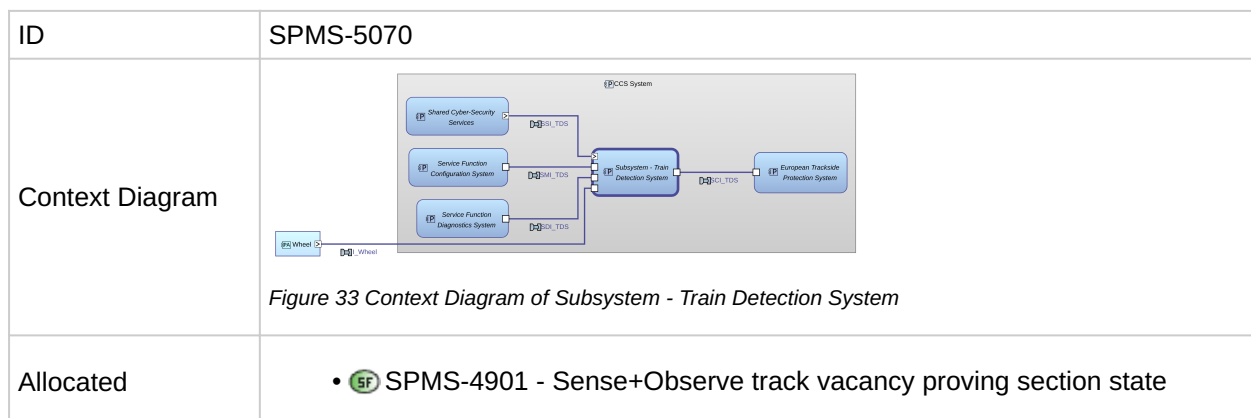
Interfaces	Interface	Direction	Partner
	•  SPMS-6301 - I_SUBSET_139	bidirectional	•  SPMS-5108 - Rolling Stock Operation System
	•  SPMS-6307 - I_SUBSET_126	bidirectional	•  SPMS-5058 - Automatic Train Operation Trackside
	•  SPMS-6701 - I_SUBSET_130	bidirectional	•  SPMS-5063 - European Train Control System On-board
	•  SPMS-6704 - I_TBD	bidirectional	•  SPMS-5073 - Multi Display System

#### 4.1-6.1 - I\_SUBSET\_126











The interface  SPMS-6307 - I\_SUBSET\_126 connects  SPMS-5058 - Automatic Train Operation Trackside with  SPMS-5057 - Automatic Train Operation On-board.  
See: [SPT2TRAFFIC-3445 - SUBSET-126].






#### 4.1-7 - Subsystem - Train Detection System






Interfaces	Interface	Direction	Partner
	•  SPMS-6303 - I_Wheel	bidirectional	•  SPMS-5112 - Wheel
	•  SPMS-6311 - SCI_TDS	bidirectional	•  SPMS-5062 - European Trackside Protection System
	•  SPMS-6713 - SDI_TDS	bidirectional	•  SPMS-6295 - Service Function Diagnostics System
	•  SPMS-6714 - SMI_TDS	bidirectional	•  SPMS-6294 - Service Function Configuration System
	•  SPMS-6719 - SSI_TDS	incoming from	•  SPMS-6696 - Shared Cyber-Security Services

#### 4.1-7.1 - SCI\_TDS

The interface  SPMS-6311 - SCI\_TDS connects  SPMS-5070 - Subsystem - Train Detection System with  SPMS-5062 - European Trackside Protection System.




See [[SPP-18534 - Interface specification SCI-TDS v4.1](#)].

ID	SPMS-6311
Context Diagram	 <p>Figure 34 Context Diagram of SCI_TDS</p>

## 4.2 Internal interfaces

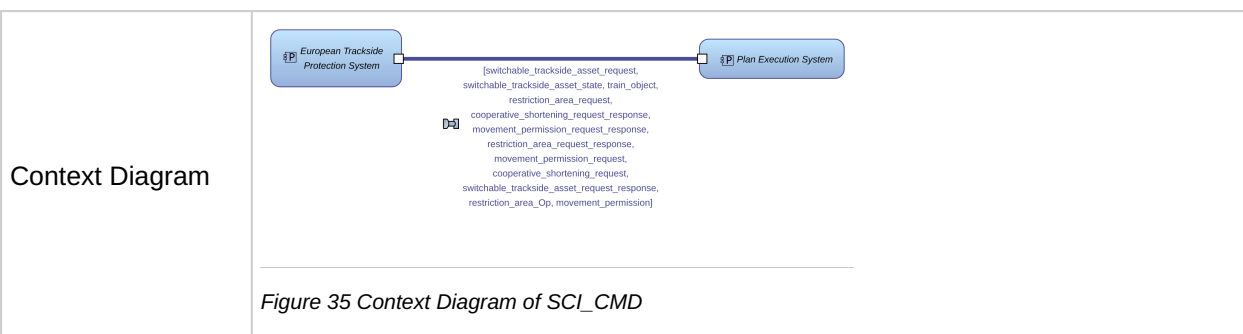
### 4.2.1 SCI\_CMD

#### 4.2.1-1 - SCI\_CMD

The interface  SPMS-6308 - SCI\_CMD connects  SPMS-5062 - European Trackside Protection System with  SPMS-5060 - Plan Execution System.

See: [[SPP-18094 - System Interface Description SCI-CMD](#)].

ID	SPMS-6308
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## 5 System behaviour

The system behaviour is represented via system capabilities. These capabilities are further described by scenarios and functional chains in the following sub chapters.

### 5.1 Perform operational plan movement

#### 5.1-1 - Perform operational plan movement

This exchange scenario describes the sequence of scenarios of one operational plan which could happen during the movement or stillstand of the train.

The figure below provides an overview of *Perform operational plan movement*.

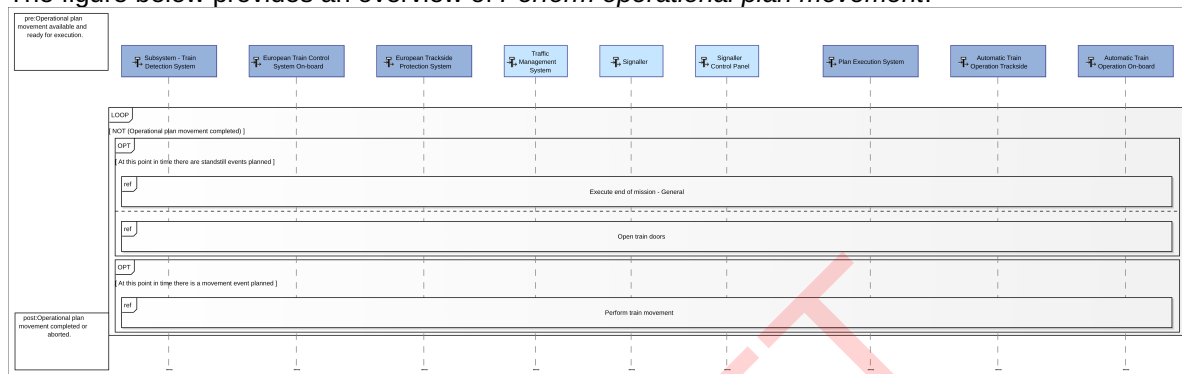


Figure 36 Diagram [PES] Perform operational plan movement [Exchange scenario]

ID	SPMS-5977
Pre Condition	Operational plan movement available and ready for execution.
Post Condition	Operational plan movement completed or aborted.

### 5.2 Perform train movement

#### 5.2-1 - Perform train movement

This exchange scenario describes the sequence of scenarios that support train movement. These scenarios may occur during the operation of a train in full supervision or automatic driving mode, with the movement requested by the Traffic Management System in accordance with the operational plan.

The figure below provides an overview of *Perform train movement*.

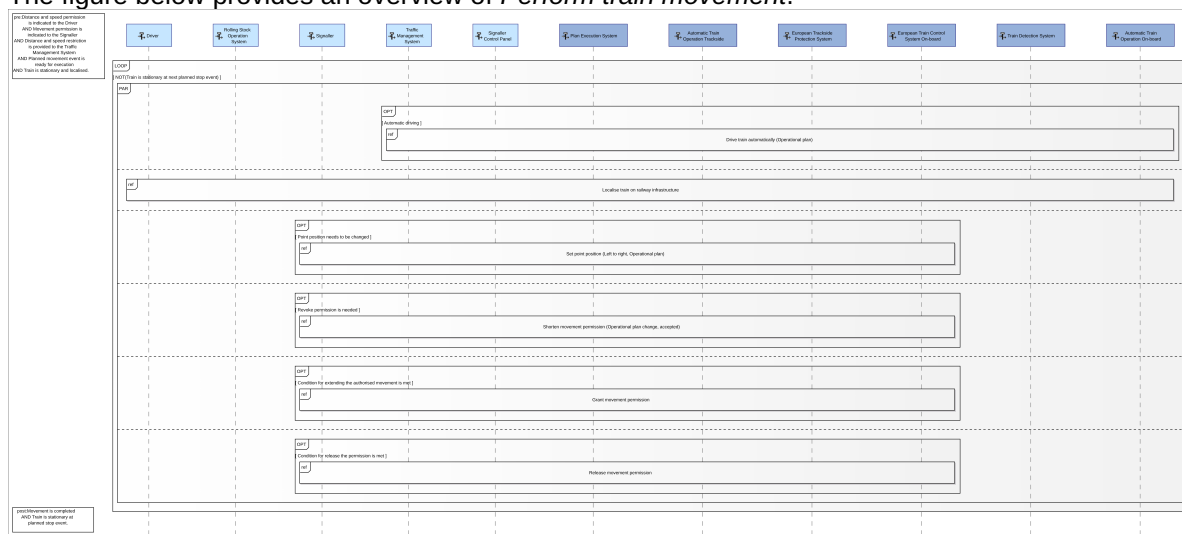


Figure 37 Diagram [PES] Perform train movement [Exchange scenario]

ID	SPMS-6176
Pre Condition	Distance and speed permission is indicated to the Driver AND Movement permission is indicated to the Signaller AND Distance and speed restriction is provided to the Traffic Management System AND Planned movement event is ready for execution AND Train is stationary and localised.
Post Condition	Movement is completed AND Train is stationary at planned stop event.

### 5.2-2 - Perform train movement

This functional chain outlines the sequence of processes that facilitate train movement. These processes may occur during the operation of a train in full supervision or automatic driving mode.

The figure below provides an overview of *Perform train movement*.

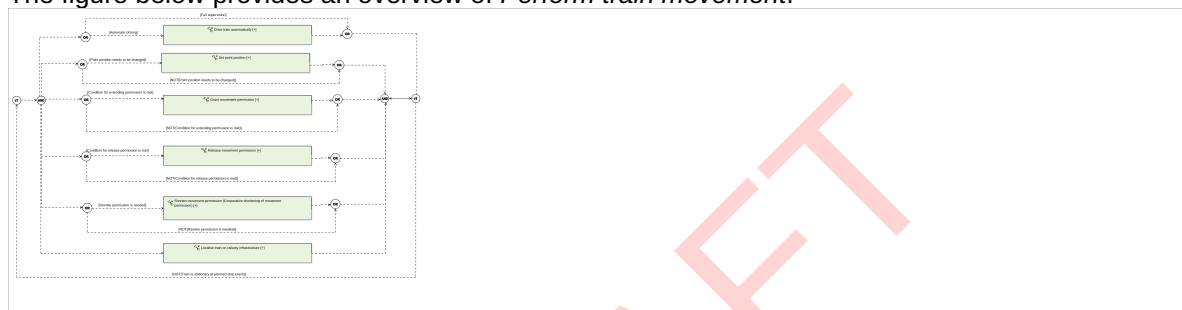


Figure 38 Diagram [PFCD] Perform train movement [Functional chain description]

ID	SPMS-6096
Pre Condition	Distance and speed permission is indicated to the Driver AND Movement permission is indicated to the Signaller AND Distance and speed restriction is provided to the Traffic Management System AND Planned movement event is ready for execution AND Train is stationary and localised.
Post Condition	Movement is completed AND Train is stationary at planned stop event.

## 5.3 Grant movement permission

### 5.3-1 - Grant movement permission

This scenario describes the sequence of functions related to each other to grant a movement permission requested by the Plan Execution System according to the operational plan.

The figure below provides an overview of *Grant movement permission*.

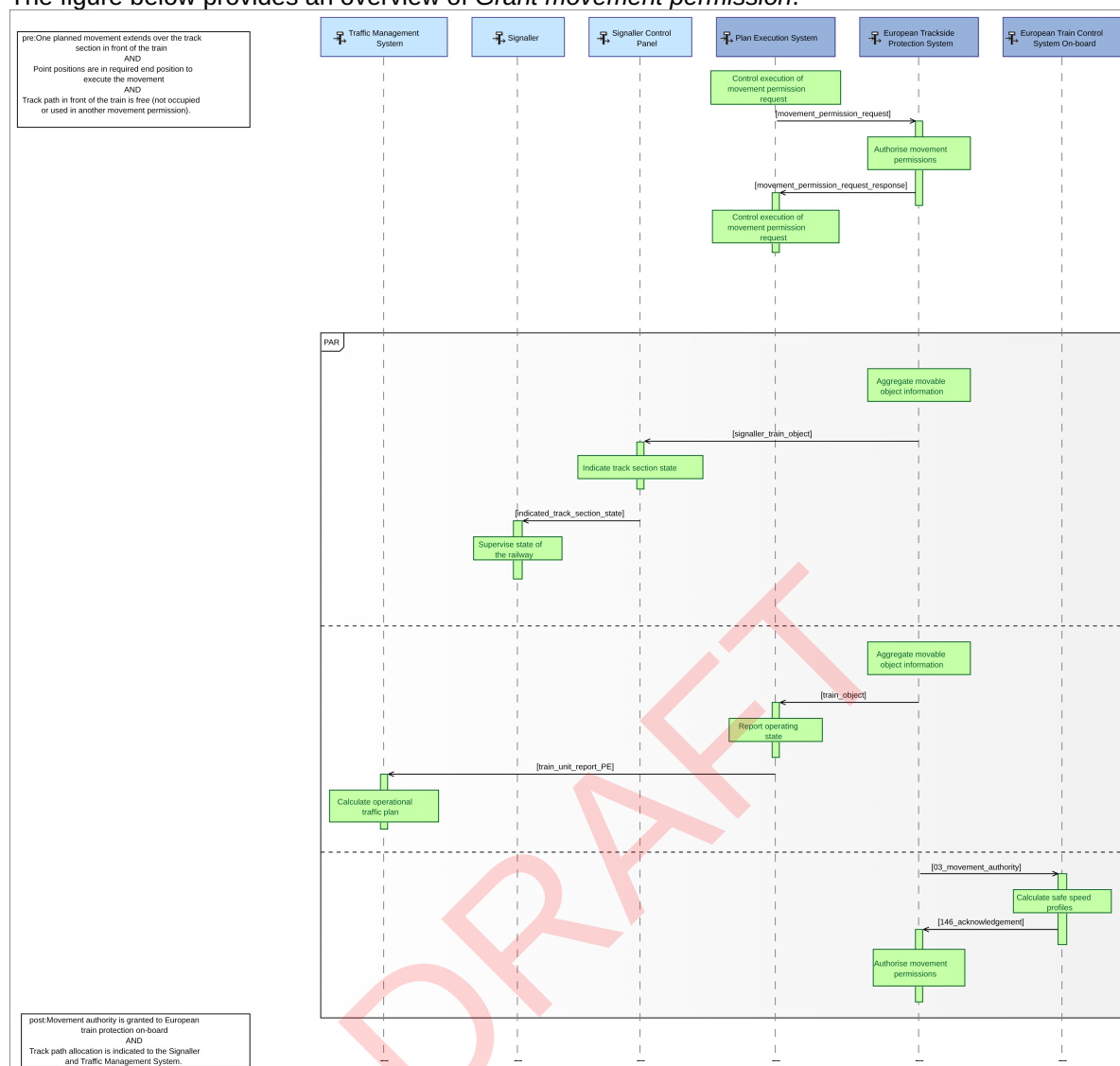










Figure 39 Diagram [PES] Grant movement permission [Exchange scenario]

ID	SPMS-5014
Pre Condition	<p>One planned movement extends over the track section in front of the train</p> <p>AND</p> <p>Point positions are in required end position to execute the movement</p> <p>AND</p> <p>Track path in front of the train is free (not occupied or used in another movement permission).</p>
Post Condition	<p>Movement authority is granted to European train protection on-board</p> <p>AND</p> <p>Track path allocation is indicated to the Signaller and Traffic Management System.</p>

Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4871 - Aggregate movable object information</li> <li>•  SPMS-4873 - Calculate safe speed profiles</li> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4878 - Control execution of movement permission request</li> <li>•  SPMS-4883 - Authorise movement permissions</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-4910 - Indicate track section state</li> <li>•  SPMS-5355 - Report operating state</li> </ul>
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### 5.3-2 - Grant movement permission

This functional chain describes the sequence of functions related to each other to grant a movement permission requested by the Plan Execution System according to the operational plan. The figure below provides an overview of *Grant movement permission*.

