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Annex to the

**Communication from the Commission to the European Parliament and the Council on
the deployment of the European rail signalling system ERTMS/ETCS.**

{COM(2005)298 final}

Technical Annex 1: financing the critical mass

1. THE "AVERAGE" COSTS OF ETCS ON THE TRACK AND ON BOARD

Trackside costs vary widely according to traffic density, to whether it is a new line or not and to the way in which certain costs, such as deployment of the GSM-R system or interfacing with the existing systems, are attributed to ETCS. The direct costs of deployment of ETCS thus vary considerably from case to case. For one kilometre of double track, figures from less than €40 000 to more than €200 000 are possible. For ETCS, i.e. not counting GSM-R, it would seem that on average €100 000 per kilometre of double track can be taken as an approximate reference figure.

On board, the costs vary above all according to the difficulty of installing the ETCS system and interfacing with the other on-board systems. The costs are about twice as high for trainsets needing ETCS at each end. The figure of €300 000 per ETCS equipment is taken as the guideline by the railway industry.

These first estimates are no substitute for case-by-case studies, particularly the corridor studies provided for by the Memorandum of Understanding mentioned in section 7.1 of this Communication. The results of the latest calls for tender seem to show these costs to be falling appreciably, in particular due to the effects of competition for a product which is becoming technologically mature.

A case in point: the new Rome-Naples high-speed line

For this line, to be opened at the end of 2005 with ETCS as its only signalling system, the total "direct" cost associated with ETCS and therefore excluding GSM-R and fixed telecommunications networks is of the order of €30 000 per kilometre of double track. On board the trains, the costs of each ETCS equipment is around €300 000, or €600 000 per trainset.

2. ESTIMATING THE SIZE OF THE "CRITICAL MASS"

It is of course difficult to pin down at what level equipment with ETCS will trigger a "snowball effect" leading to the generalisation of ETCS. It is nevertheless necessary to make the best estimate possible in the present state of knowledge in order to evaluate the economic implications.

As regards the track network, the figure of 20 000 kilometres of double track will have to be confirmed by the industry. On board, the thinking generally is that about 10 000 ETCS equipments for the existing locomotives and trainsets could be taken as a reference for a ten-year period starting with the new financial perspective (2007).

3. THE COST OF THE CRITICAL MASS

On the basis of the above assumptions, which still have to be confirmed by the industry and refined in the framework of studies to be carried out corridor by

corridor, the costs to be considered for a reference period of 10 years would therefore be of the order of:

- €2 billion for trackside equipment, corresponding to 20 000 kilometres of double track¹ at €100 000 per kilometre. This is the average indicative costs corresponding to the installation of ETCS on existing, updated or new lines;
- €3 billion for on-board equipment, corresponding to 10 000 ETCS equipments intended for existing locomotives and trainsets².

In total, therefore, this rapid migration strategy would, over a 10-year period (2007-2016), have an average annual cost of €500 million. By way of comparison, in the 15 "old" Member States some €13 billion were invested in railway infrastructure on the trans-European networks annually in the period 1996-2001. Investment in ETCS would therefore be less than 4% of the average amount of investment in infrastructure alone in EU-15.

4. FINANCING THE CRITICAL MASS

This project undeniably has a Community dimension justifying a substantial investment of Community funds partially for subsidising the installation of ETCS on new or existing lines and in existing locomotives or trainsets.

4.1. The current possibilities

In the framework of the trans-European networks, studies and other technical support measures can benefit from Community participation amounting to up to 50% of the total cost of the study. For other projects, Community participation must not in principle exceed 10% of the total investment cost, but it may be increased to 20% for stretches of cross-border priority projects under certain conditions, including the fact that they must ensure interoperability of the national networks³.

In addition, the Member States assisted by the Cohesion Fund⁴ have at their disposal substantial Community financial resources which can cover up to 85% of the costs of eligible projects which they wish to finance, which may promote the deployment of ERTMS. Other Community instruments, notably the ERDF and certain funding possibilities open especially to candidate countries and neighbouring EU countries can also contribute to the development of transport infrastructures.

