DECISION OF THE SYSTEM PILLAR STEERING GROUP

adopting the publication as System Pillar Documents of EULYNX Baseline 4 Release 3 subset

N° 1/2024

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 2 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
  - EuRequirements 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
  - Specification of Point of Service - Signalling
  - Interface specification SDI-LC

ANNEX

SYSTEM PILLAR – TRACKSIDE ASSETS CONTROL AND SUPERVISION

Baseline set 4 Release 3 Publication overview

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Malik Benameur - TACS domain lead industry

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 continued the developments and improvements of the Trackside Assets specifications on the basis of the results published in Baseline set 4 Release 2 in June 2023. In addition, for the topics related to diagnostics, maintenance and configuration management, the domain closely worked 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 3 is identical to the previous release, with an addition of a new specification related to communications as per updated domain remit: Specification of Point of Service - Signalling specifies the requirements between the communication participants and the communication network.

Some of the interfaces of the EULYNX architecture are not in the scope of this joint SP/EULYNX BL4R3 release. These interfaces concern Traffic Management System (TMS) and Traffic CS (Adjacent Interlocking and RBC). These specifications will be published as EULYNX documents. These interface specifications may be used as input documents in other SP domains.

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, 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
- Subsystem Power supply (subject to analysis as part of SC2.3, to be defined in future phases)

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 are in development by the Security domain. As the work of the Security domain fully integrates EULYNX BL4R2 specifications, the EULYNX BL4R3 publication will no longer contain separate EULYNX security specifications. References have been made to the upcoming release of the SP Security domain.
For validating the defined modelled requirements, simulators for the subsystem and interface behaviour have been developed and are also delivered by the domain as supporting artefacts.
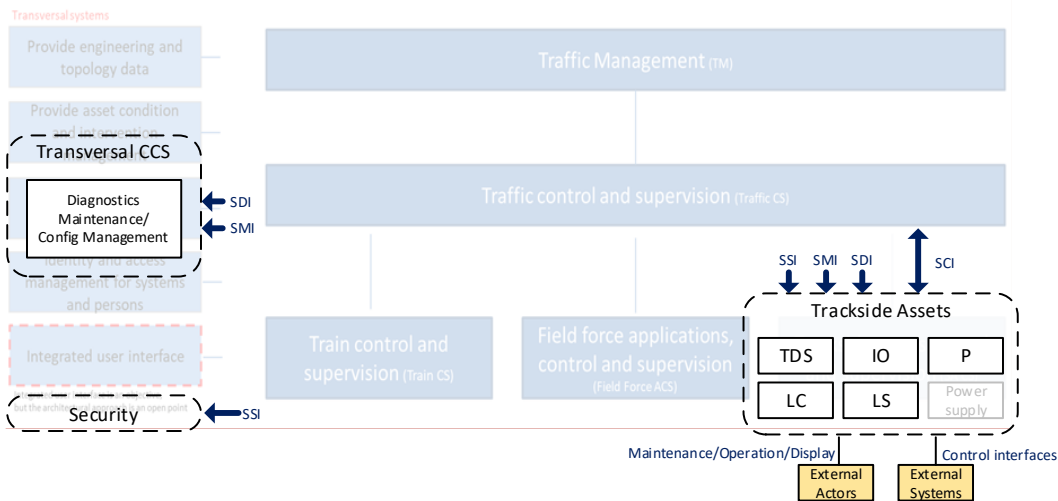
Figure 1: Overview of the Trackside Assets scope

The transmission of information objects between the communication participants shall be provided by the Communication System. As mandated by the extended domain remit, the TACS domain has integrated the matching EULYNX specification for Point of Service - Signalling. This specification describes the requirements for the Point of Service - Signalling for its network and security 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

The TACS domain focused on outstanding open issues from BL4R2, harmonisation proposals and change requests introduced by the participants, and completion of all specifications. Alignments and improvements with functional impact are summarised by the following change requests:

- EUAR-622: End criterion for status update: Alignment across all subsystems on conditions for ending the status update upon establishing connection.
- EUAR-617: Order of Report Status telegrams: Alignment of the order of telegrams during status report.
- EULS-415: Improvement of luminosity after the luminosity is restored: Change of the internal reaction of the SubS LS after restoration of a luminosity failure.
- EUTDS-499: Correction and simplification of reporting Power Off Monitoring and power failures: Reduction of complexity related to Power Off Monitoring for Track Circuits.
- EUTDS-508: Power Off Monitoring for Track Circuits functionality not needed on every TVPS with track circuit: Changes the function to configurable per TVPS, as it is not required on all TVPS.
- EULX-593: SubS LC further harmonisation of safety timing requirements: Definition of harmonised timing requirements for cases that were still referring to national specs in BL4R2.
- EUAR-638: Checksum validation mechanism on SMI-XX: Harmonisation of requirements and scope clarification for the SMI checksum mechanism.
- EUAR-644: Clarify optionality of 'asynchronous preloading': Allocation of file preloading to an optional functional package.
- EUIO-382 and EUIO-414: Revision of the 'Debouncing_Time' range and Adjustment of resolution, step size for IO timers: Refinement of applied timers.
- EUAR-692: Changes in service function Time Synchronisation: Alignment with the requirements of the Security domain.

