



The impact of operational requirements on the future of the European railway sector

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UNIFE – The European Rail Supply Industry Association

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INTRODUCTION

The development of European railways and the deployment of solutions are still driven to a large extent by national requirements and their localised conditions.

There are shared commonalities due to the introduction of basic technologies for telecommunication and signalling solutions. But the way railways are organised and managed is still a national matter today.

Some attempts were launched in Europe to harmonise operations, but all have failed at their high implementation hurdles. The national railways are aware of the theoretical advantages of harmonised operation. But with implementation challenges, the expected benefits are considered secondary to undertaking the work to create a Single European Railway Area.

Now is the right time to introduce a European wide harmonised operation, which can achieve more standardised technical solutions for a quicker rollout of a more cost efficient and better performing railway system. If this opportunity is not taken, the European railway sector will very likely lose further ground against other modes of transport, in moving both freight and passengers.

Railways and Suppliers agreed during the creation of Shift2Rail on the Common Business Objectives (CBO). They were used to guide decisions during the development of Shift2Rail, and are still used in Europe's Rail Joint Undertaking as business objectives. Besides the fundamental objective to achieve a proper level of Safety and Security, three main Common Business Objectives were identified:

- 1. Cost Efficiency** (by harmonisation of operation, by simplification of regulations, procedures, standardisation and acceptance processes, by standardisation of architecture, by efficient system integration, testing and validation and by affordable software upgrades)
- 2. Quick Adaptation and Deployment** (by increase in flexibility, by reduction of the time-to-market, by ease of procurement and by effective migration strategies)
- 3. Better Performance** (by increase of capacity, by greater reliability and availability and by environmental sustainability)

Railways and Suppliers have also agreed to manage the business objectives through cooperation and not in isolation, (i.e. increased cost efficiency and quicker rollout of solutions with increased performance), and shall be achieved in a combined way.

Pure cost reductions will not lead to higher system performance, and without an accelerated rollout, it will take too long to achieve the modal shift.

Because operational requirements are national to a large extent, it is the major reason for the huge variety of technical solutions we find today in Europe.

THE IMPACT OF OPERATIONAL REQUIREMENTS

“Differences in operation are one of the key root causes for complexity, as well as product diversity and therefore are a major cost driver.”

This statement can be found in the CBO document developed during Shift2Rail. Just to illustrate the consequences for Europe, consider there are 25 different infrastructure managers. Due to their individual history, all have introduced four different versions of signalling systems. The variety of signalling solutions is very likely even higher, because not only operational, but also national technical requirements influence the requirements baseline, which is the basis for the development of a technical solution.

Unfortunately, railways often impose specific technical requirements, leading to customer specific solutions and dedicated developments. At least 100 substantially different requirement baselines for signalling solutions exist in Europe. This high number of baselines is leading to a market segmentation in competition, because no supplier has the capacity to comply with all baselines.

These baselines have not only an impact on development, approval and certification cost. The resulting solutions have to be tested which requires intense in-house and field tests. Such field tests prolong project implementation times, occupy infrastructure and require vehicles with specific configurations. In particular, integration tests between trackside and onboard systems are critical.

In the ideal case of only one European requirements baseline, the situation is completely different. It will enable suppliers to not only address the entire European market, but it will also release capacities to develop quicker innovations and therefore improve the competitiveness of rail transport.

To summarise, the diversity of operational requirements is leading to fragmented and small market places, higher costs and a slow introduction of innovations. This applies for all stakeholders, including Infrastructure Managers, Railway Undertakings and Suppliers.

THE FUTURE OF SIGNALLING

ETCS infrastructure solutions differ in Europe, because operation under ETCS is not standardised. ATO GoA1 and 2 is now technically specified and included in the latest CCS TSI revision.

Unfortunately, also ATO GoA1 and 2 operation is not standardised. The technical ATO variants will introduce an additional dimension to the signalling variants in Europe, because the ATO variants come on top of existing signalling variants.

The System Pillar of Europe's Rail Joint Undertaking (ERJU SP) has the harmonisation of operation at the top of its agenda. This is motivated by the circumstances and objectives described in the chapters above. In parallel, the ERJU SP is working on a harmonised architecture and technical requirements for new important features like Moving Block

and DAC. Work on the ATO GoA 3 and 4 will continue, as well as the specification and tests for FRMCS.

Without a successful operational harmonisation provided for the new features, additional complexity dimensions will appear. It is not just about variants to be added, but multiplied, because ETCS, interlocking, ATO or DAC related operational requirements will be defined at national level independently from each other.

As a result, the variability of requirements baselines will grow over-proportionally with the introduction of additional features, if operational requirements are not harmonised. There is no chance for suppliers to compensate for this effect. The development, validation, verification and approval cost will increase over-proportionally.

CONCLUSIONS AND RECOMMENDATIONS

To pursue the standardisation of technical requirements without the harmonisation of operation, will lead into an economical dead-end. Nobody will be willing to pay for the results. This means exorbitant costs now, and well into the future, which will be a hard sell to policymakers. The solution is to accept the benefits of having a real Single European Railway Area, notably the ability to have harmonised operational requirements for signalling applications.

The existence of standardised technical solutions based on harmonised operational requirements will not be enough - they must be implemented across Europe. To achieve this, it is not enough for only the technical experts working on those standards to be convinced, but also the departments of the organisations dealing with architecture, design and procurement.

The purpose of this paper is to persuade all railway stakeholders, that only a fundamental change in the orientation from a national to a European perspective will lead us to a successful railway sector.

ABOUT UNIFE AND UNISIG

Based in Brussels since 1992, UNIFE is the association representing Europe's Rail Supply Industry at the European Union (EU) and international levels. UNIFE's members include more than 120 companies - from SMEs to major industrial champions - active in the design, engineering and manufacture of rolling stock (i.e. trains, metros, trams, freight wagons) as well as rail signalling and infrastructure equipment. UNIFE also brings together the national rail industry associations of 11 European countries.

As part of UNIFE, UNISIG is the committee responsible on the supplier side for developing, maintaining, and updating the Signalling and Traffic Management specifications including ETCS. This is undertaken in close cooperation with Europe's Rail Joint Undertaking (EU-Rail) and the European Union Agency for Railways (ERA).