

European Commission

# ERTMS

Work Plan of the European Coordinator **Karel Vinck** 

Transport

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This report represents the opinion of the European Coordinator and does not prejudice the official position of the European Commission.

# Executive summary

With this Work Plan for ERTMS the European Coordinator would like to propose the way to speed up ERTMS implementation in Europe. He proposes a **breakthrough program** established on the basis of four principles. The first principle is the **"Users first" and not "Designers first"** approach that shall facilitate the competitive situation of the Railway Undertakings as users. Secondly, he urges the complete definition of **standardised on-board equipment** compliant with ETCS Baseline 3. Third principle indicates the **entire priority and focus on deployment**; finally the system **cost reduction for ERTMS** shall be one of the main objectives in the upcoming years achieved inter alia through harmonisation of rules.

The Breakthrough program consists of five objectives that need to be achieved by end of 2016. As already announced in the interim Work Plan, the Coordinator submits a proposal for the **review of the European Deployment Plan** agreed on in 2009. Member States should ensure that major part of ERTMS implementation along the Corridors is finalised by 2027, using the financial opportunities provided by the ongoing (2014-2020) and future programming period (2020 – 2027). A complete, stable and mature set of specifications is the condition for the seamless operation of a software based system, like ERTMS. An interoperable and compliant infrastructure adapted to Baseline 3 trains is essential for a competitive railway network in Europe. The European Commission and the Member States are requested to guarantee a clear and transparent regulatory framework for ERTMS. Through funding and (innovative) financial tools, technical assistance and efficient coordination, ERTMS deployment has to be facilitated.

# 1. Introduction

With the establishment of the nine multimodal Core Network Corridors (CNC) the Commission has taken a major step towards the realisation of a sustainable transport network in Europe. With this coordinated way of implementation the European Commission has provided a strategic and political framework for the implementation of the Single European Railway Area: as a first step, the Corridors –as implementation tools - shall be made operational, and then the remaining parts of the Core Network Corridor can be completed by 2030.

The ERTMS Coordinator has always highlighted that in order to get a railway corridor operational three conditions need to be fulfilled: the removal of the bottlenecks on the infrastructure, the harmonisation of national operational rules throughout Europe and the introduction of ERTMS. As regards the latter one, significant results have been achieved in Europe over the last 10 years: the technology as such has become mature and we have reached the point of no return: ERTMS is *the* interoperable signalling system in Europe, accepted by all Member States.

Nevertheless, the implementation does not progress as swiftly as it has been planned and expected from all stakeholders: in some Member States it is well beyond the foreseen schedule. The most frequently used arguments are that the financial means have not been sufficient (in particular due to the financial crisis), the price of ERTMS products is not always adequately related to their added value (in particular on-board equipment), the lack of ERTMS expertise has been hampering the implementation, the maintenance of specifications is in delay etc. Furthermore, some European Member States have invested in maintaining/updating their national systems on regular basis and use the argument that the existing signalling system has not reached the end of its life cycle. With this Work Plan for ERTMS the European Coordinator would like to propose the way to give a boost to the implementation through an ambitious breakthrough program, in order to be able to achieve quick wins and tangible results in the upcoming two years. Furthermore, the Coordinator would like to propose a reviewed and more realistic European Deployment Plan with a definite time horizon of 2030 and an extended geographical scope (instead of six ERTMS Corridors it covers CNC's). This deployment plan will be further discussed with the Member States on a bilateral basis and along the Core Network Corridors, with the support of the other CNC Coordinators.

# 2. Breakthrough program – focus on limited number of priorities

In its intermediate Work Plan (prepared for the Informal Council in Milano, 16-17 September 2014) the Coordinator has described in broad lines what currently are the main difficulties that hinder the implementation of an interoperable railway network in Europe. He highlighted one main problem, which is not really about interoperable barriers, but rather mentality barriers (resistance to change) and urged all main actorsincluding the railway undertakings, the infrastructure managers, the national safety authorities and in particular the European railway industry to take the commitment to go together for a real breakthrough in realizing an interoperable, safe and efficient rail system in the European Union. He identified some actions to be carried out by the respective stakeholders: they all need to leave their historical comfort zone and make significant effort to find the right way out of the existing deadlock.