Newly introduced functions are summarised by the following change requests:

- EULX-596: Report LCPF 'Idle' state to EIL: Addition of the idle state from the level crossing protection facility.
- EULX-568: Configuration of initial state and reaction to communication loss: Additional configurable reaction of level crossing protection facility added after communication loss.

The remaining development on SDI diagnostic data points was done for Subsystem Train Detection System (for track circuits and train detection points) and Subsystem Level Crossing, completing the full set of SDI specifications. In addition, revisions of SDI diagnostic points were done to improve the consistency across the diagnostic model.

A lot of effort was placed on improving the understanding and readability of specifications and identifying potential gaps. Overall, approximately 250 editorial tickets were handled and resolved in the preparation of BL4R3.

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

This release finalises the developments and brings stability to the Baseline set 4.

5. Development and Review Process

The BL4R3 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 BL4R2. 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. These approvals are basis for submission of change requests and deliverable 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 Mirror Group.

- **Endorsement by other domains:** as the TACS Domain defines interfaces between various subsystems, there are dependencies to other SP domains. Close collaboration and alignment with the following domains was realized: Architecture & Release Coordination, Traffic CS, Transversal CCS and Security. The position of each of these domains is documented in Table 1.
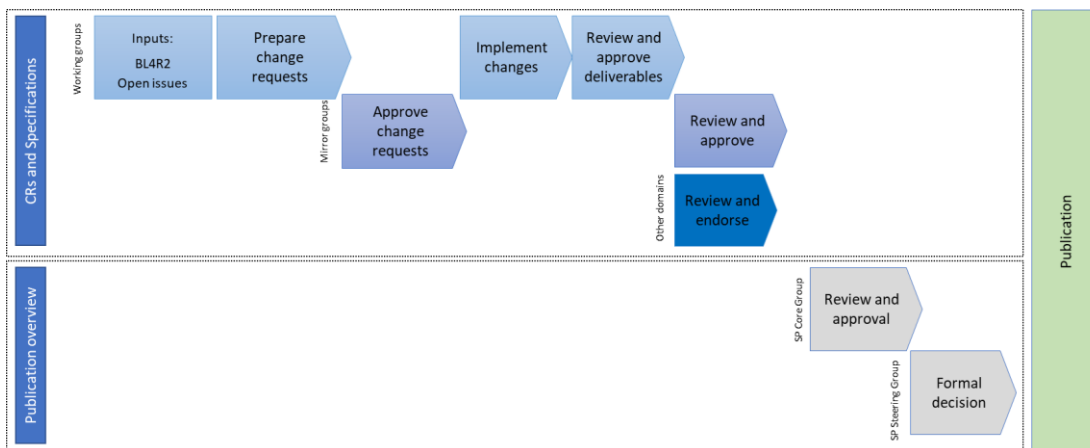
Roles for the SP decision process

- **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 BL4R3.

Note: Architecture Circle review as a strategic sector review was carried out ahead of the first SP publication BL4R2. The changes for BL4R3 are on a detailed specification level, without any strategic or broader architectural impact, therefore the architecture circle review has been omitted.

The following diagram summarises the process:

Planned milestones:
- Approval by TACS Working Groups: April 30th (complete)
- Endorsement by relevant domains: May 22nd (complete)
- Approval by TACS Mirror Groups: May 29th (complete batch 1 and batch 2, final batch review ongoing)
- Approval SP Core Group: May 20th
- Formal decision SP Steering Group: June 14th by correspondance
- Publication by ERJU and EULYNX: June 30th

Endorsement of relevant domains:

The following table summarizes the endorsements from the relevant domains.

Domain	Position
Architecture & Release Coordination	• The domain endorses the integration of the document Specification of Point of Service Signalling. • There are no relevant changes from BL4R2 to BL4R3 that impact the overall architecture.
Traffic CS	• The domain endorses the functional changes impacting the interfaces to TCS: ○ EULX-596: Report LCPF 'Idle' state to EIL ○ EULS-415: Improvement of luminosity after the luminosity is restored ○ EUTDS-508: POM functionality not needed on every TVPS • The domain endorses the integration of the document Specification of Point of Service Signalling.
Transversal CCS	• The domain endorses all documents related to SDI and SMI. These documents were prepared in common task forces between TCCS and TACS domains. • The domain endorses the integration of the document Specification of Point of Service Signalling.
Security	• The domain endorses all documents related to SMI. These documents were aligned between the Security and TACS domains. • The domain endorses the integration of the document Specification of Point of Service Signalling.

Table 1: Endorsements from cross-domain alignment

6. List of deliverables

Following deliverables are part of the proposed release BL4R3.

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

Table 2: List of SP/EULYNX BL4R3 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 BL4R2, also this proposed publication of BL4R3 will be delivered as a single set of specifications fitting both the System Pillar documentation set and the EULYNX documentation set for BL4 Release 3, under a single common publication by the System Pillar and EULYNX. The System Pillar is the technical authority for the listed deliverables of Table 2 and ensures their maintenance.

The deliverables of the TACS and TCCS domain which are based on EULYNX 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.