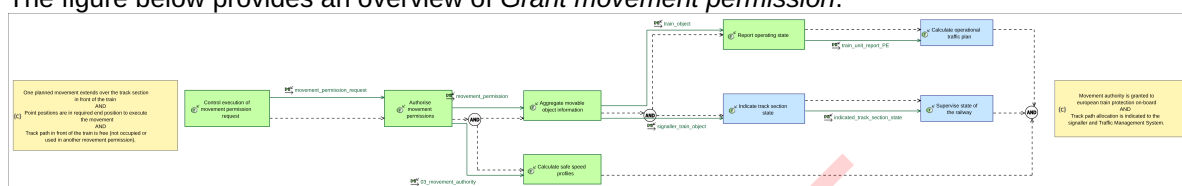


Figure 40 Diagram [PFCD] Grant movement permission [Functional chain description]

ID	SPMS-4868
Pre Condition	
Post Condition	

### [PAB] Grant movement permission [Control loop]

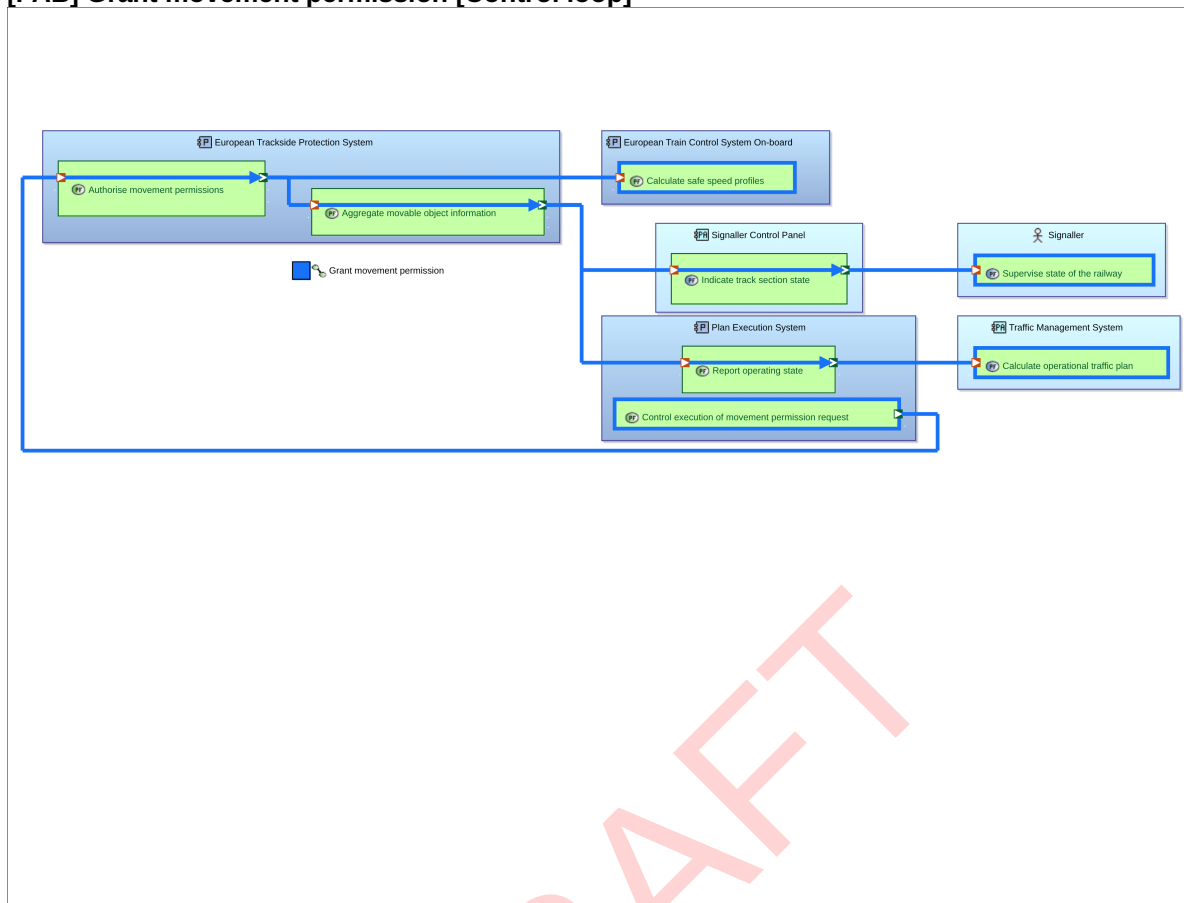


Figure 41 Diagram [PAB] Grant movement permission [Control loop]

ID	SPMS-7316
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## 5.4 Release movement permission

### 5.4-1 - Release movement permission

This scenario describes the sequence of functions related to each other to release a movement permission according to the train position (rear end has passed part of the movement permission).

The figure below provides an overview of *Release movement permission*.

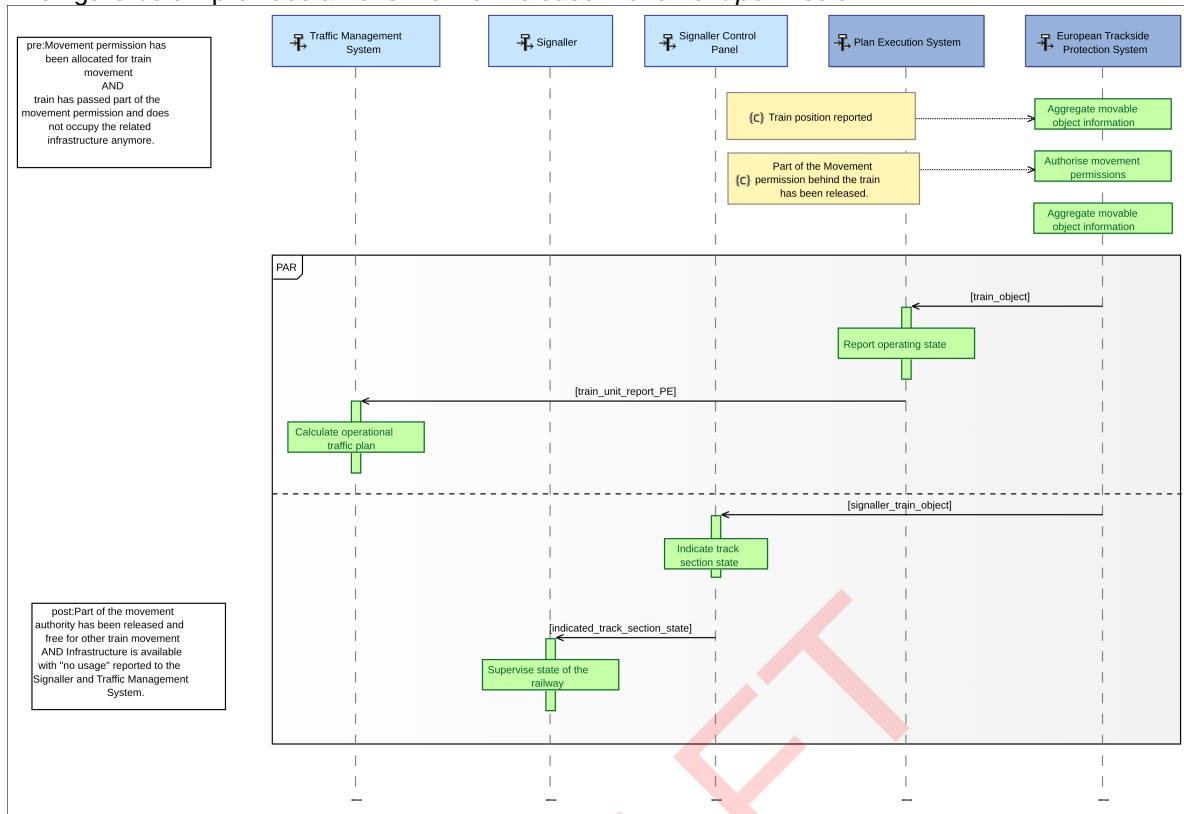


Figure 42 Diagram [PES] Release movement permission [Exchange scenario]

ID	SPMS-5893
Pre Condition	Movement permission has been allocated for train movement AND train has passed part of the movement permission and does not occupy the related infrastructure anymore.
Post Condition	Part of the movement authority has been released and free for other train movement AND Infrastructure is available with "no usage" reported to the Signaller and Traffic Management System.
Involved Functions	<ul style="list-style-type: none"> <li>SPMS-4871 - Aggregate movable object information</li> <li>SPMS-4875 - Calculate operational traffic plan</li> <li>SPMS-4883 - Authorise movement permissions</li> <li>SPMS-4908 - Supervise state of the railway</li> <li>SPMS-4910 - Indicate track section state</li> <li>SPMS-5355 - Report operating state</li> </ul>

#### 5.4-2 - Release movement permission

This functional chain describes the sequence of functions related to each other to release a movement permission according to the the train position (rear end has passed part of the movement permission). The figure below provides an overview of *Release movement permission*.

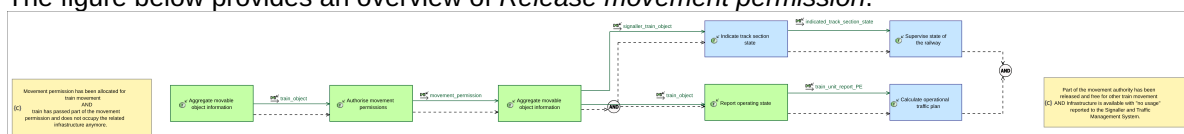


Figure 43 Diagram [PFCD] Release movement permission [Functional chain description]



ID	SPMS-5886
Pre Condition	Movement permission has been allocated for train movement AND train has passed part of the movement permission and does not occupy the related infrastructure anymore.
Post Condition	Part of the movement authority has been released and free for other train movement AND Infrastructure is available with no usage reported to the Signaller and Traffic Management System

#### [PAB] Release movement permission

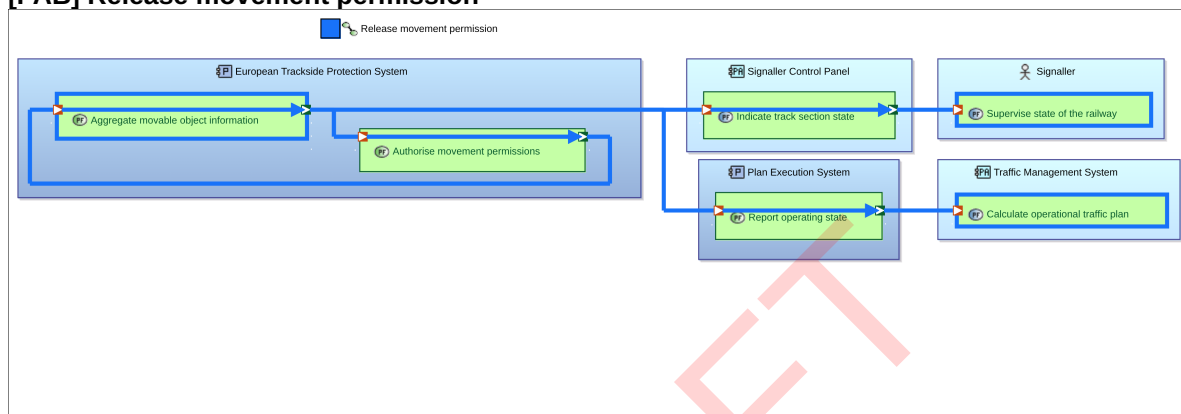


Figure 44 Diagram [PAB] Release movement permission

ID	SPMS-7794
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## 5.5 Shorten movement permission

### 5.5-1 - Shorten movement permission (Cooperative shortening of movement permission)

This functional chain describes the sequence of functions related to each other in case an active movement permission needs to be shortened. Such request can be triggered by the Traffic Management System or by the Signaller.

The figure below provides an overview of *Shorten movement permission (Cooperative shortening of movement permission)*.

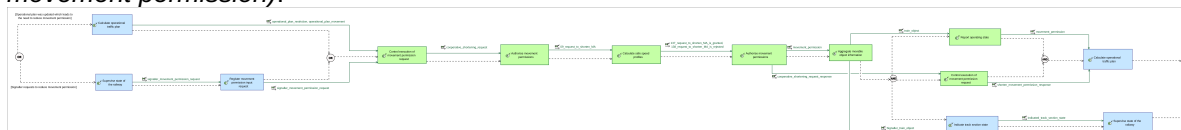


Figure 45 Diagram [PFCD] Shorten movement permission (Cooperative shortening of movement permission) [Functional chain description]

ID	SPMS-5474
Pre Condition	A movement authority is granted by European Trainside Protection System and transmitted to ETCS-Onboard AND Traffic Management System OR Signaller detects the need to shorten movement permission ahead of a train unit

Post Condition	<p>[Part of the track that was reserved before is now released AND Shortened movement authority is transmitted to train protection on-board AND Shortened movement permission is reported to Signaller and Traffic Management System] OR [Request to shorten movement permission got rejected AND The rejection is reported to Traffic Management System OR Signaller]</p>
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### 5.5.1 Shorten movement permission (Signaller request)

#### 5.5.1-1 - Shorten movement permission (Signaller request, accepted)

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trackside Protection System when a shortening request for an active movement permission is triggered by the Signaller and will be accepted by ETCS-Onboard System. The figure below provides an overview of *Shorten movement permission (Signaller request, accepted)*.

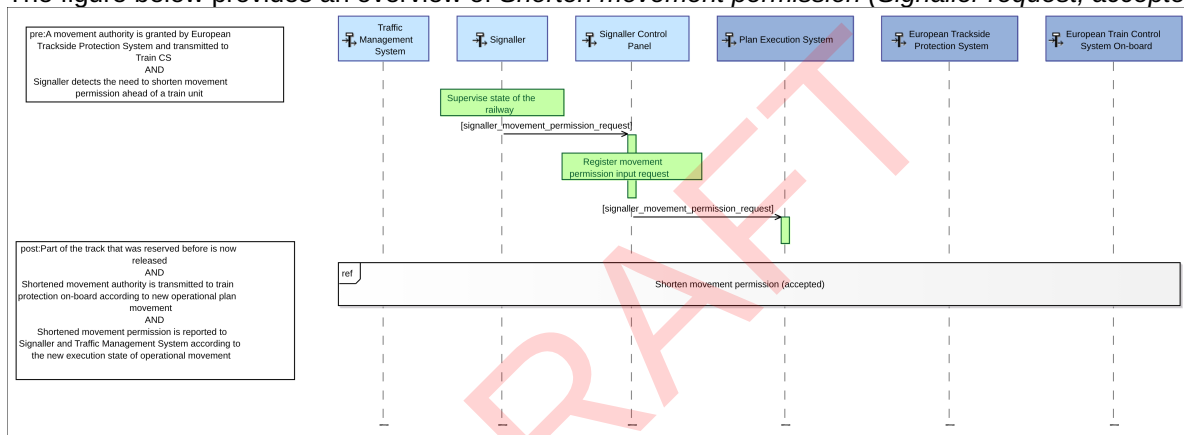




Figure 46 Diagram [PES] Shorten movement permission (Signaller request, accepted) [Exchange scenario]

ID	SPMS-5222
Pre Condition	<p>A movement authority is granted by European Trackside Protection System and transmitted to ETCS-Onboard AND Signaller detects the need to shorten movement permission ahead of a train unit</p>
Post Condition	<p>Part of the track that was reserved before is now released AND Shortened movement authority is transmitted to train protection on-board according to new operational plan movement AND Shortened movement permission is reported to Signaller and Traffic Management System according to the new execution state of operational movement</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-5190 - Register movement permission input request</li> </ul>

#### 5.5.1-2 - Shorten movement permission (Signaller request, rejected)

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trackside Protection System when a shortening request for an active movement permission is triggered by the Signaller and will be rejected by ETCS-Onboard System.

