



Project Profile

NERA's Economic Review of the European Rail Traffic Management System Programme

ERTMS is a complex, modern train control system comprising the following:

1. The European Train Control System (ETCS), a new system comprising complex computer equipment on trains and trackside. It is available at several levels, and the higher the level the better the effect on performance. It is supplied by six signalling companies, represented in Europe as UNISIG, and the UK as RIASIG.
2. Global System for Mobile communications – Railways (GSM-R), comprising fixed and mobile telecommunications, provides 'voice' radio. Higher levels of ERTMS require GSM-R to provide data transmission from the track to the train.
3. Rules and Procedures for Operations, starting with Harmonisation of European rail Rules for Operation of ERTMS (HEROE). Core rules for ERTMS are currently being prepared, but require significant national rule changes - particularly in the UK, where historically, "route" signalling has been used, as opposed to the continental practice of "speed" signalling.
4. Interfaces to traffic management, trains and signalling, which must be integrated with ETCS and GSM-R. The European Traffic Management Layer (ETML) is not yet fully specified or developed. The UK signalling principles will require rewriting for ERTMS at the higher levels of performance.

NERA was commissioned by the Health and Safety Executive to review the economic aspects of the work of the European Rail Traffic Management System Programme Team (EPT), in particular their "Final Report" of April 2002.

The EPT Reports

The Joint Inquiry into Train Protection Systems, organized following the Southall and Ladbroke Grove accidents, reported in March 2001. It recommended that the European Train Control System (ETCS) should be installed on the Great Britain main line network. Among its specific recommendations, it stipulated that all lines that carry trains above 100 mph should be fitted with ETCS no later than 2008. As explained in the box below, ETCS is a component of the European Rail Traffic Management System (ERTMS).

Railway Safety and the Strategic Rail Authority subsequently organized and now co-chair a European Rail Transport Management System Programme Board (EPB), with wider industry representation, and with the Health and Safety Executive, the Office of the Rail Regulator and Department for Transport as observers. The EPB appointed the cross industry EPT to produce an industry plan for ERTMS implementation, to be submitted to the Health and Safety Commission. The EPT work "has been done on the basis that ERTMS will be implemented in accordance with EC Directives".¹

¹ EPTFR, p. 5.

The EPT Final Report (EPTFR) was published in April 2002. Although the EPT produced two earlier reports, this report, and a summary version of it, is the only published work of the EPT.² In their Interim Report of January 2002, the EPT considered five options for ERTMS implementation, including an option favoured by the Joint Inquiry and an option favoured by the industry. The Joint Inquiry's favoured option defined timescales, sequence and priority of trackside fitment. The option favoured by the rail industry proposed that trains be fitted with ERTMS to a programme with the same scope, sequence and priority as the option proposed by the Joint Inquiry report, but with the timescales varied according to resource criteria and other constraints and the trackside fitted with ERTMS when the signalling is replaced or renewed.

Following the Interim Report, the EPB asked the EPT to focus on the option proposed by the Joint Inquiry report, and a refined version of the option favoured by the industry. The EPTFR compares each of these two options against a common baseline, where no ERTMS is implemented. They were modelled and appraised over a 40 year time period.

What did the EPT find?

The EPTFR explains that there are three main reasons for implementing ERTMS: capacity and performance, interoperability across Europe and safety.

The EPTFR concludes that, relative to the Train Protection and Warning System (TPWS) baseline (the current, programmed Automatic Train Protection [ATP] implementation in Britain) and at present traffic levels, fitting ERTMS according to the Joint Inquiry's proposed plan is likely to initially save an average of 1 equivalent life per year, rising to 2.8 equivalent lives per year by 2042. However, the Joint Inquiry's option also reduces rail capacity, one effect of which is to shift traffic from rail to road that will in turn cause an increase in overall transport fatalities.

The EPTFR concluded that ERTMS should be implemented over a significantly longer timescale than recommended by the Joint Inquiry, because the industry's preferred strategy would be:

- Much cheaper (£3.6 billion as opposed to £6 billion); and
- Better for overall transport safety, given the increase in total transport fatalities from the additional road traffic, and because of a greater amount of track work.

NERA's Conclusions and Recommendations

NERA's review firmly supports the EPT conclusion that endorsing the Joint Inquiry recommendations on time would be premature, and not now justifiable against the government's policy appraisal criteria - even having regard to the special, "media amplifying" characteristics of ATP-preventable accidents. Furthermore, the NERA team concluded that it is likely to be a year, or longer, before sufficient information is available to support firm policy decisions about ERTMS installation timescales for the British railway network as a whole.

While the NERA team concurred with the main conclusion of the EPTFR, they did not endorse the economic analysis of the EPTFR. NERA's experts found that it not only contained a number of weaknesses, it seriously over or understated important quantitative arguments. In addition, more important reasons for reconsidering ERTMS implementation are those of operational feasibility, the risk of an ERTMS induced accident, other business risk and the need for integration of ERTMS implementation with wider railway development strategies.

NERA's economists also found an imbalance in the EPTFR between a strong emphasis on detailed analysis and modelling, and a much weaker emphasis on higher strategic analysis. Lack of higher-level analysis limits the value of the works as a source of policy advice. However, subsequent work of the EPT has begun to address the higher-level strategic issues, and the NERA team encourages the SRA and the government to promote this trend.

² The report and the summary may be found in the Publications page of the website of the Strategic Rail Authority.

The EPTFR compared the industry's own preferred option with one other option, which the industry concluded was infeasible. However, it does not follow that simply because one method is demonstrated to be better than another method that is in fact the best. The EPTFR lacked analysis of alternative options, or a satisfactory basis for identifying the key differences between options and comparing alternative, more feasible options. There were also institutional and disciplinary restrictions on the EPT's review, NERA's review team found the EPTFR to be incomplete and not appropriate as a basis for policy action.

NERA's experts recommend that future work should include analysis focused at the somewhat higher level needed to provide a basis for sound policy advice about ERTMS strategy. In addition, stronger measures should be taken to integrate the work of the EPT and of Railtrack's West Coast Route Modernisation with other railway developments, and with disciplines beyond signalling engineering. This includes the development, either in SRA or elsewhere, of a wider range of policy options; it also includes consideration of structural change, such as absorption by the SRA of the EPT. ERTMS implementation should be but one part of a much larger framework for change in the railway industry in Britain.

NERA's Review

NERA's economists approached this study as a constructive review and not as an "audit". An audit would be unrealistic, as the EPTFR and the EPT's subsequent work is very extensive, and it would also be too narrow. Rather, the NERA team inquired not only into what has been done, but also into broader issues of policy analysis, such as the rationale underlying the assumptions and the choice of options. Their objectives in conducting this Economic Review were to support the EPT's recommendations to the extent that the evidence supports them, while identifying any possible improvements and suggestions for remedies where they might be needed.

About NERA

NERA Economic Consulting (www.nera.com) is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges. For over half a century, NERA's economists have been creating strategies, studies, reports, expert testimony, and policy recommendations for government authorities and the world's leading law firms and corporations. We bring academic rigor, objectivity, and real world industry experience to bear on issues arising from competition, regulation, public policy, strategy, finance, and litigation.

NERA's clients value our ability to apply and communicate state-of-the-art approaches clearly and convincingly, our commitment to deliver unbiased findings, and our reputation for quality and independence. Our clients rely on the integrity and skills of our unparalleled team of economists and other experts backed by the resources and reliability of one of the world's largest economic consultancies. With its main office in New York City, NERA serves clients from more than 20 offices across North America, Europe, and Asia Pacific.

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