In order to speed up the implementation process and to reach tangible results during in the two coming years, the European Coordinator proposes to focus on a limited number of priorities that need to be implemented by the end of 2016. This limited number of priorities defines the proposed Breakthrough programme.

# Key principles of the Breakthrough Program

The Key principles behind the breakthrough programme are the following:

- "Users first" and not "Designers first" approach. Users are defined from economic point of view: considering that Railway Undertakings (RU) are in a competitive situation (vis-à-vis other transport modes, in contrast to the Infrastructure Managers (IM)), which have a national monopoly, their needs shall be better taken into account and the burden that a change in the specifications would impose on them should be carefully assessed, before implementing them. IMs' requirements can be taken into account, provided that RU's benefit as well. Improving in a significant way the interoperability is a sine qua non.
- Running everywhere in Europe. Based on the principles at the heart of ERTMS, a vehicle equipped with a standardised and complete<sup>1</sup> on-board equipment compliant with ETCS Baseline 3<sup>2</sup> (Maintenance Release 1) should be able to run everywhere in Europe. Baseline 3 embeds the *backward compatibility* concept, ensuring that vehicles equipped with Baseline 3 can run on Baseline 2<sup>3</sup> trackside equipment. A pre-condition is to make sure that the trackside equipment is compliant with the legal specifications ("CCS TSI"<sup>4</sup>). Moreover, infrastructure managers, supported by manufacturers, should commit to develop the trackside engineering to be implemented by the suppliers to ensure that the standardised onboard equipment is able to run on their network, with specific attention to the design and implementation of the transitions between ETCS and the legacy national systems.

<sup>&</sup>lt;sup>1</sup> i.e. able to performs the different modes and levels of applications, e.g. level 1limited or full supervision, level 2

<sup>&</sup>lt;sup>2</sup> it means the set of specifications #1 in Table A2 of Annex A to Commission Decision 2012/88/EU

<sup>&</sup>lt;sup>3</sup> When reference is made to "Baseline 2", it means the set of specifications #1 in Table A2 of Annex A to Commission Decision 2012/88/EU

<sup>&</sup>lt;sup>4</sup> 2012/88/EU, Commission Decision of 25 January 2012 on the technical specification for interoperability relating to the control-command and signalling subsystems of the trans-European rail system

- Focus on deployment. The focus of all stakeholders should shift from the specifications and development to deployment, operation and maintenance of the ERTMS specifications. The latest set of specifications should be used to build onboard and trackside equipment. This set called "Baseline 3" contains indeed all the "Baseline 2" functions (that have been corrected, clarified, improved). Problems having an impact on the deployment and operation should be reported and fixed in a timely and transparent manner, preserving the harmonized approach,
- ERTMS System Cost reduction should be pursued for ERTMS solutions and products, and their maintenance, but also for the European system as a whole. A further European Standardisation shall be continued when it makes sense from an economic point of view, for all involved actors (RUs, IMs and manufacturers). For example, harmonization of operational rules and of engineering rules shall be pursued to reduce complexity; as well as the standardisation of ERTMS components and interfaces. It is essential that procurement and call for tenders do not introduce detrimental variations or specific requests negating the advantage of economies of scale and standardization.

#### ERTMS Breakthrough Program 2014-2016

#### 1. A realistic and committed deployment plan

By end 2016, a true 2030 master plan for deployment, to legally replace the current European Deployment Plan, introduced in 2009

An entirely reviewed European Deployment plan will be issued by the end of 2016 and it is expected to formally replace the current European Deployment Plan. This new release will include information on issues hindering the ERTMS deployment and how these issues could be resolved (at the level of Member states, Railway Undertakings and Infrastructure Managers).

On the basis of the proposal for review, bilateral and coordination meetings will take place between the Member States, the ERTMS Coordinator and the European Commission, assisted by ERA, INEA and the future Deployment Management team, in order to draft a realistic, accurate and reliable plan by end 2016. In particular, cross border sections will receive the highest priority. This plan will define the priorities, e. g. which Core Network Corridor needs to be operational by which date, and which sections come first.

