

FACT SHEET NO.: 7 / 4

PERFORMED BY: PRO

A GENERAL INFORMATION		
A 1	Category	Research and Innovation
A 2	Subcategory	Framework - Transport safety
A 3	Transport policy measure (TPM)	European Rail Traffic management system ERTMS
A 4	Description of TPM	<p>More than 20 (national) signalling and speed control system in rail operation existed throughout Europe in the past. These technical barriers should be removed by the ERTMS (European Rail Traffic Management System), which aims to increase the competitiveness and dynamism of the rail sector. Further, it aims at promoting the integration of rail freight and passenger market. The ERTMS aims to harmonise the signalling and speed control system throughout the EU rail transport infrastructure.</p> <p>The ERTMS system consists of two core components:</p> <p>1. GSM-R (Global System for Mobiles - Railway): This component is based on standard GSM but using various frequencies specific for rail as well as certain advanced functions. It is a radio system used for exchanging voice and data information between the track and the train.</p> <p>2. ETCS (European Train Control System): The European Train Control System makes it possible not only to transmit permitted speed information to the train driver, but also constantly to monitor the driver's compliance with these instructions. The ETCS consists of two modules, one trackside and the other on board. The trackside module transmits information which enables the on-board computer to calculate, at any given moment, the maximum permitted speed. The on-board computer slows down the train automatically if this speed is exceeded. The ETCS guarantees a common standard that enables trains to cross national borders and enhances safety.</p> <p>There are key prerequisites for a successful implementation of ERTMS, which are: the specifications needed to be widely accepted and applied, the establishment of a central management and the strict compatibility of the system. [EE]</p> <p>There exist three levels of the ETCS system: Level 1 contains the most "simple" information exchange system, which transmits information from radiobeacons along the track to the train driver regarding maximum speed. In Level 2 the information for trains is transmitted by GSM-R, the position is still detected by track. The lineside signals are no longer necessary, which allows a reduction of investments and maintenance costs. At level 3 the trains are able to submit their position and speed themselves which allows an optimisation of capacity and further reduction of track equipment.</p>
A 5	Implementation examples	<ul style="list-style-type: none"> - Rotterdam - Genova rail freight corridor [4] - Germany: Berlin - Jüterbog - Halle/Leipzig [9] - UK: Cambrian Coast Line, a single track line of 215km, between Shrewsbury (Sutton Bridge Junction), Aberystwyth and Pwllheli in Wales. [10]
A 6	Objectives of TPM	<ul style="list-style-type: none"> - Increase rail safety by an effective signalling system with automatic train speed control - Ensure the technical interoperability of rail system throughout Europe - Increase competitiveness and dynamism of the rail sector - Stimulate the European rail equipment market - Optimisation of distance between running trains and capacity increase - RAMS: Reliability, Availability, Maintainability, Safety
A 7	Key changes concerning:	
A 7.1	- Choice of transport mode / Multimodality:	ERTMS will facilitate an increase in the market share of European rail transport. This in turn is expected to create a more competitive market of suppliers, and to reduce the costs of railways in the long term. [3] More international (rail) freight services.
A 7.2	- Origin and/or destination of trip:	No major change expected
A 7.3	- Trip frequency:	The capacity of rail infrastructure will increase due to less distances between trains. Capacity gains in terms of infrastructure usage. [1]
A 7.4	- Choice of route:	No major change expected
A 7.5	- Timing (day, hour):	No major change expected
A 7.6	- Occupancy rate / Loading factor:	Capacity gain in terms of infrastructure use [1]
A 7.7	- Energy efficiency / Energy usage:	Circulation of freight trains will be smoother: less variations in speed and indirectly affected by modal shift.
A 8	Main source	[4] Obrenovic et al. (2006); European Transport Conference: Proceedings of the ETC; Migration of the European Train control system (ETCS) and the impacts on the international transport markets

B IMPACTS																																																																				
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B 1.1	Summary	<ul style="list-style-type: none"> - Main impacts will positively affect the the rail sector and the overall society. - Significant improvements of rail safety (operators, passengers, employees, society). - ERTMS /ETCS will be able to reduce transport time and increase punctuality on international relations significantly. 																																																																		
B 1.2	Summary: Income groups																																																																			
B 1.3	Summary: Age groups																																																																			
B 1.4	Summary: Disabled people																																																																			
B 1.5	Summary: Gender groups																																																																			
B 1.6	Summary: Ethnic groups																																																																			

B 2 TRAFFIC IMPACTS																		
B 2.1	Travel or transport time																	
B 2.2	Risk of congestion																	
B 2.3	Vehicle mileage																	
B 2.4	Service and comfort																	
B 2.I	Overall impacts on social groups																	
B 2.II	Implementation phase																	
B 2.III	Operation phase																	
B 2.IV	Summary / comments concerning the main impacts	<ul style="list-style-type: none"> - Service and comfort improvements because of less delays and higher track capacity (also on local regional level). - Less risks of delay because of standardised technical systems (also on local / regional level). - Modal shift towards railway (primarily freight) due to a harmonised railway control system which increases the vehicle mileage. [4] - ETCS/ERTMS will not be able to improve the performance significantly, combined with other measures the operational structure can be optimised. [4] - ERTMS /ETCS will be able to reduce transport time and increase punctuality on international relations significantly. [4] - Travel time benefits for cargo operators & clients, in some specific cases also for travellers [8] 																
B 2.V	Quantification of impacts	<ul style="list-style-type: none"> - ECTS gains capacity of 20% compared to the existing less efficient system. [1] - Increase of rail market share (example Rotterdam - Genova) from 22% to 28%, travel time from 22h to 18h, punctuality from 70% to 85%. [4] 																

C REFERENCES	
C 1	Other TPMs of this subcategory
C 2	<p>References</p> <p>International</p> <p>[1] European Commission: 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</p> <p>[2] European Commission: The ERTMS in 10 questions. MEMO/05/235, Brussels</p> <p>[3] European Commission (2006): <i>ERTMS – Delivering flexible and reliable rail traffic. - A major industrial project for Europe</i>. Brussels 2006</p> <p>[4] Obrenovic et al. (2006); European Transport Conference: Proceedings of the ETC; Migration of the European Train control system (ETCS) and the impacts on the international transport markets</p> <p>[5] de Tilière; Interoperability in Europe: Case of the ERTMS development in the new European rail market; Association for European Transport 2004</p> <p>[6] International Union of railways - UIC (2003): Implementing the European Train Control System ETCS: Opportunities for European Rail Corridors; December, Paris</p> <p>[7] Institution of railway signal engineers (IRSE) (2003): Proceedings 2002/2003</p> <p>National</p> <p>[8] Ministry of transport, public works and water management of the Netherlands (2010): Social Cost Benefit Analysis of implementation strategies for ERTMS in the Netherlands</p> <p>[9] European Commission (2009). Nationaler Umsetzungsplan für die TSI Zugsteuerung, Zugsicherung und Signalgebung des konventionellen transeuropäischen Eisenbahnsystems im Rahmen der Richtlinie 2001/16/EG in der Bundesrepublik Deutschland". http://ec.europa.eu/transport/modes/rail/interoperability/ertms/doc/edp/national_deployment_plans/germany_nda.pdf</p> <p>[10] Department for Transport (2007). ERTMS National Implementation Plan. http://ec.europa.eu/transport/modes/rail/interoperability/ertms/doc/edp/national_deployment_plans/united_kingdom_nda.pdf</p>