

DECISION OF THE SYSTEM PILLAR STEERING GROUP

Adopting the CONEMP Deliverables 1, 5 and 6 for publication as System Pillar documents

N° 08/2026

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

NOTES

- The Concept of Employment (CONEMP) for Command, Control and Signalling (CCS) defines the overall operational and lifecycle concept for the CCS system. It re-uses and integrates the artefacts of the Traffic CS, Train CS, TACS and Computing Environment domains into one consistent overall CCS concept, and derives the resulting constraints and requirements for external processes on the basis of the ERA ontology.
- The CONEMP work is carried out under System Pillar Task 2 and comprises seven deliverables. Deliverables 1, 5 and 6 have been developed within Sub-Cycle 2.6 and are submitted to the Steering Group for decision (noting that Deliverable 5 is published to System Level 4, and will be further developed and finalised to System Level 5 during the next year). Deliverables 2, 3, 4 and 7 remain under development in Sub-Cycle 2.7, are not finalised in this remit phase and are not subject to this decision.
- The deliverables submitted for decision are:
 - Deliverable 1 – Concept of Employment (CONEMP) for CCS, defining the harmonisation scope and its prioritisation, the stakeholder requirements, the operational analysis and process description including the roles of the actors involved, the ambition level, and the breakdown and functional allocation across System Levels 3 to 5;
 - Deliverable 5 – Safety Risk Analysis for the configuration management process at System Level 4, identifying the hazards, the risk acceptance criteria and the resulting safety requirements, together with the operational consequences and conditions, and referring to the safety-related application conditions for engineering and configuration data; it is applicable to trackside systems only;
 - Deliverable 6 – Computing Environment specifications for the interfaces I2 (hardware abstraction interface) and I3 (virtualisation interface), including the linking and traceability between the Polaron work items and the Capella models.
- The deliverables were subject to an extensive sector involvement process. Two complete consultation rounds were held with all System Pillar domains, the Mirror Group, the ARC Circle and the sector associations: Round 1 from 11 to 19 June 2026 and Round 2 from 6 to 9 July 2026. These were

complemented by continuous bilateral exchanges between the domains and the respective deliverable leads, by a final call for consultation and approval issued on 13 August 2026, and by the CONEMP Final Tutorial held in Brussels on 9 and 10 September 2026.

- The sector associations CER, EIM, AERRL, UIP, UNIFE, EUG, UNISIG, EULYNX and the Smart Rail Group were invited to and involved in the consultation process.
- The CONEMP results have been taken into account in the Flagship Project FP2 R2DATO. The R2DATO deliverable D3.1 – Specification and Architecture consistency report lists the applicable System Pillar documents, including the ERA CCS/TMS ontology. Work Package 27 (Digital Register) maintained a regular exchange with the System Pillar domain, and the alignment on the application and compatibility of the digital register with ATO up to GoA 4 was captured in Annex 1 to deliverable D27.3. This was confirmed by the FP2 R2DATO Wave 1 System Expert on 2 September 2026.
- In accordance with the CONEMP Deliverable Approval Plan agreed with the domains, formal approval is required from Operational Design, Traffic CS, TACS, Train CS and the CONEMP domain itself for Deliverable 1; from Operational Design, Traffic CS, TACS, Train CS, PRAMS and the CONEMP domain itself for Deliverable 5; and domain-internally for Deliverable 6. The approval process was carried out in Polarion and closed on 30 September 2026. All domains concerned recorded their position. One disapproval was recorded, by Operational Design on Deliverable 1, justified by the review time available and explicitly not by the content of the deliverable. Two domains formally stepped out of parts of the process, in both cases in writing. No other disapproval was recorded, and none of the comments received objects to the adoption.
- The review and approval status of the domains and of the Mirror Group, the handling of the comments received and the approvals recorded in Polarion are set out in Annex D.
- Following the completion of the formal approval process, the System Pillar Core Group reviewed the deliverables on 1 October 2026 and recommended them to the Steering Group for adoption.
- The Steering Group notes that the safety risk analysis at System Level 5 cannot be considered final as long as the Service Function Configuration specification continues to be developed. In Sub-Cycle 2.7 the risk analysis will therefore no longer be a separate deliverable but will be continued within the same deliverable as the Service Function Configuration specification. Closing and approving the risk analysis at System Level 4 now provides the stable basis for that continuation.
- Deliverable 5 is applicable to trackside systems only and is not applicable to on-board systems. It is annexed in the version approved on 30 September 2026, and the limitation applies to its publication and use as a System Pillar document.
- The deliverables may be updated when new topics are introduced or when progress in the work requires updates.

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

AGREES

1. The CONEMP Deliverable 1 – Concept of Employment (CONEMP) for CCS, as set out in Annex A, is adopted for publication as a System Pillar document.
2. The CONEMP Deliverable 5 – Safety Risk Analysis at System Level 4, as set out in Annex B, is adopted for publication as a System Pillar document applicable to trackside systems only and not applicable to on-board systems, on the understanding that it will be further developed together with the Service Function Configuration specification in Sub-Cycle 2.7 and updated accordingly.
3. The CONEMP Deliverable 6 – Computing Environment specifications for the interfaces I2 and I3, as set out in Annex C, is adopted for publication as a System Pillar document.
4. The CONEMP domain team shall use these deliverables as the basis for the continued specification work in Sub-Cycle 2.7, and shall:
 - maintain the consistency of the overall CCS Concept of Employment across System Levels 3 to 5,
 - maintain the linking and traceability between the Polarion work items and the Capella models,
 - and continue the alignment with the Traffic CS, Train CS, TACS, PRAMS, Operational Design and Cybersecurity domains.
5. The Steering Group shall be regularly informed about the progress of the CONEMP specification work, including any major findings or issues that may require Steering Group guidance or decision.
6. The CONEMP deliverables adopted by this decision shall be published as System Pillar documents and are intended to be implemented on a voluntary basis. They constitute a milestone towards the full external release of the CONEMP specification as part of the System Pillar baseline in 2027.
7. The Steering Group requests to include a disclaimer in the CONEMP Deliverable 5 that the safety risk analysis at System Level 5 cannot be considered final as long as the Service Function Configuration specification continues to be developed.