The European ERTMS Coordinator proposes a two-step approach. As a first step, those sections that can be implemented by 2020, need to be defined. The detailed planning for the first step will be finalised by the end of 2015. The remaining sections (to be completed between 2020 and 2030) will be subject to discussion and detailed planning in 2016. Since some Member States have implemented ERTMS on their territory in accordance with the current EDP; the proposed deployment plan will take the completed lines/network of those countries as the reference point and build up the network starting from them.

The so-called Deployment Management team (cf. call for tender issued by DG MOVE- n° MOVE/B2/2014-670 - "for a service contract regarding technical support for the deployment of ERTMS along the core network corridors") will also be a key enabler of the action to fulfil the Commission's commitment to follow-up the ERTMS deployment in the coming years.

Since the review of the European Deployment Plan will have a direct effect on ERTMS implementation and on the budgetary planning of the Member States, Infrastructure Managers and Railway operators, it will require further negotiations with them in 2015. Therefore, the Coordinator presents its proposal for a new deployment plan in a separate chapter of this Work Plan.

#### 2. Stable and mature set of specifications

a. First maintenance release of the set of specifications called "Baseline 3" completed by mid-2015 (test specifications).

The Baseline 3 first maintenance release specifications will be completed by mid-2015, with the delivery of the test specifications.

b. Second maintenance release of the set of specifications called "Baseline 3" to be published to cover project needs and avoid national rules.

ERA shall recommend to the Member States the content of the next release of Baseline 3 by February 2015. The priority will be given to error corrections and to the functions identified in the 2012 ERTMS MOU, i.e. ETCS over GPRS<sup>5</sup>, ATO<sup>6</sup> and on-line key management. The analysis requested by the Railway Interoperability and Safety Committee RISC to avoid the risk of national technical rules will be carried out. Specifications to be updated will also take into account the work carried out to address GSM-R interferences issues. The methodology of introducing the retained change requests into the planned releases will be part of the recommendation in order to give certainty to the users, IMs and the suppliers.

#### c. A specifications roadmap agreed by end 2015

Considering that ERTMS/ETCS is a complex software-based system, a roadmap will be needed to manage the evolution of the changes in the specifications.

A structured and disciplined approach, both in terms of specifications management and of software management in existing products and systems has to be undertaken.

ERA will develop, with the support of the stakeholders, notably the suppliers, a framework for regular releases associated to the roadmap for managing and controlling the evolution of the specifications. The specification roadmap should also address possible improvement of specification release procedures. European railway industry should learn from other critical industries where safety is a major concern. The process to gain experience, report from system failures and incidents during operations should be improved to ensure higher product quality and reliability.

d. Change management processes are reviewed to improve efficiency, to ensure backwards compatibility and project needs for error correction.

A strong Change Control Management process, associated with a scheduled workflow, needs to be properly applied by all parties involved, under the leadership and project management of ERA. The impact of new functionalities introduced via change requests (CR) should be assessed in terms of investments already made, backward compatibility, interoperability and excessive complexity. A basic criterion should be whether a limited scope would be sufficient to fit the overall purpose.

#### 3. An interoperable and compliant infrastructure

a. Lines are adapted to allow Baseline 3 trains to run on them. Migration and upgrade programmes are coordinated for trackside and on board. If existing lines are incompatible, corrective measures are evaluated and a plan for their implementation is made available.

The Backward Compatibility Analysis report (BCA), prepared by UNISIG and the ERTMS UG, confirms the robustness of Baseline 3. The issues discovered were corrected in the first maintenance release of Baseline 3 (B3, maintenance release 1). Because of the Backward Compatibility requirement, it is now important to also validate the results on real Baseline 2 trackside projects.

<sup>&</sup>lt;sup>5</sup> General packet radio service for communication between the track-side and on-board equipment

<sup>&</sup>lt;sup>6</sup> Automatic Train Operation

The first step for each IM is to review the state of their ETCS implementation in the light of the findings of the Backward Compatibility Analysis report, and make the results available.

In a second step, any corrective measure shall be evaluated and a plan for its implementation be made available. Member States will make sure that the Infrastructure Managers are committed that trains equipped with an on-board system based on Baseline 3 MR1 specifications can run on their network. A migration program, identifying the appropriate funding tools for the concerned railways is in preparation for impacted trackside and onboard equipment.

