**DECISION OF THE SYSTEM PILLAR STEERING GROUP**

**adopting the publication as System Pillar Documents of EULYNX Baseline 4 Release 4 subset**

**N° 4/2025**

THE SYSTEM PILLAR STEERING GROUP OF THE EUROPE'S RAIL JOINT UNDERTAKING, NOTES

- The information and conclusions in the Trackside Assets publication document (annex).

THE SYSTEM PILLAR STEERING GROUP OF THE EUROPE'S RAIL JOINT UNDERTAKING, AGREES

- That the following documents, a subset of the EULYNX Baseline 4 Release 4 specifications, will be published as SP documents:
  - Generic interface and subsystem requirements
  - Generic interface and subsystem requirements for SCI
  - Generic interface and subsystem requirements for SMI
  - Interface definition SCI
  - Interface specification SCI Generic
  - Requirements specification for subsystem Light Signal
  - Interface specification SCI-LS
  - Requirements specification for subsystem Point
  - Interface specification SCI-P
  - Requirements specification for subsystem Generic IO
  - Interface specification SCI-IO
  - Requirements specification for subsystem TDS
  - Interface specification SCI-TDS
  - Requirements specification for subsystem Level Crossing
  - Interface specification SCI-LC
  - Maintenance and data management specification
  - Interface definition and specification SMI
  - Interface definition SDI
  - Interface specification SDI-LS
  - Interface specification SDI Generic
  - Interface specification SDI-P
  - Interface specification SDI-IO
  - Interface specification SDI-TDS
  - Interface specification SDI-LC
  - Specification of Point of Service - Signalling

**ANNEX**

SYSTEM PILLAR – TRACKSIDE ASSETS CONTROL AND SUPERVISION

# Baseline set 4 Release 4 Publication overview

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## 1. Introduction

The Trackside Assets Control and Supervision (TACS) domain is responsible for the standardisation of the Trackside Assets and the integration of the EULYNX specifications to the relevant domains of the System Pillar to avoid separate developments outside of the System Pillar.
The TACS domain published Baseline set 4 Release 3 in June 2024. That release has been functionally closed – meaning no additional functions shall be integrated. Baseline set 4 is thus fully stable and ready for deployment. Over the past year, an update in form of Release 4 has been prepared, limited only to error corrections, adjustments, and clarifications.
As in the previous year, topics related to diagnostics, maintenance and configuration management were prepared together with the Transversal CCS (TCCS) domain in dedicated task forces.
The work in the TACS domain and in the respective task forces is performed by both railway and industry experts, ensuring an aligned and balanced representation of the sector participants.
The scope of the Baseline set 4 Release 4 is identical to the previous release.

Some of the interfaces of the EULYNX architecture are not in the scope of this joint SP/EULYNX BL4R4 release. These interfaces concern Traffic Management System (TMS) and Traffic CS (Adjacent Interlocking and RBC). These specifications will be published as EULYNX documents.

## 2. Participants

The TACS domain is structured in 6 individual working groups, focusing on generic subsystem architecture and on specific topics of each subsystem. For collaboration with the TCCS domain, joint task forces were formed as SDI Task force and SMI Task force. For collaboration with the Security domain, a joint group was formed to manage the alignment of requirements.
The Railway and Industry Mirror Groups are in place with the role to review change requests and to review and endorse finalised deliverables.
The domain coordination team with domain leads Malik Benameur and Mirko Blazic is responsible for leading and coordinating the work in the domain.

## 3. Overview of the results

The results are technical specifications on System Level 5 in the form of subsystem and interface specifications.
The TACS system is composed of following subsystems:

- Subsystem Point
- Subsystem Generic IO
- Subsystem Train Detection System
- Subsystem Level Crossing
- Subsystem Light Signal

The standardisation potential of the power supply and power management has been analysed by the domain (see also SP TACS Analysis of Standardisation potential for Power Supply and Power Management of Trackside Assets subsystems) The results of the analysis do not recommend continuing with further activities. As result, the subsystem Power supply has been removed from the scope of the TACS system.
Each subsystem is specified with a set of generic and subsystem specific requirements specifications.
The subsystem Light Signal is defined as part of the Trackside Assets CS to support migration scenarios. National signalling is out of the scope of the System Pillar target architecture.
The following interfaces are specified for communication with the Traffic CS:

