

# Signal

the European Rail Traffic Management System

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Also included in this issue:

- The journey to interoperability p2-3
- New perspectives on the newly extended Corridor E p4
- Upcoming events p4



## ERTMS and rail infrastructure: new funding opportunities

31 March 2009 saw the announcement of new EU funding opportunities for ERTMS and rail infrastructure under three calls for proposals within the framework of the trans-European transport network (TEN-T) multi-annual programme (2007-13).

Up to €240 million of Community funding is specifically being made available for ERTMS projects for 2009-13 under the *ERTMS call*. With a co-financing rate of 50%, this is the second ERTMS call for proposals launched at European level since 2007. Funding of almost €260 million was awarded under the first call.

The *EERP (European Economic Recovery Plan)* call, which has an available budget of up to €500 million for all modes of transport, will only target TEN-T infrastructure projects with works beginning in 2009 or 2010 at the latest. ERTMS-related activities are one type of eligible activity under this call.

Finally, rail infrastructure projects (including activities such as the upgrade of interlockings) are eligible to apply for funding under both the EERP call and under the *annual call* which has an indicative budget of €80 million for all modes of transport.

### Priorities under the ERTMS call

Under the ERTMS call, actions focusing on speeding up the coordinated deployment of ETCS (European Train Control System) onboard and ERTMS trackside will be given precedence. Furthermore, priority will be granted to actions that deploy ERTMS on freight routes and/or along lines referred to in national ERTMS deployment plans notified to the European Commission. Proposals submitted jointly or in a coordinated manner by Member States or organisations involving infrastructure managers or operators will also be favoured.

Interoperability continues to be high on the European rail agenda, with this issue of *Signal* focusing on the link between the European Train Control System and train braking. In addition, we explore three recently announced funding opportunities within the TEN-T multi-annual programme for 2007-13 and take a look at the newly extended Corridor E.

*The Signal team*



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Three activity types will be funded under the ERTMS call:

- **Fitting or retrofitting of ETCS onboard equipment:** for onboard equipment, the early retrofit of large series of locomotives and locomotives running on freight corridors will be given precedence.
- **Installing ERTMS trackside equipment:** for trackside equipment, Community support will be limited to ERTMS-related activities. As costs related to interlockings are not viewed as belonging to the ERTMS category, they will not be funded under the call.
- **Activities linked with implementing the MoU (Memorandum of Understanding):** eligible activities include the upgrade of lines, locomotives or train sets already equipped with ETCS in order to ensure compatibility with version 2.3.0.d, improving testing procedures and strengthening corridor coordination.

Onboard and trackside project proposals must submit an interoperability statement outlining activities related to testing and verification of conformity with the TSI (Technical Specifications for Interoperability). Other data and technical information to be submitted with each proposal is detailed under each activity of the call.

### Where to find out more

The TEN-T Executive Agency will be hosting an Info Day for prospective applicants on 22 April 2009 at the Albert Borschette Conference Centre in Brussels. Further information about the ERTMS, EERP and annual calls, including application forms, a guide for applicants and registration forms for the Info Day can be found on the website of the TEN-T Executive Agency:

<http://ec.europa.eu/tentea>

## The journey to interoperability: ETCS and train braking

Under the guidance of ERA (European Railway Agency) work has been under way since December 2008 to reach an interoperable European solution for the interrelation between ETCS and train braking. This article looks at how ETCS interacts with the train braking function, what braking curves are, and highlights what developments can be expected in this area in the near future.

ETCS does not in itself brake the train – rather it is the train’s own braking system that does the job. The role of ETCS is to supervise the train’s position and speed to ensure that they remain within the allowed limits, and – if necessary – to initiate a brake intervention to avoid any risk of the train exceeding those limits.

Braking a train is a more demanding challenge than braking a road vehicle: the low wheel-rail grip means rail transport is more energy-efficient

but this also implies longer braking distances. Indeed, a high-speed passenger train requires several kilometres in order to come to a complete standstill.

### The braking curve algorithm explained

The ETCS computer takes into account a number of parameters – such as the current train speed, its acceleration, the downhill/uphill slopes ahead – and using that information, it calculates in real time, many times per second, the distance needed to stop the train, or to decelerate it so as to respect a speed limitation. This computation is typically defined as the ‘braking curve algorithm’, evoking a mental image of the ETCS plotting the decelerating speed of the train on a graph.