The figure below provides an overview of *Shorten movement permission (Signaller request, rejected)*.

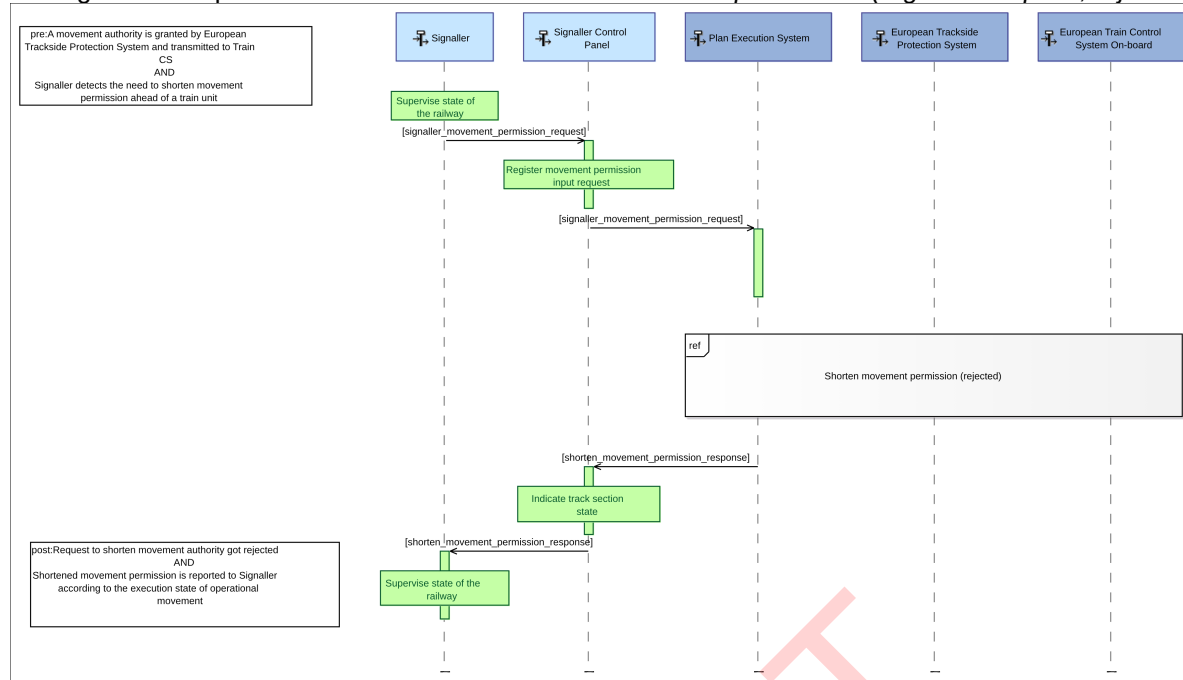


Figure 47 Diagram [PES] Shorten movement permission (Signaller request, rejected) [Exchange scenario]

ID	SPMS-5223
Pre Condition	A movement authority is granted by European Trackside Protection System and transmitted to ETCS-Onboard AND Signaller detects the need to shorten movement permission ahead of a train unit
Post Condition	Request to shorten movement authority got rejected AND Shortened movement permission is reported to Signaller according to the execution state of operational movement
Involved Functions	<ul style="list-style-type: none"> <li>• SF SPMS-4908 - Supervise state of the railway</li> <li>• SF SPMS-4910 - Indicate track section state</li> <li>• SF SPMS-5190 - Register movement permission input request</li> </ul>

#### [PAB] Shorten movement permission (Signaller) [Control loop]

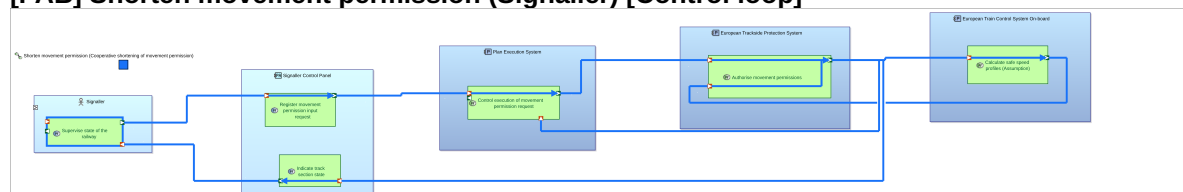


Figure 48 Diagram [PAB] Shorten movement permission (Signaller) [Control loop]

ID	SPMS-6065
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## 5.5.2 Shorten movement permission (General)

### 5.5.2-1 - Shorten movement permission (accepted)

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trackside Protection System when a shortening request for an active movement permission is triggered and will be accepted by ETCS-Onboard System. The figure below provides an overview of *Shorten movement permission (accepted)*.

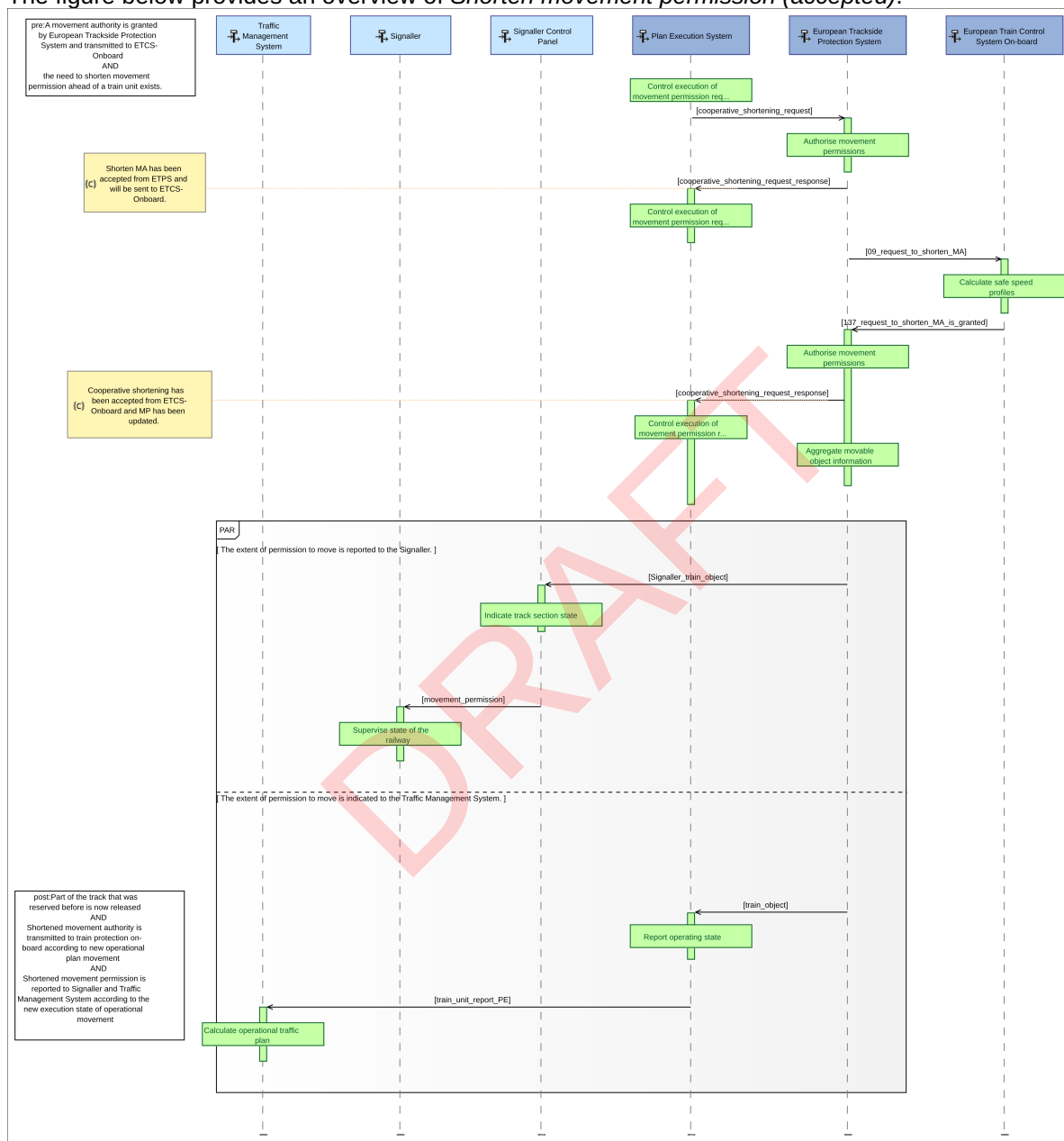










Figure 49 Diagram [PES] Shorten movement permission (accepted)

ID	SPMS-7785
Pre Condition	A movement authority is granted by European Trackside Protection System and transmitted to ETCS-Onboard AND the need to shorten movement permission ahead of a train unit exists.

Post Condition	<p>Part of the track that was reserved before is now released AND Shortened movement authority is transmitted to train protection on-board according to new operational plan movement AND Shortened movement permission is reported to Signaller and Traffic Management System according to the new execution state of operational movement</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4871 - Aggregate movable object information</li> <li>•  SPMS-4873 - Calculate safe speed profiles</li> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4878 - Control execution of movement permission request</li> <li>•  SPMS-4883 - Authorise movement permissions</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-4910 - Indicate track section state</li> <li>•  SPMS-5355 - Report operating state</li> </ul>

### 5.5.2-2 - Shorten movement permission (rejected)

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trainside Protection System when a shortening request for an active movement permission is triggered and will be rejected by the ETCS-Onboard.

The figure below provides an overview of *Shorten movement permission (rejected)*.

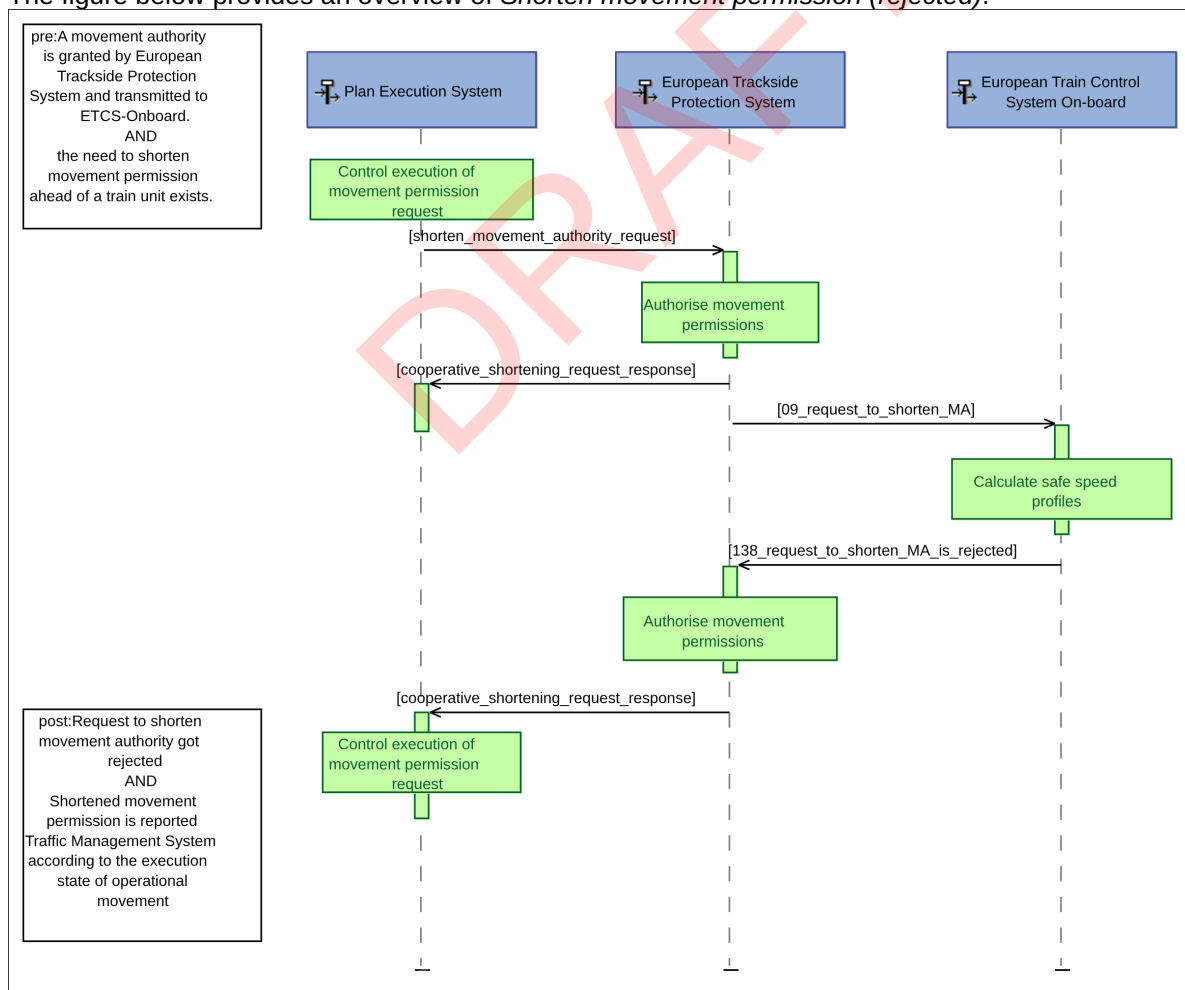





Figure 50 Diagram [PES] Shorten movement permission (rejected)

ID	SPMS-7800
Pre Condition	A movement authority is granted by European Trackside Protection System and transmitted to ETCS-Onboard. AND the need to shorten movement permission ahead of a train unit exists.
Post Condition	Request to shorten movement authority got rejected AND Shortened movement permission is reported Traffic Management System according to the execution state of operational movement
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4873 - Calculate safe speed profiles</li> <li>•  SPMS-4878 - Control execution of movement permission request</li> <li>•  SPMS-4883 - Authorise movement permissions</li> </ul>

Disclaimer: In the actual state, the concept of actualisation of the operational plan by TMS is still under development (i.a. by the technical concept team). Therefore, in this document the request of shortening of the movement permission by TMS is not considered. The review can be focused on the request of shortening the movement permission by Signaller.

## 5.6 Set point position

### 5.6.1 Set point position (Operational plan)

#### 5.6.1-1 - Set point position (Left to right, Operational plan)

This scenario describes the sequence of functions related to each other in case of an operational plan movement requiring "right end position" point position request by the Traffic Management System. The figure below provides an overview of *Set point position (Left to right, Operational plan)*.