It is important that IMs upgrade pre-B2 infrastructure to Baseline 2 or Baseline 3.

b. IM have the legal responsibility to provide a detailed description of their infrastructure, including ERTMS, to allow fair and non-discriminatory access to RU. This should be done by using, inter-alia, the register of infrastructure; an "interoperability map" shall be made available by end 2016 by the Rail Freight Corridors' management structures

# 4. A clear and transparent regulatory framework

a. The EU legal text(s)

The EC legal text containing the ERTMS specifications (CCS TSI) will be aligned with the other technical specifications for interoperability. Clarification will be provided where necessary. Operational requirements applicable to ERTMS are harmonised in annex A of Commission Decision 2012/464/EU (OPE TSI).<sup>7</sup>

b. Quicker and cheaper authorisation procedures, supported by rigorous verification and appropriate certification and demonstration by the suppliers' of the conformity of their products and systems, without waiting for the adoption and implementation of the 4th Railway Package

A guidance is prepared on verification, conformity assessment and national authorisation processes (a) of constituents, (b) of subsystems and (c) of vehicle equipped with ERTMS. Specific guidelines and roadmap are prepared to facilitate and harmonise EU-wide ETCS and GSM-R authorization. The aim is to reduce the cost and duration of the assessment (e.g. replacing some field test by lab tests). The availability of products and systems fully compliant with the specification is a pre-requisite.

c. Possible national requirements (including possible specification deficiencies), or other "requirements", if any, should be notified, collected, validated (or not) by ERA, mutually-accepted, and publicly available;

National requirements in contradiction with EU law are identified and withdrawn. ERA may (only) support the Member States (MS) to clean up the national rules (for CCS, Chapter 12 of the RDD), but it is the Member States' responsibility to eliminate them. Moreover, and in principle, in the case of Baseline 3, a required national rule can only be the subject of a formal change request.

The standardisation of engineering rules shall be continued under the leadership of the ERA working group, with the resources made available by the RFC working groups. The IMs shall use those rules as a matter of priority in order to reduce complexity and allow a more robust system testing. A special focus shall be given to the transition between ERTMS and Class B systems in order to solve as a matter of priority the border crossing situations;

Harmonisation of operational requirements/rules which are not covered by the directive shall be continued in order to simplify the engineering of the system. The lack of harmonisation in train data preparation has to be investigated further because it is as one of the main causes for stops at Member States borders.

<sup>&</sup>lt;sup>7</sup> Technical specification of interoperability relating to the subsystem Traffic Operation and Management of the trans-European conventional rail system

The coordination between, and cooperation among, Infrastructure Managers, National Spectrum Regulator and Public Mobile Network Operators must continue in order to obtain an appropriate radio coverage and an absence of mutual interferences, by, e.g. adapting the emitted power level of both GSM-R and public (UMTS/LTE) radio transmitters to the local operational conditions.

# 5. Facilitation of the deployment

*a.* National and European financing and funding schemes exist, are known and are clear. Positive business cases are prepared and are communicated.

A main priority is to collect and facilitate a "positive business case" for the different segments of the deployment plan. The CEF funding strategy should be adapted but national funding programs should also be fine-tuned to support the ERTMS ambition. It is crucial to further define the scope and conditions of ERTMS financing within new CEF programs. In particular, funding the resolution of cross border section issues should be a priority. The projects where a coordinated trackside and vehicle upgrade is necessary also have to be carefully considered. Nonetheless, CEF budget will not be sufficient to cover all investment needed for ERTMS deployment. The Commission has launched an initiative to develop tailor-made solutions for use of innovative financing to support the deployment of ERTMS. Innovative financing should be addressed through business cases. In particular positive examples of PPP will be collected and disseminated by the Commission by the end of 2015.

b. ERTMS initiatives are consistent and effective. Communication, coordination and management principles for all these ERTMS related activities have to be formalised.

The Commission shall set up a structure to monitor (and to report on) the deployment plan implementation. Moreover, an indicative financial plan supporting it shall be drafted. Coordination and cooperation are reinforced among the stakeholders required to implement projects.

Communication is reinforced: information is adequately provided to different stakeholders and best practices are shared e.g. the access to all relevant technical ERTMS information is facilitated through an internet website.

