

Ex-post evaluation of technical
follow-up of TEN-T funded ERTMS
projects carried out under Service
Framework Contract TREN/E2/322-
2008 (Lots 1, 2 and 3)

Final Report

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Executive Summary

Context

1. There are currently more than 20 stand-alone train control (signalling) systems across the European Union that are not interoperable and this represents a significant barrier to trans-European interoperability. The European Rail Traffic Management System (ERTMS) is a major rail industry programme being implemented throughout Europe, which will serve to make rail transport safer, more competitive and support increases to rail network capacity. One component of ERTMS, the European Train Control System (ETCS), guarantees a common standard that enables trains to cross national borders and enhances safety.
2. Following an intense ten year phase of research and development, validation of the ETCS standard was carried out between 2000 and 2007 using test/pilot projects. Since 2005, feedback from these projects prompted the need to refine the specifications in order to apply them to ensure interoperability between all projects in Europe. The specification, as modified by a Commission Decision on 23 April 2008, will ensure that trains equipped with ETCS can operate over rail lines similarly equipped with ETCS and thereby facilitate efficient cross-border rail transport between Member States. On 22 July 2009 the Commission adopted a European Deployment Plan for ERTMS which provides for the progressive deployment of ERTMS on Europe's main freight corridors. This aims to reduce running costs and improve the system efficiency of cross-border rail transport over long distances.
3. The Trans-European Transport Network (TEN-T) programme was established in the mid-1980's to provide the transport infrastructure needed to facilitate a smooth functioning of the internal market, to ensure economic, social and territorial cohesion and to improve accessibility across the European Union (EU) territory. The ultimate policy objective of the TEN-T programme is the establishment of a single, multimodal network covering both traditional ground-based structures and equipment (including intelligent transport systems) to enable safe and efficient traffic flows, by integrating the land, sea and air transport infrastructure components.
4. ERTMS is a key part of TEN-T Policy. Under the 2007-2013 TEN-T Programme, three dedicated ERTMS calls for proposals have been launched (excluding the fourth call launched on 28 November 2012), providing overall financial support of around €520 million for almost 50 projects, and € 9.3 million in the past financial perspective (up to 2006). These grants have focused on the equipment of rail infrastructure and trains, as well as activities covered by the industry Memorandum of Understanding (MoU), such as ERTMS testing and the definition of the technical specifications.
5. There are significant benefits of implementing ERTMS in terms of investment in rolling stock, an interoperable control and signalling system reduce (virtually eliminate) the need to have multiple systems on board trains to service routes

which cross borders. However, there are some issues regarding interoperability and ERTMS. Initially, the functional specification of ERTMS left some margin for interpretation by the engineers of the companies supplying it. For a long time, there was no real standard for ERTMS: with different countries implementing the system slightly differently, eventually causing it to be non-interoperable. There were also system upgrades released, with the consequence that rolling stock equipped with an older version cannot use tracks with a newer version of ERTMS.

Objectives and methodology

6. In 2007, the European Commission entered into a 4-year service framework contract TREN/E2/322-2008 (comprising several lots) with a maximum budget of €550,000 per year (or a maximum total of €2.2 million) to strengthen its capacity to monitor EU funded projects for the deployment of the ERTMS programme. In addition to EU financing for large-scale TEN-T rail infrastructure projects which incorporate ERTMS within the project, €520 million of targeted EU financing was also allocated for trackside and on-board deployment within the framework of the TEN-T 2007-2013 multi-annual work programme under two separate calls for proposals launched in 2007 and 2009.
7. At the time of the launch of the call for tender for technical assistance, neither the TEN-T EA nor ERA were in a position to ensure the IOP monitoring as required in the Terms of Reference for the contract in subject. And while it is within ERA's mandate to assess the interoperability of projects, ERA was clearly not in a position to do so in 2007-2008 when the tender was launched as it was heavily involved in stabilisation and development of the standard at that time.
8. The framework contracts for the technical follow-up and monitoring of ERTMS projects will come to an end in December 2012. The Commission is seeking to determine whether technical follow-up and monitoring of such projects (and possible future projects) should be continued from 2013 and if so, the best means of doing so.
9. The objectives of this evaluation were described by the Terms of Reference as to:
10. Assess the effectiveness of the framework contracts (2008-2012) in delivering the technical expertise which enabled the mitigation and minimisation of interoperability threats to EU-funded ERTMS projects;
11. Assess the most appropriate way to ensure that these projects (and future ERTMS projects - possibly also including projects which receive Structural Funds) are fully interoperable taking into account resource constraints faced by the Commission.
12. The methodology developed has been based on the evaluation criteria defined in the EU evaluation guidelines: relevance, effectiveness, efficiency, utility and sustainability. Added value of the Community intervention was also added to the five evaluation criteria of the Guidelines.
13. Relevance is the extent to which an intervention's objectives are pertinent to the needs, problems and issues to be addressed.
14. Effectiveness is the extent to which the set objectives are achieved. This also includes the functioning of management structures and the way they support the organisation in delivering results.