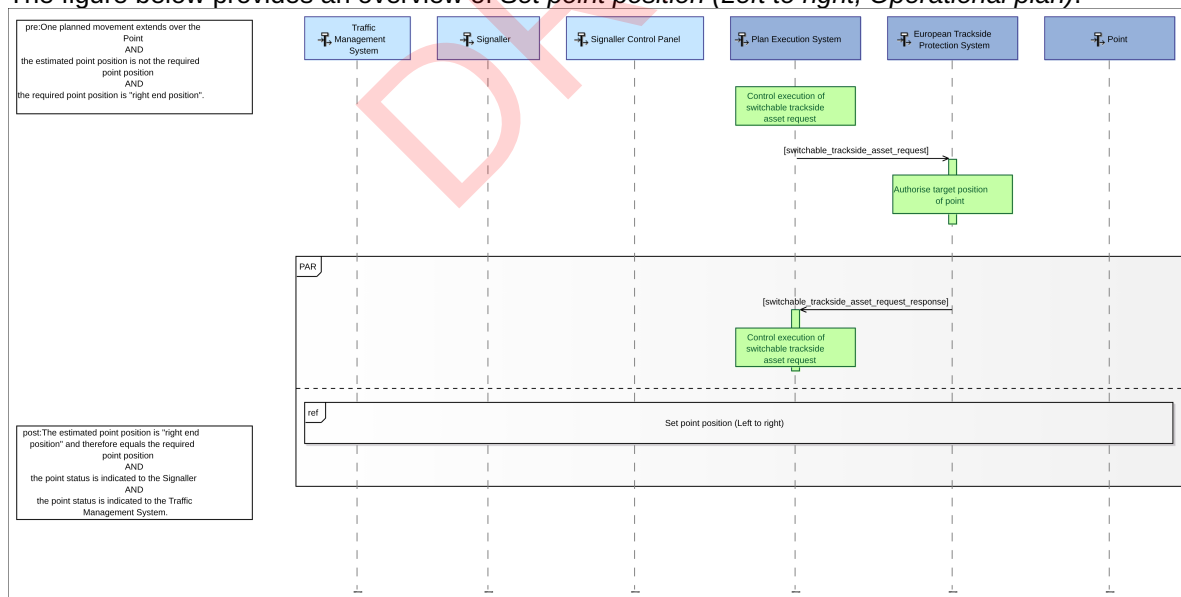




Figure 51 Diagram [PES] Set point position (Left to right, Operational plan) [Exchange scenario]

ID	SPMS-5015
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Pre Condition	<p>One planned movement extends over the Point AND the estimated point position is not the required point position AND the required point position is "right end position".</p>
Post Condition	<p>The estimated point position is "right end position" and therefore equals the required point position AND the point status is indicated to the Signaller AND the point status is indicated to the Traffic Management System.</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4877 - Control execution of switchable trackside asset request</li> <li>•  SPMS-4903 - Authorise target position of point</li> </ul>

### [PAB] Set point position (Operational plan) [Control loop]

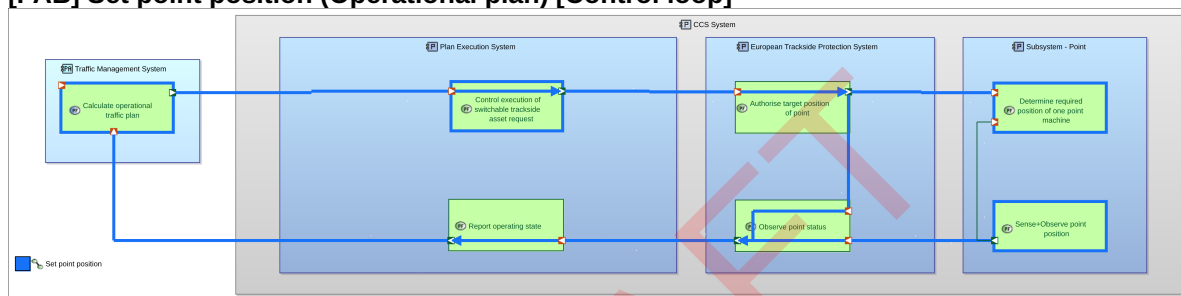



Figure 52 Diagram [PAB] Set point position (Operational plan) [Control loop]

ID	SPMS-5856
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## 5.6.2 Set point position (Signaller)

### 5.6.2-1 - Set point position (Left to right, Signaller, accepted)

This scenario describes the sequence of functions related to each other in case of a right end position point position request by the  SPMS-5110 - Signaller.

The figure below provides an overview of *Set point position (Left to right, Signaller, accepted)*.

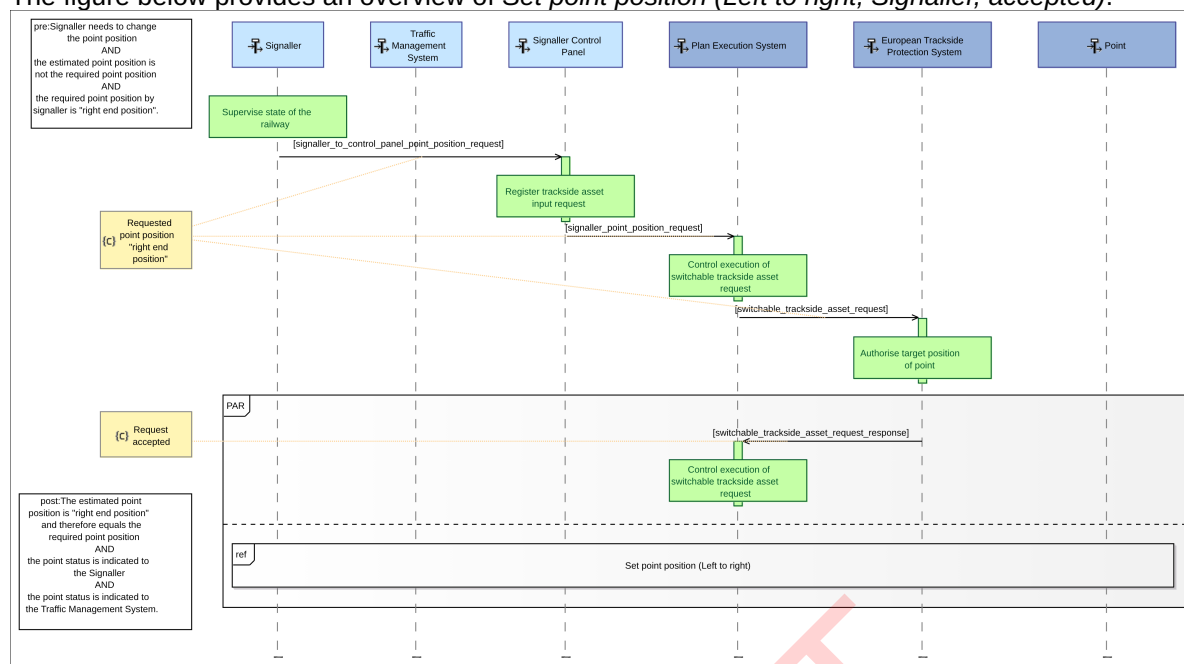






Figure 53 Diagram [PES] Set point position (Left to right, Signaller, accepted) [Exchange scenario]

ID	SPMS-5796
Pre Condition	<p>Signaller needs to change the point position AND the estimated point position is not the required point position AND the required point position by signaller is "right end position".</p>
Post Condition	<p>The estimated point position is "right end position" and therefore equals the required point position AND the point status is indicated to the Signaller AND the point status is indicated to the Traffic Management System.</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4877 - Control execution of switchable trackside asset request</li> <li>•  SPMS-4903 - Authorise target position of point</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-4911 - Register trackside asset input request</li> </ul>



### [PAB] Set point position (Signaller) [Control loop]

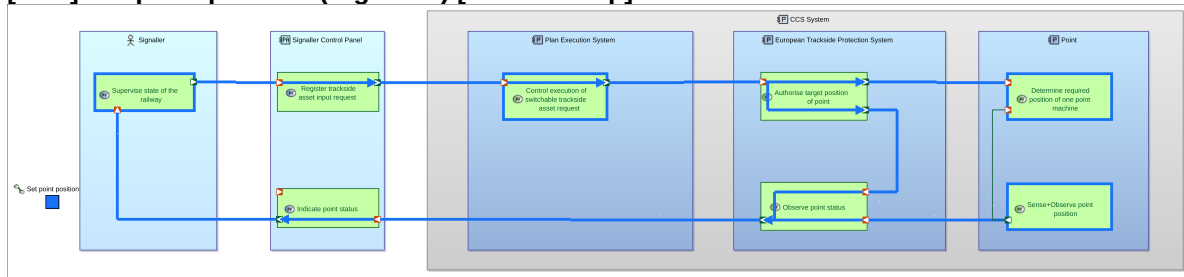


Figure 54 Diagram [PAB] Set point position (Signaller) [Control loop]

ID	SPMS-5327
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### 5.6.3 Set point position (General)

#### 5.6.3-1 - Set point position (Left to right)

This scenario describes the sequence of functions related to each other when a "right end position" point position is required and the current estimated point position is not the required point position.

The figure below provides an overview of *Set point position* (Left to right).

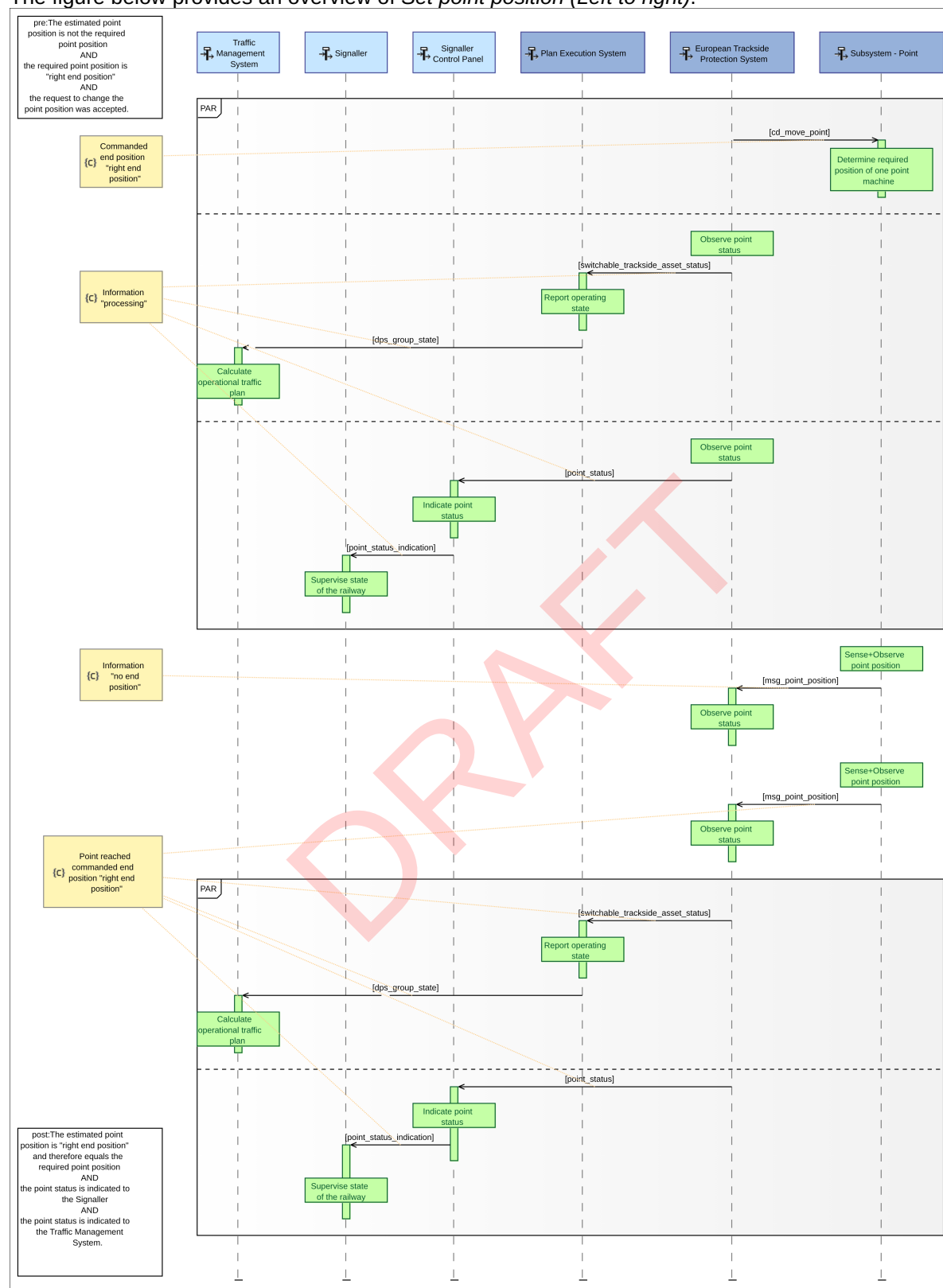










Figure 55 Diagram [PES] Set point position (Left to right)

ID	SPMS-7752
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Pre Condition	<p>The estimated point position is not the required point position  AND  the required point position is "right end position"  AND  the request to change the point position was accepted.</p>
Post Condition	<p>The estimated point position is "right end position" and therefore equals the required point position  AND  the point status is indicated to the Signaller  AND  the point status is indicated to the Traffic Management System.</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4885 - Determine required position of one point machine</li> <li>•  SPMS-4888 - Observe point status</li> <li>•  SPMS-4900 - Sense+Observe point position</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-4913 - Indicate point status</li> <li>•  SPMS-5355 - Report operating state</li> </ul>

## 5.7 Activate usage restriction

### 5.7-1 - Activate usage restriction (Planned usage restriction)

This scenario describes the sequence of functions related to each other in case of an activation request by the  SPMS-5111 - Traffic Management System for a planned usage restriction.

The figure below provides an overview of *Activate usage restriction (Planned usage restriction)*.

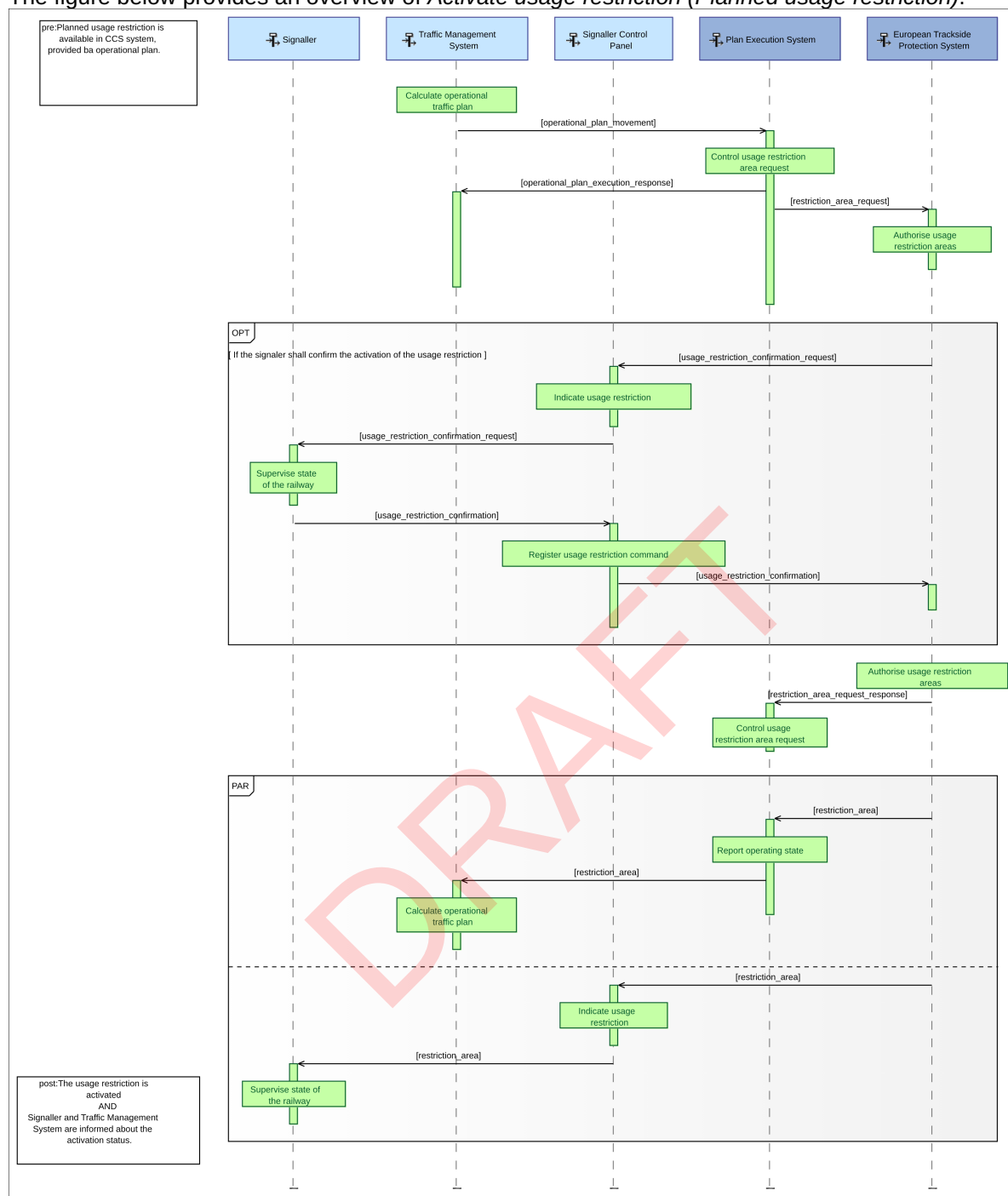









Figure 56 Diagram [PES] Activate usage restriction (Planned usage restriction) [Exchange scenario]

ID	SPMS-5224
Pre Condition	Planned usage restriction is available in CCS system, provided ba operational plan.
Post Condition	The usage restriction is activated AND Signaller and Traffic Management System are informed about the activation status.

Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-5355 - Report operating state</li> <li>•  SPMS-5723 - Control usage restriction area request</li> <li>•  SPMS-5724 - Authorise usage restriction areas</li> <li>•  SPMS-5726 - Indicate usage restriction</li> <li>•  SPMS-6591 - Register usage restriction command</li> </ul>
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### 5.7-2 - Activate usage restriction (Unplanned TSR)

This scenario describes the sequence of functions related to each other in case of an activation request by the Signaller for an unplanned temporary speed restriction.

The figure below provides an overview of *Activate usage restriction (Unplanned TSR)*.

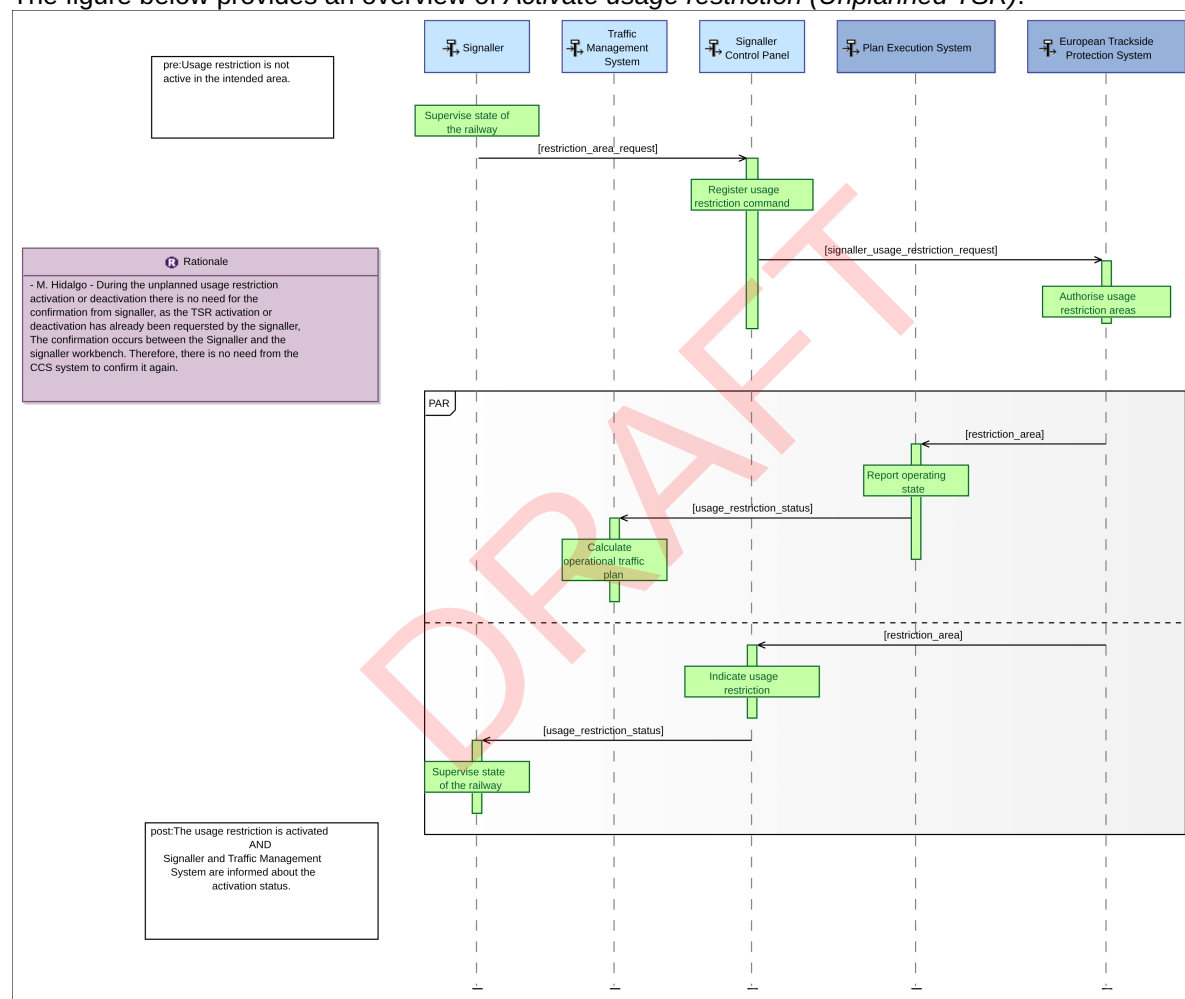



Figure 57 Diagram [PES] Activate usage restriction (Unplanned TSR)

ID	SPMS-7835
Pre Condition	Usage restriction is not active in the intended area.
Post Condition	The usage restriction is activated AND Signaller and Traffic Management System are informed about the activation status.

Involved Functions	<ul style="list-style-type: none"> <li>• 5F SPMS-4875 - Calculate operational traffic plan</li> <li>• 5F SPMS-4908 - Supervise state of the railway</li> <li>• 5F SPMS-5355 - Report operating state</li> <li>• 5F SPMS-5724 - Authorise usage restriction areas</li> <li>• 5F SPMS-5726 - Indicate usage restriction</li> <li>• 5F SPMS-6591 - Register usage restriction command</li> </ul>
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### 5.7-3 - Activate usage restriction

This functional chain describes the sequence of functions related to each other in case of an activation request by the  SPMS-5111 - Traffic Management System for a planned usage restriction.

The figure below provides an overview of *Activate usage restriction*.

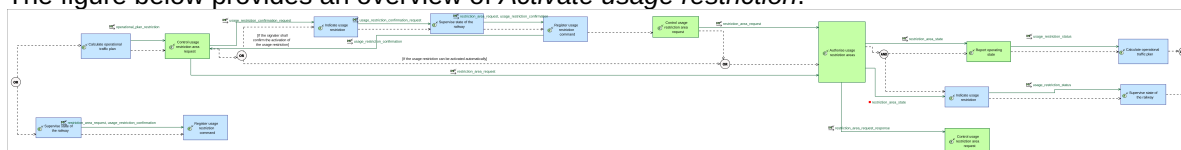


Figure 58 Diagram [PFCD] Activate usage restriction [Functional chain description]

ID	SPMS-5189
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### [PAB] Activate Usage Restriction (Operational plan) [Control loop]

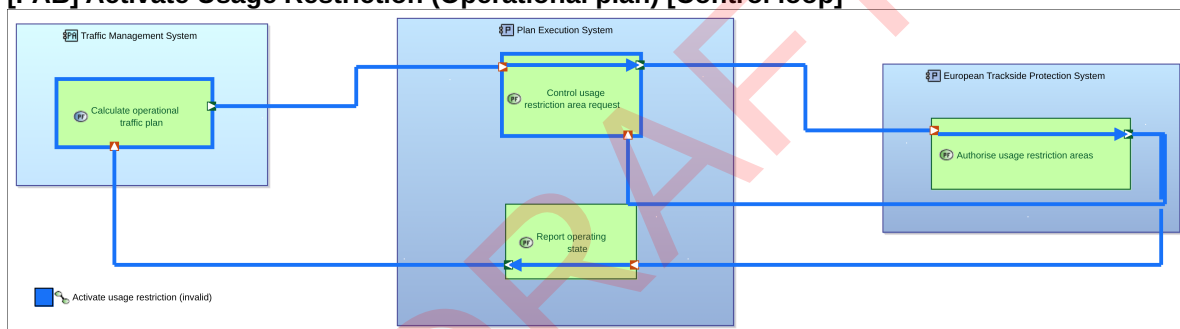



Figure 59 Diagram [PAB] Activate Usage Restriction (Operational plan) [Control loop]

ID	SPMS-7803
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## 5.8 Deactivate usage restriction

### 5.8-1 - Deactivate usage restriction (Planned usage restriction)

This scenario describes the sequence of functions related to each other in case of a deactivation request by the  SPMS-5111 - Traffic Management System for a planned usage restriction.

The figure below provides an overview of *Deactivate usage restriction (Planned usage restriction)*.

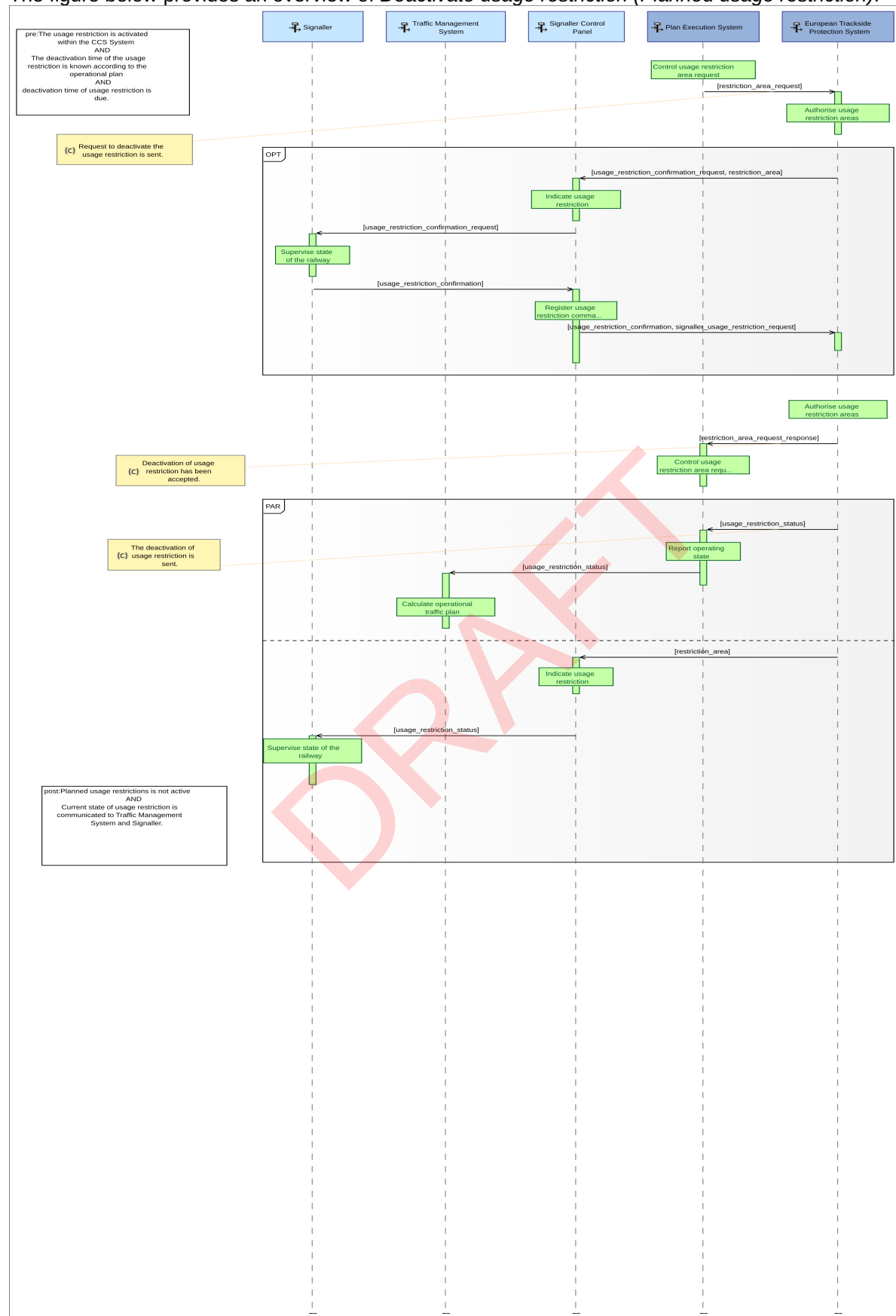










Figure 60 Diagram [PES] Deactivate usage restriction (Planned usage restriction) [Exchange scenario]

ID	SPMS-5852
Pre Condition	<p>The usage restriction is activated within the CCS System AND The deactivation time of the usage restriction is known according to the operational plan AND deactivation time of usage restriction is due.</p>
Post Condition	<p>Planned usage restrictions is not active AND Current state of usage restriction is communicated to Traffic Management System and Signaller.</p>
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-5355 - Report operating state</li> <li>•  SPMS-5723 - Control usage restriction area request</li> <li>•  SPMS-5724 - Authorise usage restriction areas</li> <li>•  SPMS-5726 - Indicate usage restriction</li> <li>•  SPMS-6591 - Register usage restriction command</li> </ul>

### 5.8-2 - Deactivate usage restriction (Unplanned TSR)

This scenario describes the sequence of functions related to each other in case of a deactivation request by the  SPMS-5111 - Traffic Management System for a planned usage restriction.



The figure below provides an overview of *Deactivate usage restriction (Unplanned TSR)*.