- SCI-P for process data communication with the subsystem Point
- SCI-IO for process data communication with the subsystem Generic IO
- SCI-TDS for process data communication with the subsystem Train Detection System
- SCI-LC for process data communication with the subsystem Level Crossing
- SCI-LS for process data communication with the subsystem Light Signal

The following interfaces are specified for communication with the Transversal CCS for maintenance and diagnostics:

- SDI-P for transmission of diagnostic data from subsystem Point
- SDI-IO for transmission of diagnostic data from subsystem Generic IO
- SDI-TDS for transmission of diagnostic data from subsystem Train Detection System
- SDI-LC for transmission of diagnostic data from subsystem Level Crossing
- SDI-LS for transmission of diagnostic data from subsystem Light Signal
- SMI-XX for communication between each subsystem and maintenance service functions

The security requirements for shared security services and related SSI interface have been published by the SP Security domain. The EULYNX BL4R4 publication fully refers to the EU-Rail Cybersecurity Specification.
For validating the defined modelled requirements, simulators for the subsystem and interface behaviour have been developed and are also available by the domain as supporting artefacts. For BL4R4, there were no new functions nor functional changes, therefore no additional simulators have been made.

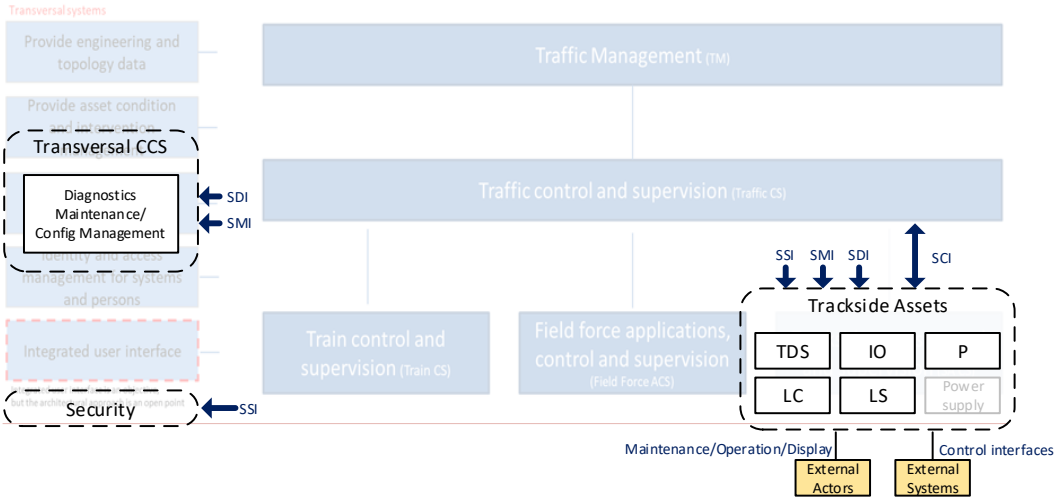


**Figure 1: Overview of the Trackside Assets scope**

The transmission of information objects between the communication participants shall be provided by the Communication System. The specification for Point of Service - Signalling describes the requirements for the Point of Service - Signalling for its network components and their interfaces with communication participants. The definition of the PoS-Signalling provides the lower layers (network layer, data link layer and physical layer) of the protocol stacks of the standardised interfaces.

## 4. Summary of changes

Error corrections are summarised by the following change requests:

- EUAR-690: Alignment between RJ45 and SPF cage requirement: Corrects SPF bandwidth requirement to be aligned with the RJ45 values.
- EUAR-763: Correct missing Operation_State when leaving Data_Update: Adds explicit output state definitions to ensure proper transition logic from DATA_UPDATE.
- EUIO-439: SDI-IO, correction of multiplicities for PhysicalChannelConnection: Fixes diagnostic model diagram to correctly display multiplicity relations between logical and physical IO channels.
- EULX-642: SDI-LC wording correction: Fixes wording error in the SDI-LC specification by correcting 'cluster time' to 'closure time'.
- EULX-644: Correct missing package marking: Adds missing marking of functional package ‘Basic LC’ in one sequence diagram.
- EUP-576: Wrong transition condition in STM diagram F_Control_And_Observe_4W_PM: Corrects trigger port in two transitions in one diagram of the state machine.
- EUP-577: Missing condition for degraded point position at startup: Extends the conditions in two initial transitions to correctly express degraded point position.

