EULYNX commits to SERA

The EULYNX Consortium strongly supports standardization of Control, Command and Signalling Systems (CCS) and the strategic vision of the Single European Railways Area (SERA). Digitalization with already specified and yet to be specified systems, as well as efficient processes that match the new architecture and operational design, are the key to the establishment of a SERA. EULYNX interfaces are a first mature building block on the journey to SERA outside the TSI CCS. Many more building blocks will be specified in the System Pillar (SP) as a part of the Europe’s Rail Joint Undertaking (ERJU) program. The members of the EULYNX Consortium will over the time comply with the strategic vision of SERA by adjusting their strategies.

The long-standing underfunding of signalling technology in recent decades has led to an increased need for investment. With budgets rising sharply in many member states, the investment backlog must be cleared immediately and in the coming years, if not decades. Above that, there are large and challenging rollout programs coming up within the next 10 years across Europe. A step-by-step migration to the SERA target is therefore unavoidable, to channel investments and reap early fruits of standardization. The alternative is an uncoordinated migration towards the SERA target, diversifying sector resources and funding across multiple unaligned and uncoordinated solutions. An uncoordinated migration will inevitably lead to SERA becoming unattainable. Need for Migration Steps

For this reason, this position paper advocates a coordinated approach on the path to SERA. Clearly

defined migration steps2 that build on one another will help the entire rail sector to drive forward the digitalization of signalling technology in a predictable and coordinated manner.

The migration steps define a series of requirements that lead to systems and operational rules. These are available for all railways from a defined point in time and form the basis for all rollouts from the defined point in time. For the supplier industry, migration steps provide a stable and predictable framework for the further development of their product range. Migration plans must therefore be defined jointly between the IMs and the suppliers with sufficient lead time.

A first migration step will primarily have an impact on the infrastructural equipment while further steps will partly require changes in software. Furthermore, the members of the consortium are aware that all vehicles need to be equipped with ETCS for an initial migration step, which represents a major challenge, as does the rollout of the infrastructure.

It is not the aim of this position paper to define the number or the design of further migration steps.

Nevertheless, the consortium recognizes the need for a larger time gap between the migration steps,

assuring predictability and stability in the process of migration. Rather, this position paper promotes a consensus in the sector in favour of such an approach and makes a proposal for defining the building blocks of an initial migration step. The members of the EULYNX Consortium are convinced that an initial migration step must be finally defined latest in the first quarter of 2025. Due to the rollouts of signalling technology planned over the next few years, the foundations for SERA must now be laid by defining tangible steps using mature building blocks ready for tender. Building Blocks of Migration Step 1 A first migration step is required for upcoming tenders, applying existing specifications of ETCS Level 2 without signals. ETCS Level 2 without signals is crucial for SERA. The members of the EULYNX Consortium see ETCS Level 2 without signals together with (digital) interlockings using an IP network as the jump base for a first Migration Step. Baseline set 4 or later of EULYNX specifications is considered to be mandatory for (digital) interlockings. ATO GoA 2 is an important component for increasing capacity on existing routes and should therefore be included in the initial migration step. FRMCS will be an important basis for SERA and should be included as soon as possible. With the roll-out of ETCS and ATO in particular, there is a need for including a "Digital Register" in an initial migration step for the consistent and secure provision of all topological and project planning data. IT-Security specifications are well defined in EULYNX Baseline set 4 and in the System Pillar. All systems allow to take a first step forward towards harmonized operating rules. On the other hand, an early harmonization of operational rules will foster unified interfaces for a standardized architecture. The members of the EULYNX Consortium are well aware that in an ideal world, concise operational rules would be the basis for elaborating standards. Unfortunately, most upcoming projects will be brownfield projects, and the chicken-or-egg problem cannot be solved. Priority shall be given to the operational rules that relate to interoperability and influence technical systems. These building blocks must now be bundled and formalized as an initial set of specifications that can be put out to tender. This allows IMs to channel ongoing investments in the right direction in the short run and allows the sector to profit from early standardization steps. A first migration step will give enough room for utilizing already existing national developments in the migration. Outlook and conclusion From the perspective of the EULYNX Consortium, migration steps are necessary to achieve the vision of a SERA. To guide and protect future investments, the definition of a first migration step within the above-mentioned timeframe is of utmost importance. This must be based on mature solutions and, where possible, on operationally harmonized rules. The CCS sector, and in particular ERJU System Pillar, under its role as the generic system integrator and the architect of the future SERA railway, are encouraged to integrate the necessary steps for defining the migration steps or mandate an alternative workbench to support the sector.