# 3. Review of the European Deployment Plan

# Reasons for adjustment

The Commission Decision 2012/88/EU contains the ERTMS European Deployment Plan (EDP) which provides with the progressive deployment of ERTMS along the main European rail routes. It sets out the legally-binding deadlines for the implementation of ERTMS on key corridors (inclusive terminals identified along these lines). In 2007 the Member States submitted their national ERTMS deployment plans to the Commission, on the basis of which the EDP has been defined. It does not include the entire national plans, but it concentrates on the most important stretches with European interest (corridors, links to the ports, terminals etc.). According to the existing EDP the identified corridors, sections, links have to be equipped at latest by 2020 - some of them already by 2015. Following a first mandatory reporting exercise on progress made in deploying ERTMS in accordance with the EDP, the Commission services have issued a Working document on the state of play<sup>8</sup>. Despite the significant provision of EU funding, deployment on corridors is behind schedule and results in an uncoordinated and patchy deployment.

In the Coordinator's view it is necessary to adapt the EDP to the reality and create an ambitious and pragmatic plan with clearly defined priorities within the Corridors with a definite time horizon of 2030. As described above, the current one was adopted in 2009.

<sup>&</sup>lt;sup>8</sup> <u>http://ec.europa.eu/transport/modes/rail/interoperability/ertms/edp\_map\_en.htm</u>

At that time the available experiences on ERTMS implementation were very few at national and European level: Baseline 2 was adopted one year before (at the same time development of Baseline 3 was decided) which means that the already equipped lines (with older versions than Baseline 2) had and partially still have to be upgraded. The equipment of locomotives was also at a very early stage. The number of experts (engineers, project managers, drivers with necessary knowledge on ETCS etc.) was limited. Today infrastructure managers, railway undertakings, national safety authorities etc. still have difficulties due to the lack of qualified experts. The national deployment plans, provided by the Member States in 2007, were too optimistic for the reasons mentioned. In addition to that, a serious economic crisis was hampering any infrastructure activities in Europe and delayed the implementation with years.

On the other hand, we must recognize that some Member States have implemented ERTMS on their territory in accordance with the existing EDP; therefore a radical change of the timeline without prioritisation of cross-border sections and without the guarantee to continue to build up the network would be an unacceptable disavowal for them. Therefore the proposed deployment plan will take the completed lines/network of those countries into account and integrate them in the reviewed deployment plan.

#### Supporting environment for adjustment

Technical stability has been reached, since Baseline 2 and Baseline 3 are available and constitute the legally binding specifications. Baseline 2 was developed in 2008. At that time this standard was the unique set of specifications for an interoperable signalling system in Europe. However, following consultations with major stakeholders it appeared that this standard did not provide all the required functions and was not capable of offering a certain number of additional requested services. Therefore the commitment was taken in 2008 by the European Railway Agency to design a complete and stabilised technical standard for ERTMS, which became ERTMS Baseline 3. Thanks to the active participation of all stakeholders (UNISIG, ERTMS Users Group etc.) in the preparation of reviewed specifications, in 2012 ERA was able to submit its final recommendations to the Commission. Subsequently, the specifications of Baseline 3 have been agreed on by the Member States and have been included in the reviewed CCS TSI.

In order to ensure an efficient, synchronised and timely implementation of ERTMS along core network corridors and to ensure the consistency with the other sections of the network, the Commission will launch an implementation support programme by a deployment management team. Deployment planning coordination, deployment monitoring, technical assistance and economic advice supporting the deployment will be the core tasks of this implementation support programme, and a business case for each Core Network Corridor will be carried out as well. This deployment management team should be a guarantee of a coordinated ERTMS implementation in the European Union; however, the obligation to deploy will stay with the stakeholders.

The Commission provides a significant amount of contribution through the Connecting Europe Facility (CEF, up to  $\in$  1,1 billion only for ERTMS) and European Structural and Investment Funds (in total  $\in$  35 – 40 billion for transport). In addition, the CEF provides for financial instruments to promote substantial participation in infrastructure investment by private investors and financial institutions. Since studies demonstrate that public-private partnerships in the ERTMS sector can work if properly structured, stakeholders should make use of those innovative financial instruments as well.

