

ERTMS: also a major change process

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The introduction of ERTMS is not only a major technical task, but also a major change process.

The major objective for new signalling systems is to ensure that more passenger and freight transport can be accommodated on the network. With these systems, we meet our objectives as infra manager and facilitate growth for the rail business. We will also achieve improvements in interoperability, safety, reliability and higher speed demands.

The programme in the Netherlands is also mainly driven by the need to renew, due to end-of-life of the Class B signalling assets, and in particular the future shortage of workforce needed for maintaining and engineering. This summer our government approved a 2,5 billion euro investment in ERTMS for equipment in rolling stock, the central system and the first infra corridors.

In this conference, other speakers will contribute to technical issues, I want to address the organisational and people change which comes with the transformation in railway signalling.

ERTMS is a real system leap forward.

The programme itself is a major technical and realisation task but it also causes four major changes for ProRail and the industry.

1. From track-based roll-out to national implementation
2. From operational technology to data driven IT
3. From customer-supplier approach towards partnerships
4. From separate contributions to joint performance

ProRail sees the introduction of ERTMS as a steppingstone and as a transformation vehicle to change the organisation into a more flexible, and resilient one. It capitalises on all benefits and future opportunities of digital technology. Thus, in addition to our Programme High Frequent Railways (Programma PHS) which focusses on building new tracks, we will invest in a more efficient use of the network.

I will address these 4 major changes in the industry and ProRail.

These change statements do not intend to be exhaustive. It reflects the insights we now have. This will continue to be a learning process in the next few years.

1. From track-based roll-out to national implementation.

Traditionally, ProRail has implemented railway safety systems per section or corridor. The base Class B ATP technology installed allows us to do this in a non-problematic way, because different signalling sections always connect to each other and the technology has not changed substantially in recent decades.

The same track-based approach has been applied to the current ERTMS line sections (High Speed Line, Havenspoorlijn, Amsterdam-Utrecht, Hanzelijn and Betuweroute). Equipment for a section or line is contracted and actually placed next to the section.

This has resulted in 5 unique ERTMS implementations. This means that, in the Netherlands, we now have 8 different automatic train protection systems (5 x ERTMS and 3 x ATB). If we follow this approach, the programme will add a 9th variant and at least a 10th after the programme for the continued national roll-out. From a management and operational point of view, this is entirely undesirable.

With so many systems and parties, version and release management will be virtually impossible in the future. It would not be feasible to achieve or maintain the same level nationwide for upgrading or, for example, implementing Hybrid level 3, or later level 4, or ATO.

This requires a number of changes:

- We will be making a contract that will ultimately result in fewer different signalling (CCS (command and control) systems in the Netherlands. Part of the national solution is the de-coupling of intelligent centralised equipment for example in RBC-interlocking servers in data centres and simple decentralised equipment, for example simple object controllers. ProRail strongly supports RCA, EULYNX and OCORA developments, so also open interface architecture. This de-coupling ensures that the central part can be changed or expanded independently of the decentralised part.
- The ProRail organisation and the industry must be set up this way. Contract management must collaborate with technical and functional management. IT will have a hand in managing the central equipment together with signalling (CCS (command and control safety) systems, train safety experts and the suppliers.
- In the longer term, this also means that the work assigned to contractors and Engineering Consultancy firms will change. For example, linking object controllers to fibre-optics instead of patching hundreds of copper wires in clamps will not only change the work in the field, but also in the design phase.
- The national approach will also affect the project realisation process. This will be done in three ways:
First, digitalisation of the data flow from infra layout, design and operations will be used for ECTS, engineering and traffic management systems.
Secondly, part of the responsibility for commissioning will be shifted to a central organisation. and

Finally we are investigating whether we can commission the projects on a functional level, instead of a geographical one. For example, one project connecting all outdoor elements to fibre-optics (using object controllers) and one project setting up a central project for RBC-interlocking, instead of an integrated contract for a railway corridor.

- As a result, we are moving from geographical contracts to contracts per construction stream. Where we will optimise the roll-out in the Netherlands in relation to end of life issues, operational demands and financial conditions.

2. From operational (Relay) technology to IT.

The base Class B technology installed is a static technology. ERTMS is based on IT and, therefore, in itself dynamic due to developments in technology and cyber security challenges, but also in developing functional requirements such as ATO and hybrid level 3.

This change will lead to a new approach:

- The infra manager will ensure that the system supplier contract accommodates yet unknown changes and releases to the system. This means a resilient new way of working is needed.

We all know this is not new within IT contracts, however the current terms we talk about in railway signalling are much longer, generally about 25 years, than the usual IT contracts, which have a term of about 5 years. In the case of signalling systems, the roll-out does not even start until 4 to 6 years after design and contracting, followed by years of further roll-out.