Adjustments are summarised by the following change requests:

- EUAR-762: Differentiate Con_tmax_DataInstallation and Con_tmax_DataTransmission per configItem: Allows configuration of data installation and transmission timeouts per item to reflect varying complexity.

Clarifications are summarised by the following change requests:

- EUAR-720: Removal of redundancy PreloadItemStarted and PreLoadItemFinished: Removes redundant preload methods by replacing them with standard OPC UA file transfer actions.
- EUAR-731: SDI-XX, diagnostics for SSI: Refines diagnostics for the Shared Cybersecurity Service Interface (SSI) including new attributes and class extensions.
- EUAR-739: SDI-XX, express source and target of Interface classes: Refines diagnostic attributes related to interfaces to clearly identify both end points.
- EUAR-756: SDI-XX, sampling rate for related physical and railway operational data: Changes the sampling rate value for railway-related physical data on SDI-XX to handle it more effectively.
- EUAR-760: Add SDI-XX attribute for expiration of Con_tmax_DataInstallation in SMI: Introduces a new attribute to define expiration logic for Con_tmax_DataInstallation.

- EUAR-761: Wording improvements in SMI time value descriptions: Refines unclear SMI time value descriptions to clarify system behavior and responsibility.
- EUAR-765: Add SDI-XX attribute for reporting PDI repetition: Adds attribute to SDI-XX for reporting repetitions of Process Data Interface telegrams.
- EUAR-771: Refine diagnostic attributes for connections status: Improvement of the enumerations and descriptions reporting the connection status of the safe communication protocol.
- EUAR-764: Remove sentence from meaning isTimeSynchronised: Removes misleading diagnostic-related sentence from the definition of isTimeSynchronised.
- EUAR-766: Update and align TACS and EULYNX documents to SP Cybersecurity publication: Updates security references and structure to align with SP Cybersecurity specifications.
- EUP-564: SDI-P, point machine grouping: Enhances the PointMachineType enumeration to include combined drive types and separates detector-only handling in diagnostics.
- EULX-643: SDI-LC, Is MotorTurnData mandatory for BarrierTurnEvent?: Clarifies that MotorTurnData is optional in the BarrierTurnEvent diagnostic model by adjusting multiplicity.

Backwards compatibility within this release has been managed with the »Backwards compatibility guideline« and the version handling is ensured.

## 5. Development and Review Process

The BL4R4 release consists of 25 detailed specifications documents. A review process, aligned with the SEMP, has been applied to manage the changes and reviews within the development of this release. The release follows two "review granularities":

- **Change requests and specification documents**: this review concerns the review and approval of raised change requests and the review and approval of detailed specifications documents. Its audience are the Domain Teams/Working Groups and the Mirror Groups.

- **Publication overview document (present document):** this document gives the overview of the results and lists the relevant functional changes from previous publication BL4R3. It serves as basis for the review and decision process performed by the SP Core Group, and as basis for publication ratification by the SP Steering Group.

**Roles and approval process on domain level**

- **Approval by the domain working groups** (consisting of named experts and contributors). The domain approval is done together by railway and industry participants. As part of this process, the change requests are reviewed and approved, followed by the review and approval of finalised deliverables. Part of the approval process is also validation of the modelled requirements by simulation (no such changes are included in BL4R4). These approvals are the basis for submission of change requests and deliverables to the Mirror Groups.

- **Approval by the Mirror groups:** The Railway Mirror group and Industry Mirror group review and approve raised change requests before their implementation. Once the changes are implemented in the deliverables, the Mirror Groups provide review comments on final deliverables and approve the deliverables. Each approval decision takes place in dedicated meetings and is fully documented by meeting minutes.
  *It should be noted that both Mirror Groups worked together and in common meetings as a joint TACS/TCCS Mirror Group.*

- **Endorsement by other domains:** The applied change requests impact only the Transversal CCS domain. All applied changes were discussed, implemented and reviewed in the TACS-TCCS joint SDI- and SMI-Taskforces.

**Roles for the SP decision process**

- **Approval by the SP Core Group:** the SP Core Group acts as the CCB (until the full CCB as per Change Control Management Process is operational) to approve the functional change requests and the domain results as summarised by the Publication overview document, considering also the approvals of involved Mirror groups and domains. The SP Core Group decides if the deliberables are ready for submission to the SP Steering Group.