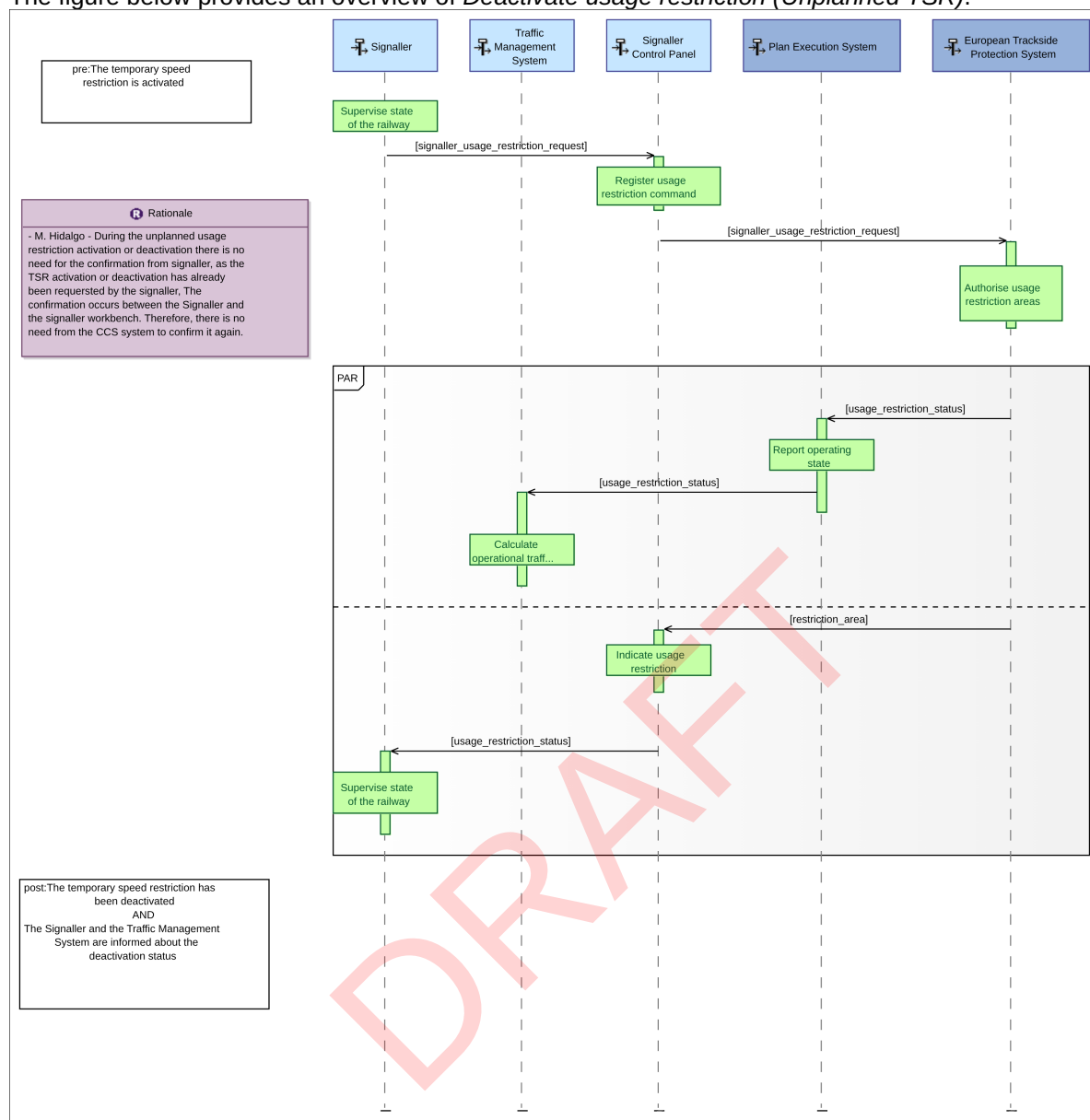


Figure 61 Diagram [PES] Deactivate usage restriction (Unplanned TSR)

ID	SPMS-7909
Pre Condition	The temporary speed restriction is activated
Post Condition	The temporary speed restriction has been deactivated AND The Signaller and the Traffic Management System are informed about the deactivation status
Involved Functions	<ul style="list-style-type: none"> <li>• SPMS-4875 - Calculate operational traffic plan</li> <li>• SPMS-4908 - Supervise state of the railway</li> <li>• SPMS-5355 - Report operating state</li> <li>• SPMS-5724 - Authorise usage restriction areas</li> <li>• SPMS-5726 - Indicate usage restriction</li> <li>• SPMS-6591 - Register usage restriction command</li> </ul>

### 5.8-3 - Deactivate usage restriction

This functional chain describes the sequence of functions related to each other in case of a deactivation request by the SPMS-5111 - Traffic Management System for a planned usage restriction.

The figure below provides an overview of *Deactivate usage restriction*.

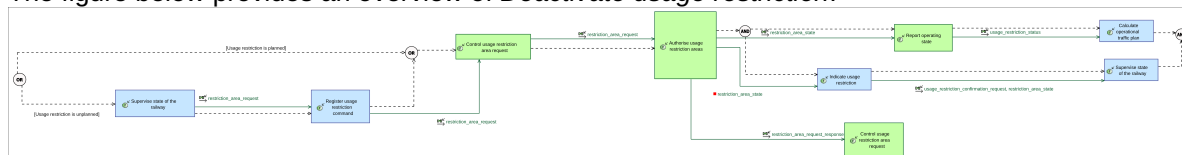


Figure 62 Diagram [PFCD] Deactivate usage restriction [Functional chain description]

ID	SPMS-5840
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### [PAB] Deactivate Usage Restriction (Operational plan) [Control loop]

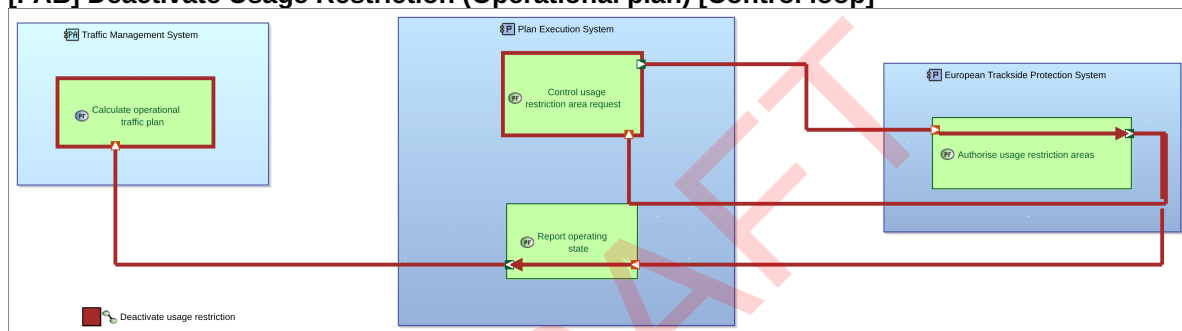


Figure 63 Diagram [PAB] Deactivate Usage Restriction (Operational plan) [Control loop]

ID	SPMS-6180
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## 5.9 Execute end of mission

### 5.9.1 Execute end of mission - General

#### 5.9.1-1 - Execute end of mission - General

This functional chain describes the sequence of functions related to each other in case an End of Mission (i.e. cab closure and possibly communication closure or power off) is executed by the European Train Control System On-board.

The figure below provides an overview of *Execute end of mission - General*.

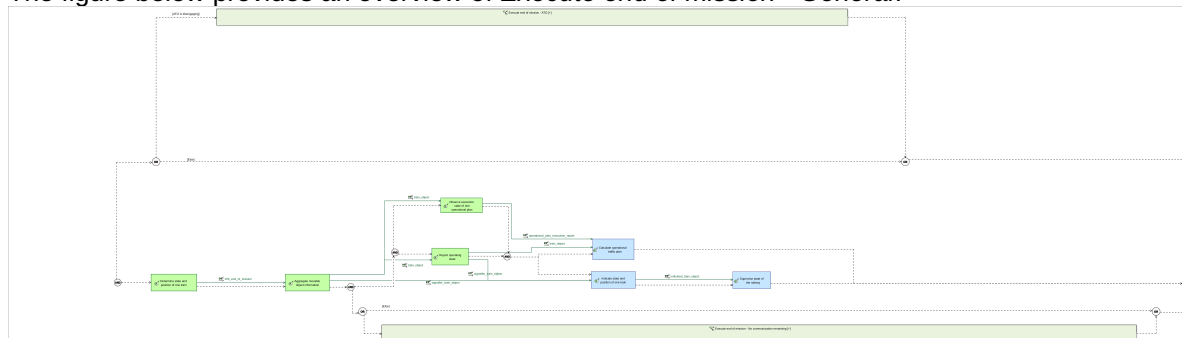


Figure 64 Diagram [PFCD] Execute end of mission - General

ID	SPMS-7150
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### 5.9.1-2 - Execute end of mission - General

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trainside Protection System when an End of Mission (i.e. cab closure and possibly communication closure or power off) is executed by the European Train Control System On-board.

The figure below provides an overview of *Execute end of mission - General*.

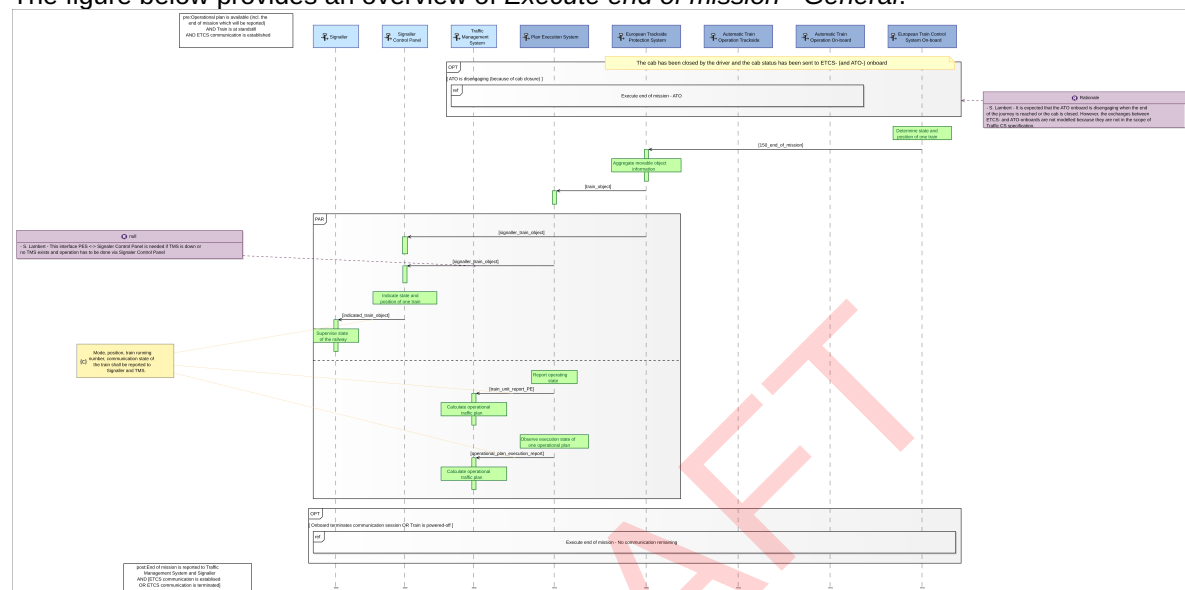









Figure 65 Diagram [PES] Execute end of mission - General

ID	SPMS-7224
Pre Condition	Operational plan is available (incl. the end of mission which will be reported) AND Train is at standstill AND ETCS communication is established
Post Condition	End of mission is reported to Traffic Management System and Signaller AND [ETCS communication is established OR ETCS communication is terminated]
Involved Functions	<ul style="list-style-type: none"> <li>•  SPMS-4871 - Aggregate movable object information</li> <li>•  SPMS-4874 - Determine state and position of one train</li> <li>•  SPMS-4875 - Calculate operational traffic plan</li> <li>•  SPMS-4880 - Observe execution state of one operational plan</li> <li>•  SPMS-4908 - Supervise state of the railway</li> <li>•  SPMS-5355 - Report operating state</li> <li>•  SPMS-7141 - Indicate state and position of one train</li> </ul>

### [PAB] Execute end of mission [Control loop]

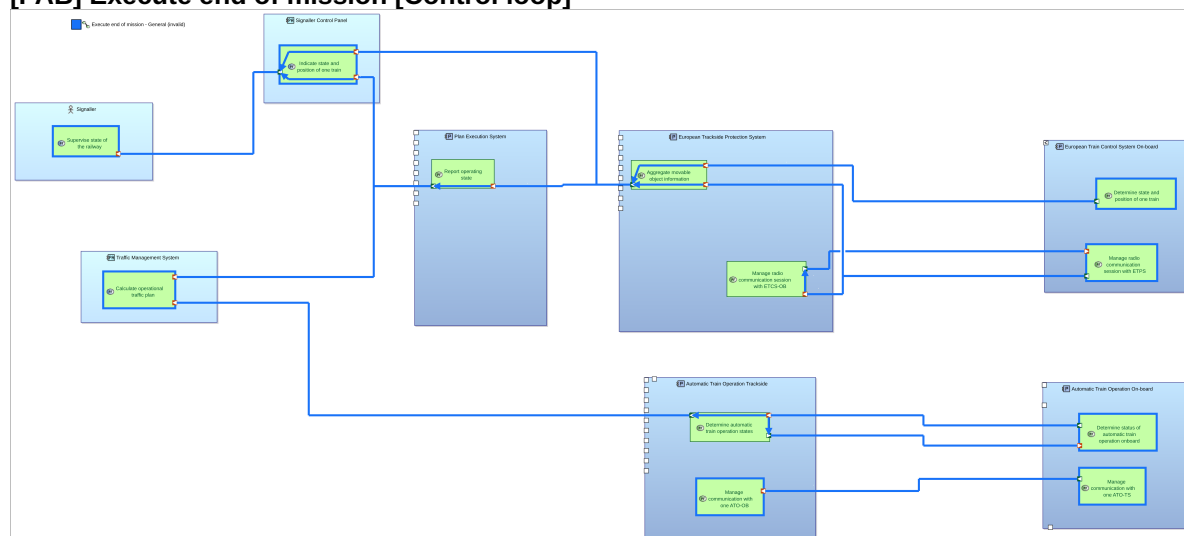


Figure 66 Diagram [PAB] Execute end of mission [Control loop]

ID	SPMS-7165
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## 5.9.2 Execute end of mission - No communication remaining

### 5.9.2-1 - Execute end of mission - No communication remaining

This functional chain describes the sequence of functions related to each other in case an ETCS communication is closed/lost with the European Train Control System On-board.

The figure below provides an overview of *Execute end of mission - No communication remaining*.

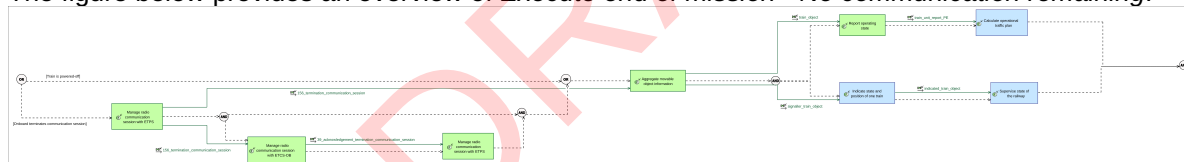


Figure 67 Diagram [PFCD] Execute end of mission - No communication remaining

ID	SPMS-7961
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### 5.9.2-2 - Execute end of mission - No communication remaining

This exchange scenario describes the exchange of information on the interfaces of the Plan Execution System and the European Trackside Protection System when an ETCS communication is closed/lost with the European Train Control System On-board.

The figure below provides an overview of *Execute end of mission - No communication remaining*.

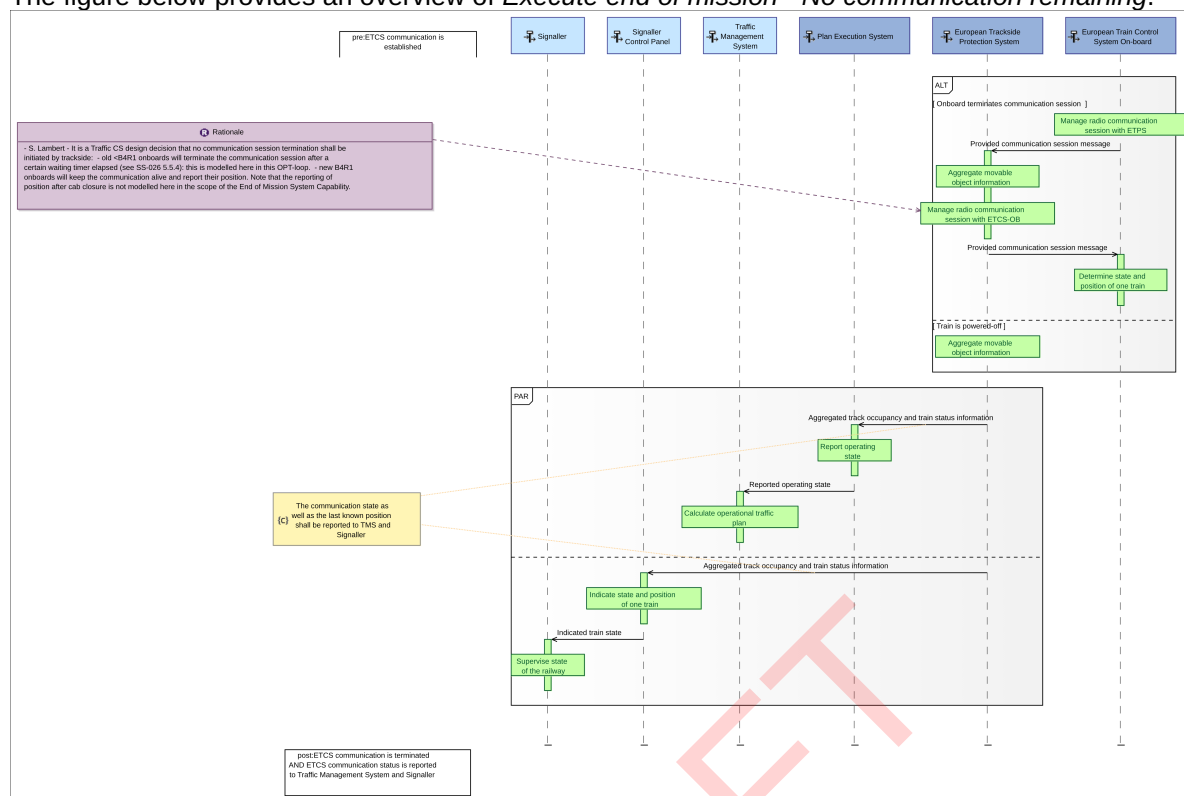


Figure 68 Diagram [PES] Execute end of mission - No communication remaining

ID	SPMS-7968
Pre Condition	ETCS communication is established
Post Condition	ETCS communication is terminated AND ETCS communication status is reported to Traffic Management System and Signaller
Involved Functions	<ul style="list-style-type: none"> <li>• <b>5F</b> SPMS-4871 - Aggregate movable object information</li> <li>• <b>5F</b> SPMS-4874 - Determine state and position of one train</li> <li>• <b>5F</b> SPMS-4875 - Calculate operational traffic plan</li> <li>• <b>5F</b> SPMS-4908 - Supervise state of the railway</li> <li>• <b>5F</b> SPMS-5355 - Report operating state</li> <li>• <b>5F</b> SPMS-6671 - Manage radio communication session with ETCS</li> <li>• <b>5F</b> SPMS-6672 - Manage radio communication session with ETCS-OB</li> <li>• <b>5F</b> SPMS-7141 - Indicate state and position of one train</li> </ul>

### 5.9.3 Execute end of mission - ATO

#### 5.9.3-1 - Execute end of mission - ATO

This functional chain describes the sequence of functions related to each other in case ETCS cab is closed and Automatic Train Operation On-board is disengaged.