The new contract must somehow accommodate developments that take place during this period without us knowing exactly what these developments will be at the present time. Here, we also need a resilience approach.

In addition, managing IT(-like) systems is a different discipline than managing the current static track sections. For example, the ITIL way of working will apply. Setting up the management and division of responsibilities has a direct impact on the contract. All this will lead to new competences in the signalling and IT departments.

- Modularity is key, RCA and EULYNX are initiatives strongly supported by ProRail to enforce modularity of the CCS system. Connecting decentralised object controllers to a centralised RBC-Interlocking system by means of an open interface.

Updating or upgrading and replacement of the centralised system thus becomes independent of the labour and capital-intensive decentralised part.

Implementing new technologies in modules will only impact the module, verification and validation will become easier.

- It is important for ERTMS to have sufficient knowledge of the technology and what the technology means for the organisation.

At ProRail, we have technical knowledge on board with a limited number of experts. We are going to offer this knowledge more widely to employees in the organisation and in the industry, collaborating closely with universities and our Railcenter in Amersfoort where we concentrate our training facilities for the

whole country. And in addition, we will extend the state of the art ERTMS in an integration laboratory, a smart assets lab and new test facilities.

- Knowledge of what this means for the various departments, such as operations and traffic management, is still limited. We have launched an awareness-raising programme with our human resources department and will expand this initiative to the market.
- And finally, it is also a change for traffic management and train drivers. In the traffic control centres more automation and more national work will apply. Instead of looking for signals, train drivers have to look at the display and pay attention: both will take intensive transition periods. In our country alone we foresee that this development will change the daily work activities of about 15,000 railway employees.
Human factors are key in this transition!

3. *From customer-supplier approach to partnership.*

The duration and scope of the contract requires more than a simple contract relation between ProRail and the system supplier, a collaborative partnership is a necessity.

Both have to look for ways to roll out the system faster and more efficiently.

Following our current way of executing projects, we do the roll-out of the ERTMS system and commissioning in our 7000 km network towards 2050. However, this does not meet our core growth ambition. This is not acceptable; we have to come forward with more agile collaboration in doing projects.

During the term of the contract, we must encourage each other to develop innovations that are not yet known, in which risks and benefits must be shared and mutually contracted.

The sector players also see that demand is changing as I pointed out before.

Examples of this are the nationwide implementation in Denmark and Norway.

Sector players see that the current approach to individual solutions in individual countries is not sustainable. It requires too much capacity, too much investment, insufficient effectiveness and unmanageable solutions.

The implementation of the collaborative partnership or alliance with sector players will only take place later in the tendering procedure. However, in view of the limited experience for players with ERTMS as the subject of a partnership, it still needs in-depth analysis and preparation before contract award. We will do this in close cooperation.

4. *From separate contributions to joint performance.*

We are used to working in standardised working processes build by separate competences, departments and organisations such as contractors, engineering consultants, infra managers, suppliers.

This value chain has existed for a very long time and has been developed and optimised over the years. ERTMS is changing the value chain and this requires renewed coordination.

We are not used to that.

- Rolling out ERTMS requires working closely together across the value chain in setting up the programme, the design and construction phase and eventually implementing ERTMS in the operations. In this context, procurement plays an essential role in the acquisition of the necessary systems and suppliers over the years.
- The ERTMS development and management value chain affects nearly all the ProRail business units such as traffic management, capacity management, IT, asset management and projects. Our HR and financial departments will have to support this change in a more pro-active but different way.
- Also in other businesses, the collaboration between the asset and IT departments will have to change. In technology and in looking at business models
This involves combining customer demand with technology push and the feasibility of projects, operators and European regulations.
- We are now solving this by means of lateral substantive internal consultation structures in order to work cross border. And also, with our partners in external workshops, market reviews and interviews with the supply chain to exchange information and strategies.

Conclusion

I have now come to the end of my presentation.

As I have said before, the ERTMS programme in itself is a major technical and realisation task but it also causes major changes in and between our organisations and people.

The ERTMS programme is more than just a technical project, it's also a major change process.

This has to lead to more flexibility, change and more resilience in all players concerned in the next few years.

The changes in Railway signalling, digitalisation and the other challenges mentioned are huge in the years to come. This will offer great opportunities for renewal, higher capacity and stepping into the new digital world. We will develop new technologies, architectures, new procedures and ways of working. This affects organisations, people and processes.

We cannot do this transformation the way we did before, using our core processes, contracts and ways of working. We need this change in order to achieve the ambition in public transport, growth, sustainability and satisfied passengers and freight operators.

I wish all of us a good conference, open discussions and lots of best practice exchanges.

Thank you.