- **Approval by the SP Steering Group:** the SP Steering Group is the decision-making body for the System Pillar and is responsible for ratifying the deliverables of the System Pillar. The Publication overview document, presenting the relevant changes and domain results, is proposed as basis for the decision on the publication of the BL4R4.

**Planned milestones:**

- Approval by TACS Working Groups: April 17th (complete)
- Approval by TACS Mirror Groups: April 24th (complete for batch 1, final batch (editorial only) review ongoing)
- Approval SP Core Group: May 14th
- Formal decision SP Steering Group: June 4th
- Publication by ERJU and EULYNX: June 30th

## 6. List of deliverables

Following deliverables are part of the proposed release BL4R4.

| Document ID | STIP ID | Document Name | Change in BL4R4 |
|---|---|---|---|
| **Eu.Doc.20** | STIP_100 | Generic interface and subsystem requirements | Unchanged. Reference update only. |
| **Eu.Doc.119** | STIP_99 | Generic interface and subsystem requirements for SCI | Updated |
| **Eu.Doc.120** | STIP_96 | Generic interface and subsystem requirements for SMI | Updated |
| **Eu.Doc.92** | STIP_99 | Interface definition SCI | Unchanged. Reference update only. |
| **Eu.Doc.93** | STIP_99 | Interface specification SCI Generic | Unchanged. Reference update only. |
| **Eu.Doc.32** | STIP_85 | Requirements specification for subsystem Light Signal | Unchanged. Reference update only. |
| **Eu.Doc.33** | STIP_85 | Interface specification SCI-LS | Unchanged. Reference update only. |
| **Eu.Doc.36** | STIP_86 | Requirements specification for subsystem Point | Error correction |
| **Eu.Doc.38** | STIP_86 | Interface specification SCI-P | Unchanged. Reference update only. |
| **Eu.Doc.45** | STIP_87 | Requirements specification for subsystem Generic IO | Unchanged. Reference update only. |
| **Eu.Doc.46** | STIP_87 | Interface specification SCI-IO | Unchanged. Reference update only. |
| **Eu.Doc.43** | STIP_88 | Requirements specification for subsystem TDS | Unchanged. Reference update only. |
| **Eu.Doc.44** | STIP_88 | Interface specification SCI-TDS | Unchanged. Reference update only. |
| **Eu.Doc.108** | STIP_89 | Requirements specification for subsystem Level Crossing | Error correction |
| **Eu.Doc.109** | STIP_89 | Interface specification SCI-LC | Unchanged. Reference update only. |
| **Eu.Doc.18** | STIP_97 | Maintenance and data management specification | Updated |
| **Eu.Doc.76** | STIP_96 | Interface definition and specification SMI | Updated |
| **Eu.Doc.77** | STIP_95 | Interface definition SDI | Updated |
| **Eu.Doc.78** | STIP_90 | Interface specification SDI-LS | Updated |
| **Eu.Doc.94** | STIP_95 | Interface specification SDI Generic | Updated |
| **Eu.Doc.80** | STIP_91 | Interface specification SDI-P | Updated |
| **Eu.Doc.82** | STIP_92 | Interface specification SDI-IO | Unchanged. Reference update only. |
| **Eu.Doc.81** | STIP_93 | Interface specification SDI-TDS | Unchanged. Reference update only. |
| **Eu.Doc.110** | STIP_94 | Interface specification SDI-LC | Updated |
| **Eu.Doc.100** | STIP_98 | Specification of Point of Service - Signalling | Error correction |

**Table 1: List of SP/EULYNX BL4R4 deliverables**

## 7. Overlap of deliverables in the System Pillar and EULYNX

The deliverables of the TACS and TCCS domain are applicable for both the System Pillar future target architecture and the current EULYNX architecture.

As with previous releases, also this proposed publication of BL4R4 will be delivered as a single set of specifications fitting both the System Pillar documentation set and the EULYNX documentation set for BL4 Release 4, under a single common publication by the System Pillar and EULYNX. The System Pillar is the technical authority for the listed deliverables of Table 1 and ensures their maintenance.

The deliverables will be listed under two publishers: Europe's Rail System Pillar and EULYNX, in order to ensure the fit to both documentation sets. Similarly, the release notes will be prepared separately for the publication of the System Pillar documentation set and for the publication of the EULYNX documentation set.