The braking curve algorithm is used first and foremost to indicate to the train driver the actions he or she should undertake to adapt the train’s speed



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in view of approaching targets and speed limits. As such, it is only as a last resort that the system will bypass the human in charge and command the application of the brakes.

ETCS uses a model and related parameters to take account of the effects of the braking system and its performance. For train sets, the input parameters for the model (describing the deceleration performance of that specific train set) can be 'pre-programmed' in the onboard ETCS module and then selected from a 'menu' by the driver before starting the journey. Where the train is composed of a locomotive and several wagons, a number of parameters – the train's length for example – need to be entered by the driver.

Therefore, not only is ETCS fully suitable for installation in infrastructure designed and already operating in accordance with current practice, but it also enables benefits to be derived from high-performance rolling stock, new lines or lines with upgraded or renewed signalling.

### Correction factors

In practice, the real dynamics of the train when the brakes are applied differs from that predicted by the algorithm. As a result, the algorithm includes correction factors to account for these effects. Two (sets of) correction factors are defined – one allowing for corrections inherent to the rolling stock and the other one for those inherent to the infrastructure.

The rolling stock factors take into account possible failures of the brake system's components, their variations in efficiency, etc. The train operator is responsible for the values of these factors, which are saved in the onboard ETCS computer.

The infrastructure factors consider the line's design (e.g. overlaps), the severity or frequency of the risk (intersections, traffic density), etc. The values for such factors are transmitted by the ETCS trackside equipment to the onboard computer. Each infrastructure manager is free to define the values to be used when operating on their lines.

This separation of the onboard/trackside 'margins' conforms with the distinct responsibilities allocated to infrastructure managers and railway undertakings in the Safety Directive.

The braking curve algorithm, together with the conversion model, is defined in the **SRS (System Requirement Specifications) for baseline 3** published by the ERA in December 2008.

In December 2008, the ERA created a multidisciplinary working group comprising sector experts. This group's aim is to complete the remaining work to harmonise the procedures and methods for defining the input values for the ETCS – in particular how to define the 'right' correction factors. June 2009 should see the results of this important work.

Since the methods are to be used offline to generate values that the ETCS computer receives as an input, these activities have no impact on the algorithm itself or on the SRS. Harmonisation of the operational procedures and methods for ETCS will represent a further step towards ensuring and achieving interoperability in Europe.



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## New perspectives on the newly extended Corridor E

Corridor E has recently been lengthened. Transport Ministers for Germany, the Czech Republic, Austria, Slovakia and Hungary signed the original Lol (letter of intent) in May 2007. Then in October 2008, the co-signature from Mr Ludovic Orban, the Romanian Minister of Transport, saw the Corridor almost double in length to some 5 400 km of track.

Corridor E lies at the core of a traditional axis linking North Sea ports with Black Sea harbours which were among the first tracks in central Europe; Dresden–Budapest, for example, was completed in 1851. Connecting the city of Dresden with the Czech Republic, Corridor E continues on to Vienna, Bratislava, Budapest and crosses Romania, ending in the port of Constanta.

Member States along Corridor E have confirmed its importance by submitting national ERTMS deployment plans committing to equip major parts with the ERTMS by 2015. This should also cover the principal Romanian link from the Hungarian border (Lökösháza–Curtici) via Brasov and Bucharest to Constanta.

Corridor E is coordinated by a Steering Committee, composed of transport ministries, and a Management Committee, involving both infrastructure managers and major rail freight operators from the countries concerned. This approach allows partners to benefit from a comprehensive Corridor E cost-benefit analysis when planning investments to upgrade poorly maintained tracks and replace obsolete signalling with financial support from EU structural funds.



### ERTMS diary

- 20 April 2009: Brussels  
ERTMS Corridor Group
- 22 April 2009: Brussels  
TEN-T EA Info Day for prospective applicants  
under the TEN-T calls for proposals
- 15 May 2009: Brussels  
Deadline for submissions under the TEN-T  
calls for proposals
- 18 May 2009: Brussels  
ERTMS MoU Steering Committee
- 11-12 June 2009: Brussels  
Committee on the Interoperability and  
Safety of the European Railway System

*Please send us your dates!*

For further information on ERTMS, see: [http://ec.europa.eu/transport/rail/interoperability/ertms/ertms\\_en.htm](http://ec.europa.eu/transport/rail/interoperability/ertms/ertms_en.htm)

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