The figure below provides an overview of *Execute end of mission - ATO*.

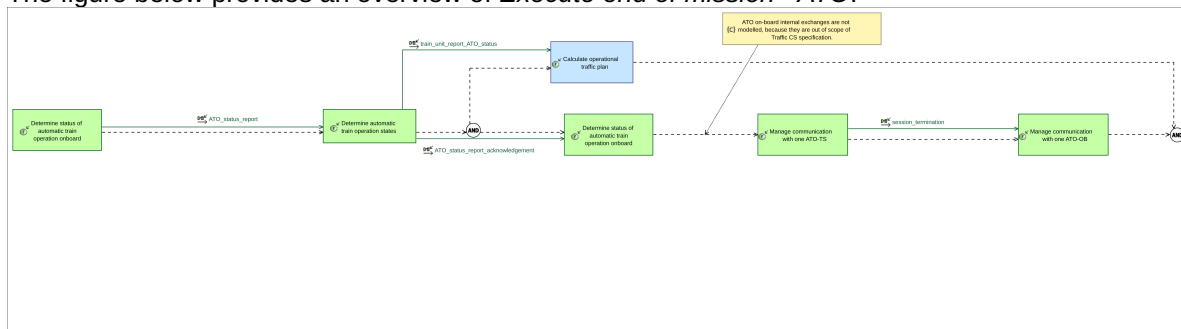


Figure 69 Diagram [PFCD] Execute end of mission - ATO

ID	SPMS-7957
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### 5.9.3-2 - Execute end of mission - ATO

This exchange scenario describes the exchange of information on the interfaces of the Automatic Train Operation Trackside when the ETCS cab is closed and the Automatic Train Operation On-board is disengaged.

The figure below provides an overview of *Execute end of mission - ATO*.

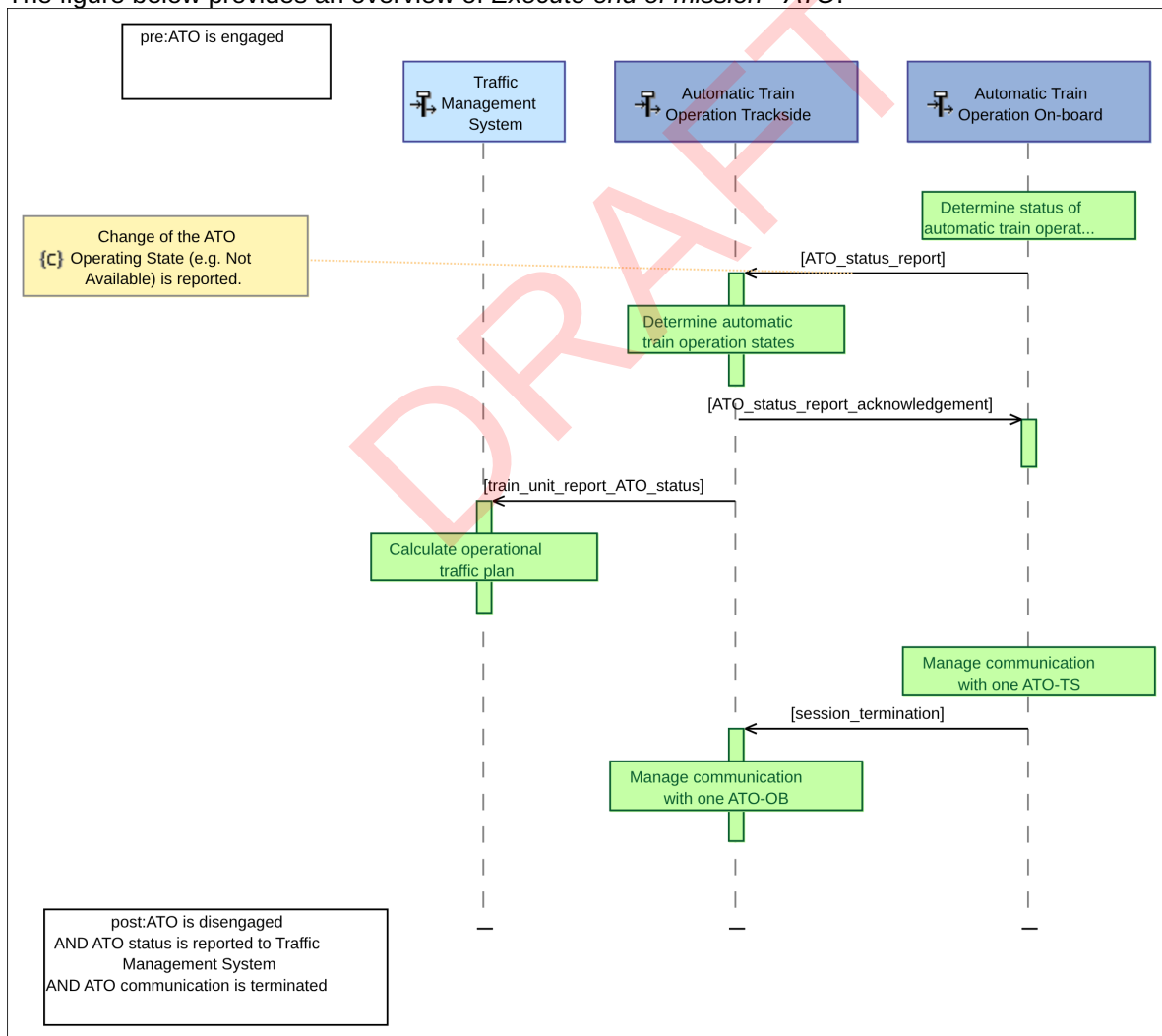







Figure 70 Diagram [PES] Execute end of mission - ATO

ID	SPMS-7967
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Pre Condition	ETCS cab status is closed AND ATO is disengaged
Post Condition	ATO is disengaged AND ATO status is reported to Traffic Management System AND ATO communication is terminated
Involved Functions	<ul style="list-style-type: none"><li>•  SPMS-4875 - Calculate operational traffic plan</li><li>•  SPMS-4881 - Determine automatic train operation states</li><li>•  SPMS-4909 - Determine status of automatic train operation onboard</li><li>•  SPMS-7217 - Manage communication with one ATO-TS</li><li>•  SPMS-7218 - Manage communication with one ATO-OB</li></ul>

DRAFT

## 6 Non-Functional System Requirement Breakdown

Will be provided in a future release.

DRAFT





## 7 System data






Will be provided in a future release.

### 7.1 Exchange items


#### indicated\_train\_object

ID	SPMS-7956
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-7146 - Indicated train state</li> </ul>



#### signaller\_train\_object

ID	SPMS-7955
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6332 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6985 - I_Signaller</li> <li>•  SPMS-7215 - Aggregated track occupancy and train status information</li> <li>•  SPMS-7970 - Reported operating state</li> <li>•  SPMS-7971 - Reported operating state</li> </ul>



#### movement\_permission

ID	SPMS-7954
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7953 - Authorised movement permission</li> </ul>



#### msg\_reset\_PDI

ID	SPMS-7943
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>



**msg\_PDI\_not\_available**

ID	SPMS-7942
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>



**msg\_PDI\_available**

ID	SPMS-7941
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>



**cd\_release\_PDI\_for\_maintenance**

ID	SPMS-7940
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7948 - Paused Provided communication state primary</li> <li>•  SPMS-7951 - Paused Provided communication state primary</li> </ul>

**signaller\_to\_control\_panel\_point\_position\_request\_response**


ID	SPMS-7826
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6395 - Indicated point status</li> </ul>

**signaller\_to\_control\_panel\_point\_position\_request**




ID	SPMS-7825
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6418 - Requested input for trackside assets</li> </ul>

**signaller\_point\_position\_request\_response**

ID	SPMS-7824
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Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7828 - Registered input response</li> </ul>
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### train\_unit\_report\_PE

ID	SPMS-7823
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6416 - Reported operating state</li> <li>•  SPMS-6440 - observed point status</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>




### restriction\_area\_Op

The exchange item "restriction\_area\_Op" is composed of the following elements:




- **restrictionAreaOperatingState** :  SPMS-7610 - RestrictionArea

ID	SPMS-7822
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6346 - Authorised usage restriction</li> <li>•  SPMS-6416 - Reported operating state</li> <li>•  SPMS-6440 - observed point status</li> <li>•  SPMS-6452 - requested usage restriction to signaller</li> <li>•  SPMS-6593 - Indicated usage restriction</li> <li>•  SPMS-6985 - I_Signaller</li> <li>•  SPMS-7827 - Authorised usage restriction</li> </ul>

### dps\_group\_state

ID	SPMS-7821
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6416 - Reported operating state</li> <li>•  SPMS-6440 - observed point status</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>


### warning\_area\_state

ID	SPMS-7820
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6416 - Reported operating state</li> <li>•  SPMS-6440 - observed point status</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>

### restriction\_area\_request\_response



Response to a request to activate or deactivate a usage restriction.

The exchange item "restriction\_area\_request\_response" is composed of the following elements:



- **RespondedURAResponse** :  SPMS-7837 - Draft\_RestrictionAreaRequestResponse

It has the following additional attributes:

Property	Value
type	Request-Response

ID	SPMS-7801
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6344 - Authorised usage restriction</li> </ul>

### indicated\_track\_section\_state

ID	SPMS-7789
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6396 - Indicated track section state</li> </ul>

### cooperative\_shortening\_request\_response

Response to the request for the cooperative shortening of movement permission.



The exchange item "cooperative\_shortening\_request\_response" is composed of the following elements:

- **respondedCooperativeShorteningRequest** :  SPMS-7797 - Draft\_CooperativeShorteningRequestResponse

It has the following additional attributes:

Property	Value
type	Request-Response


ID	SPMS-7787
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Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6441 - Authorised movement permission</li> </ul>
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### cooperative\_shortening\_request



Request for cooperative shortening of movement permission.

The exchange item "cooperative\_shortening\_request" is composed of the following elements:

- **cooperativeShorteningRequest** :  SPMS-7799 - Draft\_CooperativeShorteningRequest

It has the following additional attributes:

Property	Value
type	Request

ID	SPMS-7786
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6421 - Requested movement permission</li> </ul>

### movement\_permission\_request\_response



Response to a movement permission request message.

The exchange item "movement\_permission\_request\_response" is composed of the following elements:

- **RespondedMovementPermissionRequest** :  SPMS-7184 - Draft\_MovementPermissionRequestResponse

It has the following additional attributes:



Property	Value
type	Request-Response

ID	SPMS-7783
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6441 - Authorised movement permission</li> </ul>

### operational\_plan\_restriction

The exchange item "operational\_plan\_restriction" is composed of the following elements:

- **restrictedOperationPlan** :  SPMS-7608 - OperationalPlanRestriction

ID	SPMS-7756
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6351 - Calculated operational traffic plan</li> <li>•  SPMS-6353 - Calculated operational traffic plan</li> </ul>

### restriction\_area


Status of restriction area.

The exchange item "restriction\_area" is composed of the following elements:

- **restrictionAreaCMD** :  SPMS-7610 - RestrictionArea

It has the following additional attributes:

Property	Value
type	Operating State

ID	SPMS-7755
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7827 - Authorised usage restriction</li> </ul>

### restriction\_area\_request



Request to activate or deactivate a usage restriction.

The exchange item "restriction\_area\_request" is composed of the following elements:





- **requestedUsageRestriction** :  SPMS-7730 - Draft\_RestrictionAreaRequest

It has the following additional attributes:

Property	Value
type	Request

ID	SPMS-7754
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6424 - Requested usage restriction</li> </ul>

### operational\_plan\_movement

ID	SPMS-7753
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6304 - SCI_OP_02</li> <li>•  SPMS-6349 - Calculated operational traffic plan</li> <li>•  SPMS-6350 - Calculated operational traffic plan</li> <li>•  SPMS-6351 - Calculated operational traffic plan</li> </ul>

### switchable\_trackside\_asset\_state





Status of switchable trackside asset.

The exchange item "switchable\_trackside\_asset\_state" is composed of the following elements:

- **switchableTracksideAssetState** :  SPMS-7639 - SwitchableTracksideAssetState

It has the following additional attributes:

Property	Value
type	Operating State

ID	SPMS-7747
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6409 - Observed point status</li> <li>•  SPMS-6410 - Observed point status</li> <li>•  SPMS-6411 - Observed point status</li> </ul>

### switchable\_trackside\_asset\_request



Request to change the driveability of a switchable trackside asset.

The exchange item "switchable\_trackside\_asset\_request" is composed of the following elements:

- **requestedSwitchableTracksideAsset** :  
 SPMS-7781 - Draft\_SwitchableTracksideAssetRequest






It has the following additional attributes:



Property	Value
type	Request

ID	SPMS-7746
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6422 - Requested point position</li> </ul>



### monitoring\_and\_diagnostic\_data\_point

The exchange item "monitoring\_and\_diagnostic\_data\_point" is composed of the following elements:



- **ExchangeItemElement 1** :  SPMS-7393 - Point
- **ExchangeItemElement 2** :  SPMS-7352 - Equipment
- **ExchangeItemElement 3** :  SPMS-7380 - SCP
- **ExchangeItemElement 4** :  SPMS-7367 - OpcUaServer
- **ExchangeItemElement 5** :  SPMS-7360 - SSI

ID	SPMS-7741
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6312 - SDI_P</li> <li>•  SPMS-7024 - Monitoring and diagnostic data</li> </ul>

### train\_unit\_report\_ATO\_status

ID	SPMS-7658
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6304 - SCI_OP_02</li> <li>•  SPMS-6401 - Observed execution state of one operational plan from automatic train operation</li> </ul>

### operational\_plan\_execution\_request

ID	SPMS-7144
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7145 - Requested execution state of one operational plan</li> <li>•  SPMS-7659 - Requested execution state of one operational plan</li> </ul>



### reverse\_connect

#### Instances

This ExchangeItem has the following instances. Instances represent topics in ROS.

#### reverse\_connect

No description available.

ID	SPMS-7084
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6312 - SDI_P</li> <li>•  SPMS-7024 - Monitoring and diagnostic data</li> </ul>

### subscribe\_request


#### Instances



This ExchangeItem has the following instances. Instances represent topics in ROS.