ANNEX A: CONEMP Deliverable 1 – Concept of Employment (CONEMP) for CCS
(approved version)

ANNEX B: CONEMP Deliverable 5 – Safety Risk Analysis, System Level 4 (approved version)

ANNEX C: CONEMP Deliverable 6 – Computing Environment specifications for I2 and I3
(approved version)

ANNEX D: Review and approval record

This is subject to update prior to the SP-STG as further approvals are made.

- The approval process was carried out in Polarion. Each deliverable passed a review stage and a subsequent approval stage, which were recorded separately. The process was closed on 30 September 2026; the record below reflects the status as at 1 October 2026.

- Deliverable 1 – Concept of Employment (CONEMP) for CCS was reviewed by Karl-Albrecht Klinge (CONEMP) and Ulrich Schöni (Traffic CS). At approval stage it was approved by Christian Loeffler (Traffic CS), Nico Huurman (TACS), Anton Roethel (CONEMP) and Nico Schwan (CONEMP Core Group convenor). Jens Leuteritz (Operational Design) disapproved on 30 September 2026 on the grounds that the time available to verify the implementation of the review findings, 24 hours, was not sufficient; the disapproval does not concern the content of the deliverable. Nico Huurman approved with the comment that the list of operational restrictions requires further discussion with Operational Design and Traffic CS, referring to fifteen work items. Ulrich Schöni confirmed that the content is sufficient to continue the work on the subsequent documents and noted that, before the official release of the finalised CCS specification, the use and linking of the work items and the modelling of the operational scenarios need to be corrected; this rework is possible once the concrete technical implementation is fully defined.
- Deliverable 5 – Safety Risk Analysis at System Level 4 was reviewed by Maha Soltaniehha (Traffic CS), Sylvie Rivière (PRAMS) and Karl-Albrecht Klinge (CONEMP). At approval stage it was approved by Nico Huurman (TACS), Maha Soltaniehha (Traffic CS), Sylvie Rivière (PRAMS), Anton Roethel (CONEMP) and by both CONEMP Core Group convenors, Antoine Gavel and Nico Schwan. No disapproval was recorded. Nico Huurman approved with the comment that the deliverable refers to the TCCS System Definition as the basis of the risk analysis and that, as the TCCS System Definition is not yet final, alignment changes may become necessary at a later stage.
- Deliverable 6 – Computing Environment specifications comprises two documents: the I2 hardware abstraction interface specification and the I3 interface specification. Both were reviewed and approved by Zeeshan Ansar, Virgil Lostun, Thomas Bernburg, Julian Wissmann, Sonja Steffens, Karl-Albrecht Klinge, Marcin Toborek and Anton Roethel (all CONEMP) and by Sylvie Rivière (PRAMS); the individual review and approval steps are recorded per document in Polarion. No disapproval and no comment was recorded on either document. The Computing Environment system architecture is not part of this decision; it is covered by Deliverable 7, which continues in Sub-Cycle 2.7.
- Two domains formally stepped out of parts of the approval process, in both cases in writing. Operational Design confirmed on 29 September 2026, through Renato Rodrigues, that its involvement is limited to Deliverable 1 and asked to be removed as approver for Deliverable 5; this is consistent with the statement of Salvatore Iovino of 21 July 2026 that Operational Design is reviewing Deliverable 1. Train CS confirmed on 29 September 2026, through Nicolas Ykman and Giuseppe Mottola, that the domain stepped out of the CONEMP review process as the review of the CONEMP deliverables was not foreseen in its work for this sub-cycle, and that it therefore does not consider itself in a position to approve. Train CS had already stated on 3 August 2026 that it does not wish to block the approval process and wishes to be kept informed of its progress.
- PRAMS completed its review of Deliverables 1, 5 and 6 and confirmed the completion of the review for all three deliverables on 28 July 2026. TACS provided consolidated review comments on 28 August 2026; the comments on Deliverables 1 and 5 were resolved together with the deliverable leads and, where appropriate, incorporated. The Traffic CS comments on Deliverable 5 concerning the maturity of the underlying Service Function Configuration specification were resolved in the same way.

- Although no Mirror Group representative has been nominated specifically for the CONEMP domain, the Mirror Group was invited to both consultation rounds, on 19 June 2026 and on 9 July 2026, received all deliverables and had the opportunity to comment. No objections were raised.
- The comments received in the consultation process were reviewed, addressed and, where appropriate, incorporated into the deliverables.
- The individual approvals are recorded in Polarion and are traceable per document; the approval status is contained in the exported deliverable documents in Annexes A to C. At the time of drafting, one of the two CONEMP domain leads had not yet been able to record the approvals in Polarion because of an unresolved authentication problem. The approval was given explicitly in writing and will be recorded as soon as access is restored.