15. Efficiency is the extent to which desired effects are achieved at a reasonable cost. This also includes the management structures and the way they support a cost-effective implementation.
16. Utility is the extent to which effects achieved correspond with the needs, problems and issues to be addressed.
17. Sustainability is the extent to which positive effects are likely to last after an intervention has terminated.
18. The evaluation framework that has been used has been based around the evaluation criteria defined above, and has been used to direct the process of data collection and analysis. It consisted of a limited desk-research analysis and a large stakeholder consultation. The stakeholder contacted included EU Institutions such as DG MOVE, ERA, TEN-T Executive Agency, the external experts who undertook the technical follow-up on behalf of DG MOVE, the Member States, National Safety Authorities, Railway Undertakings, Infrastructure Managers and trade organisations. Despite repeated attempts, no Notified Body took part in the consultation. Questionnaires were circulated and where necessary face-to-face meetings or telephone meetings were organised.

Findings

Relevance

19. There is clear evidence that EU funded projects have not always delivered interoperable networks in spite of the procedures in place. Hence, there was a need for further measures to ensure that project funding was effectively spent in delivering the project goals.
20. Lack of interoperability derives from technological and operational developments and practices that have been taking place independently at a national level within Europe for many years. The fact that harmonization of operations was not stable until a long time after the introduction of the CCS TSI meant that interoperability had a different interpretation for each country. There is no doubt that in this context a European follow-up has been a successful intervention in that it looked at ensuring full interoperability.
21. Therefore we have concluded that the technical follow-up was highly relevant to the goal of reducing or removing interoperability risks in Europe.

Effectiveness

22. Our analysis of the reports of experts shows that they were able to raise awareness of the importance of interoperability and detect in a number of cases interoperability risks. They were also able to identify solutions to mitigate interoperable risks and maintain regular contacts with stakeholders. In some cases, the intervention of experts led to solutions that would not otherwise have been implemented in order to mitigate risks.
23. Whether or not technical solutions were fully consistent with TSI CCS provisions was also strongly correlated with the stage of development of the project and the extent of collaboration of the project stakeholders. In the case of projects that had been largely implemented or were nearing completion, consultants engaged in

the technical follow-up and monitoring had little scope to propose actions to ensure the project was fully consistent with the TSI CCS.

24. Experts have been able to identify solutions to mitigate interoperable risks on projects where there was still scope for change and stakeholder willingness to address them, but it was left to the beneficiaries to decide whether or not to implement the proposed solutions. Therefore, the technical follow-up has helped to reduce interoperable risks, but it has not achieved in full its effectiveness objective of ensuring technical solutions that deliver projects fully consistent with TSI CCS provisions.

Efficiency

25. The level of administrative requirements was excessive for DG MOVE and in most cases for the external experts, however both parties were able to establish good working practices that did not stop them from the overall objective of the intervention. In the case of other stakeholders, the burden was limited but some stakeholders still resented having to participate in the technical follow-up. Adequate financial management was applied by DG MOVE and the size of the budget appears proportional to the objectives.
26. We conclude that the follow-up results were obtained at reasonable costs and that the objective of financial efficiency was achieved whereas administrative efficiency was undermined by burdens.

Sustainability

27. Where the intervention was successful (early detection and willingness to address by stakeholders), then the effects will last in the near or longer term. Since the technical follow-up is not able in its present form to compel stakeholders to implement interoperable solutions, and that technical solutions depend on the legislative requirements, the objective of the long-term effect of the follow-up was only partially achieved.
28. In the early stages of the follow-up, there was only a limited amount of information disseminated to stakeholders, but this was enhanced later on, which we believe was a positive. No external communication was generated which means that apart from the few stakeholders directly involved with the follow-up, no other parties were aware of the benefits of the follow-up. We believe that the outcomes of the intervention in this case were only partially exploited.