#### **subscribe\_request**

No description available.

ID	SPMS-7083
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7085 - Monitoring and diagnostic data</li> </ul>


#### **publish\_request**

##### **Instances**

This ExchangeItem has the following instances. Instances represent topics in ROS.

#### **publish\_request**

No description available.

ID	SPMS-7082
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7085 - Monitoring and diagnostic data</li> </ul>


#### **OPC-UA\_establish\_connection**

##### **Instances**





This ExchangeItem has the following instances. Instances represent topics in ROS.

#### **OPC-UA\_establish\_connection**

No description available.

ID	SPMS-7081
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7085 - Monitoring and diagnostic data</li> </ul>

#### **usage\_restriction\_confirmation**





ID	SPMS-6458
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6426 - Requested usage restriction</li> <li>•  SPMS-6594 - Register Input</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>

#### **usage\_restriction\_confirmation\_request**

The exchange item "usage\_restriction\_confirmation\_request" is composed of the following elements:

- **confirmationStateOfURRequest** :  SPMS-7610 - RestrictionArea




ID	SPMS-6456
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Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6452 - requested usage restriction to signaller</li> <li>•  SPMS-6593 - Indicated usage restriction</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>
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### signaller\_movement\_permission\_request

The exchange item "signaller\_movement\_permission\_request" is composed of the following elements:

- **RequestedMovementPermission** :  SPMS-7183 - Draft\_MovementPermissionRequest

ID	SPMS-6238
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6413 - Register input</li> <li>•  SPMS-6417 - Requested input for movement permission</li> </ul>

### 09\_request\_to\_shorten\_MA

Message 9: Request to Shorten MA

Subset 026 - Chapter 8.7.5

ID	SPMS-5503
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### shorten\_movement\_permission\_response

The exchange item "shorten\_movement\_permission\_response" is composed of the following elements:

- **RespondedShortenMA** :  SPMS-7797 - Draft\_CooperativeShorteningRequestResponse

It has the following additional attributes:

Property	Value
type	Command

ID	SPMS-5480
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6443 - Responded movement permission</li> </ul>

### switchable\_trackside\_asset\_request\_response



Response to a switchable trackside asset request message.

The exchange item "switchable\_trackside\_asset\_request\_response" is composed of the following elements:


- **respondedSwitchableTracksideAssetRequest** :  SPMS-7782 - Draft\_SwitchableTracksideAssetRequestResponse

It has the following additional attributes:




Property	Value
type	Request-Response

ID	SPMS-5191
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6430 - Response to point position request</li> </ul>



### operational\_plan\_execution\_report

ID	SPMS-5138
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6400 - Observed execution state of one operational plan</li> </ul>

### track\_occupation\_state

ID	SPMS-5137
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6416 - Reported operating state</li> <li>•  SPMS-6440 - observed point status</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>

### operational\_plan\_execution\_response

ID	SPMS-5136
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6442 - Responded operational traffic plan</li> <li>•  SPMS-7890 - Responded operational traffic plan</li> </ul>

### train\_object








Contains all known information about a train.

The exchange item "train\_object" is composed of the following elements:



- **trainObject** :  SPMS-7625 - TrainObject

It has the following additional attributes:



Property	Value
type	Operating State

ID	SPMS-5119
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6326 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6327 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6328 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6329 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6330 - Aggregated track occupancy and train status information</li> <li>•  SPMS-6334 - Aggregated track occupancy and train status information</li> </ul>



### session\_termination

ID	SPMS-4965
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7220 - Provided ATO communication session message</li> </ul>



### session\_termination\_request

ID	SPMS-4964
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7947 - Provided ATO communication session message</li> </ul>







### ATO\_status\_report\_acknowledgement

ID	SPMS-4963
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7253 - Acknowledged ATO status report</li> </ul>



**ATO\_status\_report**

ID	SPMS-4962
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6402 - Provided ATO status report</li> </ul>



**segment\_profile**

ID	SPMS-4961
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6359 - Defined segment profile</li> <li>•  SPMS-6360 - Defined segment profile</li> <li>•  SPMS-7733 - Defined segment profile</li> <li>•  SPMS-7734 - Defined segment profile</li> <li>•  SPMS-7863 - Defined segment profile</li> </ul>






**segment\_profile\_request**

ID	SPMS-4960
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6423 - Requested segment profile</li> </ul>



**journey\_profile\_acknowledgement**

ID	SPMS-4959
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6419 - Requested journey profile</li> </ul>



**journey\_profile**

ID	SPMS-4958
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6392 - Generated journey profile</li> <li>•  SPMS-7735 - Generated journey profile</li> <li>•  SPMS-7865 - Generated journey profile</li> <li>•  SPMS-7866 - Generated journey profile</li> </ul>



### journey\_profile\_request

ID	SPMS-4957
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-6419 - Requested journey profile</li> </ul>



### handshake\_reject

ID	SPMS-4956
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7947 - Provided ATO communication session message</li> </ul>



### handshake\_acknowledgment

ID	SPMS-4955
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7947 - Provided ATO communication session message</li> </ul>



### handshake\_request

ID	SPMS-4954
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6307 - I_SUBSET_126</li> <li>•  SPMS-7220 - Provided ATO communication session message</li> </ul>

### 150\_end\_of\_mission



ID	SPMS-4953
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6412 - Observed state and position of one train</li> </ul>

### 146\_acknowledgement

ID	SPMS-4951
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6434 - Responded train-specific authorisation</li> </ul>



### 138\_request\_to\_shorten\_MA\_is\_rejected

Message 138: Request to Shorten MA is rejected  
Subset 026 - Chapter 8.6.

ID	SPMS-4950
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6434 - Responded train-specific authorisation</li> </ul>










### 137\_request\_to\_shorten\_MA\_is\_granted



Message 137: Request to Shorten MA is granted  
Subset 06- Chapter 8.6.5

ID	SPMS-4949
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6434 - Responded train-specific authorisation</li> </ul>



### 136\_train\_position\_report

The exchange item "136\_train\_position\_report" is composed of the following elements:



- **optionalPackets** :  SPMS-7397 - Packet
  -  SPMS-7398 - ETCSPacket\_0
  -  SPMS-7424 - ETCSPacket\_52
  -  SPMS-7455 - ETCSPacket\_141
  -  SPMS-7406 - ETCSPacket\_5
- **mandatoryPackets** :  SPMS-7397 - Packet
  -  SPMS-7407 - ETCSPacket\_6
  -  SPMS-7437 - ETCSPacket\_72
  -  SPMS-7412 - ETCSPacket\_41

ID	SPMS-4948
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6412 - Observed state and position of one train</li> </ul>



### 03\_movement\_authority

ID	SPMS-4945
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6393 - Authorised movement permission</li> </ul>

### cd\_close\_PDI



ID	SPMS-4943
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7948 - Paused Provided communication state primary</li> <li>•  SPMS-7951 - Paused Provided communication state primary</li> </ul>

### msg\_initialisation\_completed

ID	SPMS-4942
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>

### cd\_PDI\_version\_check

The Sender of this telegram requests the Receiver to check PDI-Version.



ID	SPMS-4941
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7948 - Paused Provided communication state primary</li> <li>•  SPMS-7951 - Paused Provided communication state primary</li> </ul>





**msg\_PDI\_version\_check**

It has the following additional attributes:



Property	Value
type	Message

ID	SPMS-4940
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>

**cd\_initialisation\_request**

ID	SPMS-4939
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7948 - Paused Provided communication state primary</li> <li>•  SPMS-7951 - Paused Provided communication state primary</li> </ul>

**msg\_start\_initialisation**

ID	SPMS-4938
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-7949 - Paused Provided communication state secondary</li> <li>•  SPMS-7950 - Paused Provided communication state secondary</li> </ul>


**msg\_status\_report\_completed**

ID	SPMS-4937
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**msg\_movement\_failed**

With this telegram the Subsystem - Point informs the Subsystem - Electronic Interlocking, that the movement has failed. This telegram refines the InformationFlow Msg\_Movement\_Failed specified in the requirements specification (ID Eu.P.6





The exchange item "msg\_movement\_failed" is composed of the following elements:

- **definedTelegram** :  SPMS-7779 - MessageMovementFailed

It has the following additional attributes:

Property	Value
type	Message

ID	SPMS-4936
----	-----------

Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6310 - SCI_P</li> <li>•  SPMS-6384 - Observed point position</li> <li>•  SPMS-6385 - Observed point position</li> <li>•  SPMS-6408 - Observed point position</li> </ul>
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### cd\_move\_point




With this telegram the Subsystem - Electronic Interlocking commands the Subsystem - Point to move the point. This telegram refines the InformationFlow Cd\_Move\_Point specified in the requirements specification (ID Eu.P.6183).

The exchange item "cd\_move\_point" is composed of the following elements:

- **definedTelegram** :  SPMS-7777 - CommandMovePoint

It has the following additional attributes:


Property	Value
type	Command

ID	SPMS-4935
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6310 - SCI_P</li> <li>•  SPMS-6357 - Commanded point position state</li> <li>•  SPMS-7904 - Commanded point position state</li> </ul>

### msg\_ability\_to\_move\_point





With this telegram the Subsystem - Point informs Subsystem - Electronic Interlocking about the ability to move point. This telegram refines the InformationFlow Msg\_Ability\_To\_Move\_Point specified in the requirements specification (ID Eu.P.6185).

The exchange item "msg\_ability\_to\_move\_point" is composed of the following elements:

- **definedTelegram** :  SPMS-7780 - MessageAbilityToMovePoint

It has the following additional attributes:

Property	Value
type	Message


ID	SPMS-4934
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6310 - SCI_P</li> <li>•  SPMS-6384 - Observed point position</li> <li>•  SPMS-6385 - Observed point position</li> <li>•  SPMS-6408 - Observed point position</li> </ul>

### msg\_point\_position

With this telegram the Subsystem - Point informs Subsystem - Electronic Interlocking about the actual Point Position. This telegram refines the InformationFlow Msg\_Point\_Position specified in the






requirements specification (ID Eu.P.6187).

The exchange item "msg\_point\_position" is composed of the following elements:

- **definedTelegram** :  SPMS-7778 - MessagePointPosition

It has the following additional attributes:

Property	Value
type	Message

ID	SPMS-4933
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6310 - SCI_P</li> <li>•  SPMS-6384 - Observed point position</li> <li>•  SPMS-6385 - Observed point position</li> <li>•  SPMS-6387 - Observed point position</li> <li>•  SPMS-6408 - Observed point position</li> </ul>

### **movement\_permission\_request**



Request message for a movement permission.

The exchange item "movement\_permission\_request" is composed of the following elements:

- **requestedMovementPermission** :  SPMS-7183 - Draft\_MovementPermissionRequest

It has the following additional attributes:


















Property	Value
type	Request

ID	SPMS-4928
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6421 - Requested movement permission</li> </ul>



### **movement\_permission**

Provides the movement permission with an extent of track reserved for a particular train to move. A Movement Permission includes all conditions under which the movement of the train can be performed safely.

ID	SPMS-2372
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Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-2198 - HMI_Signaller</li> <li>•  SPMS-2200 - I_TrafficManagementSystem</li> <li>•  SPMS-2249 - Authorised distance and speed restriction</li> <li>•  SPMS-2250 - Authorised distance and speed restriction</li> <li>•  SPMS-2958 - I_TrafficManagementSystem_01</li> <li>•  SPMS-2963 - HMI_Signaller_01</li> <li>•  SPMS-3039 - Allocated track path</li> <li>•  SPMS-3044 - Allocated track path</li> <li>•  SPMS-3052 - Allocated track path</li> <li>•  SPMS-5278 - Allocated track path</li> <li>•  SPMS-6308 - SCI_CMD</li> <li>•  SPMS-6339 - Authorised movement permission</li> <li>•  SPMS-6340 - Authorised movement permission</li> <li>•  SPMS-6342 - Authorised movement permission</li> <li>•  SPMS-6604 - Authorised movement permission</li> <li>•  SPMS-6985 - I_Signaller</li> <li>•  SPMS-7230 - Authorised distance and speed restriction</li> </ul>
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#### level\_crossing\_status

ID	SPMS-4927
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6404 - Observed level crossing status</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>

#### signaller\_point\_position\_request

The exchange item "signaller\_point\_position\_request" is composed of the following elements:



- **requestedPointPosition** : No type defined

ID	SPMS-4926
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6414 - Registered input</li> </ul>




#### point\_status\_indication

The exchange item "point\_status\_indication" is composed of the following elements:



- **indicatedpointState** : No type defined

ID	SPMS-4923
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6395 - Indicated point status</li> </ul>



### 159\_communication\_session\_established

ID	SPMS-3294
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6683 - Provided communication session message</li> <li>•  SPMS-7969 - Provided communication session message</li> </ul>




### 39\_acknowledgement\_termination\_communication\_session

ID	SPMS-3293
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6682 - Provided communication session message</li> </ul>



### 38\_acknowledgment\_to\_session\_establishment

ID	SPMS-3292
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6682 - Provided communication session message</li> </ul>

### 156\_termination\_communication\_session

ID	SPMS-3291
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6683 - Provided communication session message</li> <li>•  SPMS-7969 - Provided communication session message</li> </ul>

### 155\_initiation\_communication\_session

ID	SPMS-3289
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6306 - I_SUBSET_026</li> <li>•  SPMS-6683 - Provided communication session message</li> </ul>



### msg\_track\_vacancy\_detection\_occupancy

Note:





For further details please see EULYNX ID "Eu.SCI-TDS.PDI.163".

The exchange item "msg\_track\_vacancy\_detection\_occupancy" is composed of the following elements:

- **reportedOccupancyState** : Draft\_OccupancyState
- **reportedAbilityToBeForcedToClearState** : Draft\_AbilityToBeForcedToClear
- **reportedPOMState** : Draft\_POM\_Status
- **reportedDisturbanceState** : Draft\_DisturbanceStatus
- **reportedChangeTriggerState** : Draft\_ChangeTrigger

ID	SPMS-3269
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6311 - SCI_TDS</li> <li>•  SPMS-6398 - Observed track vacancy proving section state</li> </ul>

### signaller\_usage\_restriction\_request






ID	SPMS-7983
Exchange item in	<ul style="list-style-type: none"> <li>•  SPMS-6305 - HMI_Signaller</li> <li>•  SPMS-6426 - Requested usage restriction</li> <li>•  SPMS-6594 - Register Input</li> <li>•  SPMS-6985 - I_Signaller</li> </ul>

## 7.2 Data classes

Will be provided in a future release.

## 8 Appendix

### 8.1 References

Id	Description	Reference
[  SPP-19283 - Release Note ESPR1.0]	This Release Note describes the scope of the ESPR1.0.	Link
[  SPP-18107 - TCS_System Definition Traffic CS_V0.2]	System Definition of the Traffic CS System according to .	Link
[  SPP-18108 - TCS_System Requirement Specification Traffic CS_V0.2]	System Requirement Specification of the Traffic CS System according to.	Link
[  SPP-19877 - TCS_Traceability Report System Architecture Description Traffic CS_V0.4]	This report shows the linking between the System Definition Traffic CS and the System Architecture of the Traffic CS system.	Link
[  SPP-18486 - Traffic CS - Major Design Decisions V1.0]	Traffic CS prepared this document of major design decisions to inform the sector about the strategic orientation in the Traffic CS Design. The present document provides justifications for the taken major design decisions as requested in the remit task SC2.4. The preliminary results of the Traffic CS top-down design including the content of the	Link

Id	Description	Reference
	Traffic CS System concept form the input for the present document.	
<a href="#">[SPP-19049 - Traffic CS System Concept V1.0]</a>	Traffic CS prepared this document to summarise the most important system requirements for Traffic CS and the solution concept how it is foreseen to fulfil these requirements. Furthermore, assumptions and expectations to external systems outside of Traffic CS are stated and roadmap is presented.	Link
<a href="#">[EN 50126-1:2017"&gt;SPPRAMSS-349 - EN 50126-1:2017]</a>	Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 1: Generic RAMS Process	-