The advantages of interoperability in general and the ERTMS system in particular are taken into account in the evaluation of projects. Compliance with the interoperability standards is gradually becoming a *sine qua non* for the granting of Community funds. This is why some projects which would not have contributed to the development of an interoperable European network have not received funding,

¹ i.e. about 20% of the trans-European network

² i.e. about 20% of existing trainsets and locomotives

³ Regulation 2236/95/EC, as amended by Regulation 807/2004/EC, 21.4.2004

⁴ Greece, Spain and Portugal in addition to the 10 new Member States

since priority was given to other projects more in line with the Community objectives.

The European Investment Bank is also an important instrument for the railway industry and EIB funding can aid in the achievement of the interoperability objectives in general and the deployment of ERTMS in particular.

4.2. The Commission's proposals for the period 2007-2013

For the period 2007-2013 and in the framework of the trans-European transport networks, the Commission has proposed⁵ that, by way of exception, Community participation in projects associated with the deployment of interoperability, safety and security systems may be up to 50% of the total eligible cost of the project.

Incidentally, there could be an overall allocation in the Cohesion Fund of about €60 billion. For the record, in the previous periods about a quarter of this amount was earmarked for railway projects.

These funds might therefore make it possible to support the deployment of the ETCS system over part of the trans-European networks and in particular to the major projects included in the list of priority projects⁶ on which work is due to begin before 2010.

In order to encourage the Member States to submit projects relating to the deployment of ETCS, in particular as regards existing lines and rolling stock, the Commission intends to earmark a major part of the trans-European network funds allocation specifically for this purpose.

There can be no doubt that with this strengthened framework, which could include a principle of diminishing financial support, it will be possible to raise the ambitions of the national deployment plans for the ETCS system while supporting the infrastructure managers and the railway undertakings who are the first to decide on whether to use ETCS.

Favouring joint requests from Member States

The Commission will give particularly close attention to requests coming jointly from several Member States, since submitting a joint dossier, especially one dealing with aspects of signalling and traffic management along the main corridors, itself represents a contribution to interoperability and economies of scale that are likely to reduce costs.

5. FINANCING ARRANGEMENTS

The deployment of ETCS requires equipment to be installed both on the track and the trains. The migration to the new system needs to be based on close consultation

⁵ COM(2004) 475 final

⁶ Annex II to Decision 884/2004/EC of the European Parliament and of the Council

between infrastructure managers and railway undertakings and the optimum solution should in particular:

- guarantee non-discriminatory access to European aid (for small railway undertakings and locomotive leasing companies as well) ;
- ensure the maximum possible cohesion with the European deployment plan and contribute to it as effectively as possible, by providing an incentive for investment decisions while maintaining an optimum balance between funding granted for on-board equipment and track equipment;
- permissible and transparent management.

Technical Annex 2: Integrating satellite navigation into ERTMS

The European satellite navigation infrastructure, comprising Galileo and Egnos, will provide guaranteed positioning, speed measurement and navigation services to an accuracy unparalleled by existing satellite systems. The gains from this in all transport sectors will be measured in terms of increased accuracy, reliability and coverage.

For ETCS, trains will be able to use satellite navigation services permitting a positioning accuracy to the nearest metre for determining their position and speed, functions provided today by central odometer units.

Finally, a third "layer" relating to the traffic management component will be added to the GSM-R transmission system and the ETCS control system which currently make up the ERTMS system. At the moment this third layer is still at the demonstration stage on the Rotterdam – Milan route as part of the Europtirail pilot project.

The possibilities offered by satellite navigation in general, and Galileo in particular, can be exploited not only in ETCS itself, but also in this third traffic management layer.

Not only passenger transport logistics but also freight transport logistics, especially in regard to dangerous or high-value goods, can benefit from Galileo et Egnos. Operators and service providers will have at their disposal, in real time, the data they need for optimising the planning, execution and control of train movements, thereby reducing the cost of services.

With the Egnos system, operational since 2005, a start can be made without delay to develop the necessary equipment, and when in the long term it is integrated with Galileo services it will help to increase overall reliability.

Technical Annex 3

UE-25: Lines for which commercial use of ETCS is planned before the end of 2008.

Information updated in May 2005.



EU-25: Percentage of main lines equipped with GSM-R mid-2005