# A strategy for the planning

When preparing the proposal for the new European Deployment Plan, the Coordinator has analysed all documents available to the Commission (Rail Freight Corridor documentations, notifications, outcome of bilateral meetings etc.) and the results of the Core Network Corridor Studies. This deployment plan covers the Core Network Corridors (CNC), but the Coordinator would like to remind the Member States of their obligation to deploy the entire Core Network by 2030. Additionally, the railway part of CNC's have a passenger and a freight dimension that not always have the same alignment. Member

States shall take into account these particularities of mixed traffic in their ERTMS deployment programme and make an effort to deploy both lines; the reviewed EDP will refer to both segments of the railway part along the Corridors.

Over the last years the European Coordinator has highlighted that the corridor approach is the most appropriate way to achieve an interoperable network. A coordinated way of implementation through corridors facilitates not only the management of the implementation, but it provides an economic added value as well: the costs of ERTMS are linearly growing with the deployment, while its benefits in terms of interoperability will grow exponentially depending heavily on the harmonised deployments among different Member States.

The review of the EDP shall be based on a pragmatic approach: the starting points of the network implementation have to be the already equipped (or soon equipped) lines that are mostly located along the original ERTMS Corridors (implemented by Member States that are following the current EDP timeline). Therefore we should focus on the implementation of these lines in priority. However, the main objective is to build a network and enable an interoperable traffic flow in Europe, hence the continuation of certain priority sections ,in particular the cross-border sections, should be preferred to a straight implementation of all corridors at the same time.

Therefore, deployment along corridors shall start with the cross-border sections that require close cooperation between Ministries, Infrastructure Managers and National Safety Authorities of neighbouring countries. This cooperation will afterwards facilitate the further equipment along the corridors and will contribute to a less costly ERTMS deployment.

In order to be able to establish a credible EDP, the European ERTMS Coordinator proposes a two-step approach for the implementation of the Core Network Corridors. As a first step, those sections that can be implemented by 2020 need to be defined, and the respective Member States will have to take a commitment for their implementation in 2015. The European Coordinator proposes hereafter those sections that will serve as a basis for discussions and negotiations with the Member States in the first half of 2015. The detailed planning for the first step will be finalised by the end of 2015. The remaining sections (to be completed between 2020 and 2030) will be subject to negotiations and detailed planning in 2016.

At this point, the Coordinator would like to highlight the fact that the next financial period covers the time between 2020 and 2027, consequently Member States need to take this timing into account when planning ERTMS deployment on their respective territory and carry out the major part of the works by 2027. The remaining three years should be used for the implementation of the remaining corridor sections and the Core Network.<sup>9</sup>

# Starting points

Increasing number of countries has taken the ambitious decision to switch their national signalling system into ERTMS. According to the state of play of implementation, the Coordinator identified two main areas where ERTMS deployment is progressing in a significant way: *BeNeLux hub* and *Vienna hub* (Austria, Slovenia, Slovakia, the Czech Republic, some parts of Hungary, North-Eastern part of Italy); therefore the Coordinator calls on the Member States situated directly next to these regions to focus on the implementation around these two hubs on their territory, in order to reach benefits through the network effect.

The Coordinator has always highlighted the central role of cross-border sections as regards ERTMS equipment. In order to achieve the highest possible added value, significant cross-border section shall be first identified and implemented in a well organised manner, involving not only the Infrastructure Managers, but also the National

<sup>&</sup>lt;sup>9</sup> The schematic maps contain the timing for later deployment "Beyond 2020", however the final date is 2030.

Safety Authorities, ERA with the support of the Deployment management team. Each CNC contains at least one significant cross-border section, the implementation of which will have an influence on the entire corridor. The European Coordinator proposes that cross-border sections (incl. border crossing points) have to be implemented in the first step, by 2020. In order to do so, the Member States are called to start with the cross-border cooperation as soon as possible.

ERTMS equipment along the Corridors crossing Germany and France are playing a determinative role in Europe due to their geographical locations. The Coordinator has had constructive dialogue with these two countries that will continue in the next years. Both Member States made an ambitious commitment: the German part of the Rhine-Alpine Corridor will be finalised by 2022 and the Longuyon – Basel line by 2018.



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