**EULYNX 포지션 페이퍼: 마이그레이션 단계**

**승인일:** 2024년 8월 19일  
**상태:** 최종판  
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**EULYNX, SERA 달성에 대한 의지 천명**

EULYNX 컨소시엄은 **제어·명령·신호 시스템(CCS)의 표준화**와 **단일 유럽 철도 영역(SERA)** 구축을 위한 전략적 비전을 강력히 지지합니다. 기존 및 향후 규정될 시스템의 **디지털화**와 새로운 아키텍처 및 운영 설계에 부합하는 **효율적 프로세스**가 SERA 실현의 핵심입니다.

EULYNX 인터페이스는 TSI CCS를 넘어 SERA로 가는 첫 번째 성숙한 구성 요소입니다. 유럽 철도 공동 프로젝트(ERJU)의 \*\*시스템 기둥(System Pillar, SP)\*\*을 통해 더 많은 표준화 구성 요소가 도입될 예정이며, EULYNX 회원사들은 자사 전략을 조정해 SERA 비전에 부합할 것입니다.

최근 수십 년간 **신호 기술 투자 부족**으로 인해 유럽 전역에서 대규모 투자가 필요합니다. 회원국들의 예산 증액에도 불구하고, 향후 수년 내 **누적된 투자 결손**을 해소해야 하며, 10년 내 대규모 기술 도입 프로그램이 예정되어 있습니다.

따라서 SERA 달성을 위한 **단계적 마이그레이션**은 불가피합니다. 체계적 접근이 없다면 자원과 자금이 비조정 솔루션에 분산되어 SERA 목표 자체가 흔들릴 위험이 있습니다.

**마이그레이션 단계의 필요성**

본 포지션 페이퍼는 **예측 가능하고 협력적인 마이그레이션 전략**을 주장합니다.

**핵심 원칙**

1. **명확한 단계 정의**: 상호 연계된 마이그레이션 단계는 철도 산업 전체의 표준화 추진을 지원합니다.
2. **시스템 및 운영 규칙 표준화**: 특정 시점부터 모든 철도사가 적용할 기준을 제공합니다.
3. **공급업체와의 협력**: 철도 운영사(IM)와 공급업체는 충분한 리드 타임을 두고 공동 계획을 수립해야 합니다.

**초기 단계의 주요 과제**

* **인프라 장비** 우선 개선 → 후속 단계에서는 **소프트웨어 업그레이드** 필요
* **모든 차량의 ETCS 장착** 필수 (인프라 구축과 동등한 도전 과제)
* 단계 간 **충분한 시간 간격** 확보로 예측 가능성 보장

**마이그레이션 1단계의 구성 요소**

**1. 신호 없는 ETCS 레벨 2**

* SERA의 핵심 요소로, **디지털 인터로킹** 및 **IP 네트워크**와 결합해 초기 단계의 기반 마련.
* **EULYNX Baseline Set 4 이상**이 디지털 인터로킹에 필수 적용.

**2. ATO GoA 2**

* 기존 노선 용량 증대를 위해 초기 단계에 포함.

**3. FRMCS(미래 철도 모바일 통신 시스템)**

* SERA의 기반으로 조기 도입 권장.

**4. 디지털 레지스터**

* ETCS/ATO 도입 시 **토폴로지 및 설계 데이터**의 일관적 관리를 위해 필수.

**5. IT 보안**

* EULYNX Baseline Set 4 및 System Pillar의 명확한 표준 준수.

**6. 운영 규칙 조화**

* **상호운용성**과 기술 시스템에 영향을 미치는 규칙을 우선 통합.
* 대부분의 프로젝트가 **기존 시스템 개선(Brownfield)** 형태이므로, 실용적 접근 필요.

**전망 및 결론**

* **2025년 1분기까지 초기 마이그레이션 단계 최종 정의**가 시급합니다.
* 성숙한 솔루션과 운영 규칙 조화를 기반으로 해야 합니다.
* **ERJU System Pillar**는 SERA 아키텍처 설계자로서 마이그레이션 단계 정의를 주도해야 합니다.

이를 통해 철도 산업은 **표준화의 초기 성과**를 확보하고, 기존 국가별 개발成果도 활용할 수 있을 것입니다.

*(용어 해설: ETCS=유럽 열차 제어 시스템, ATO=자동 열차 운전, FRMCS=미래 철도 모바일 통신 시스템, Brownfield=기존 시스템 개선 프로젝트)*