Added-value

29. It is encouraging to see some stakeholders believed that there was no need for the Commission to ensure technical follow-up. Unfortunately there is plenty of evidence that only a minority of project beneficiaries were able to deliver truly interoperable solutions, so for all the other projects we believe the same results could not have been achieved without Commission-funding.

Conclusions and Recommendations

30. We believe there is still a serious and necessary on-going need for the level of support that has been provided by the technical follow-up of TEN-T funded ERTMS projects. This is because the risk of funding "non-interoperable projects" is still

high and potentially damaging for EU institutions, because ERTMS implementation is still in a critical phase, in particular on ERTMS corridors, and because there are still some concerns with Notified Body certificates. Also, the cost of the follow-up compared to the amount of funding provided to ERTMS projects is very small.

31. As regard to the TEN-T network, EU funding is fragmented between the TEN-T Programme, the Cohesion and the Regional development fund. The White Paper recognises that “better coordination of the Cohesion and Structural funds with the transport policy objectives is needed”. There does not appear to be a clear rationale justifying why the technical follow-up to TEN-T funded projects cannot apply to Regional development and Cohesion Funds-funded projects.
32. We expect the need for the follow-up to be gradually phasing out alongside support for ERTMS projects from the Commission. Since ERTMS projects are still going to be implemented up to 2022, we would expect the phase out to take place after the end of the 2014-2020 Funding Period rather than before.
33. We also recommend that the follow-up should be continuous rather than periodic, taking place as early as possible in the life of projects without ruling out more mature projects. All projects should be monitored, but the follow-up should be targeted. It should remain at project level since it appears that undertaking the follow-up at Notified Body level is not yet possible.
34. Based on our analysis, we believe the best entity to be in charge of the technical follow-up should be the European Railway Agency. This option brings most benefits in terms of effectiveness and efficiency compared to other options involving EU institutions. ERA is also the System Authority for ERTMS and would benefit from detailed knowledge of the situation on projects. ERA also benefits from ERTMS skills in-house and appears to be a cost effective option compared to others. This is also the option that was most often quoted by the stakeholders who took part and coincide with DG MOVE agenda for externalisation from 2014.
35. Selecting this option has a “domino” effect on ERA’s ability to resource other tasks. Because of significant resource constraints in the short-term, we came to the conclusion that “ERA in charge” may not be a practical solution in the short-term. Therefore, in our view, the best alternative option, at least in the short-term, would consist of ERA being in charge supported by external consultants. This option would cause less disruption for ERA and scored highly in relevance, effectiveness and sustainability.
36. We recommend that the roles required during the technical follow-up should be clarified, and in particular whether or not there is a need to follow the outputs of the stakeholder consultation, showing that information dissemination and additional support to stakeholders are valued. We also recommend improving the buy-in from stakeholders.
37. We also recommend that skills such as legal, stakeholder consultation and adequate language and cultural knowledge are part of the skill requirements of the entity in charge, alongside proven and detailed knowledge of ERTMS technical issues. The adequate level of resources for the technical follow-up has been estimated to be approximately 530 annual man-days in the case where external experts are appointed and approximately 450 man-days in the case where the

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follow-up can be undertaken without external experts. We also recommend retaining the current geographic groupings of projects.

GLOSSARY

Term/Abbreviation	Description
CCS TSI	Technical Specification for Interoperability, Control-Command and Signalling Subsystem
CR	Change Request
ERA	European Railway Agency
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
IM	Infrastructure Manager
IOP	Interoperability
MoU	Memorandum of Understanding
NoBo	Notified Body
NSA	National Safety Authority
RU	Railway Undertaking
SRS	System Requirements Specification
SAP	Strategic Action Plan
TEN-T EA	Trans European Network Executive Agency

1 Introduction

Background

The Trans-European Transport Network

- 1.1 The Trans-European Transport Network (TEN-T) programme was established in the mid-1980's to provide the transport infrastructure needed to facilitate a smooth functioning of the internal market, to ensure economic, social and territorial cohesion and to improve accessibility across the European Union (EU) territory. The network plays an essential role in helping to build missing links or removing transport bottlenecks by creating a single, multimodal network that efficiently integrates land, sea and air transport networks throughout the EU.
- 1.2 The ultimate policy objective of the TEN-T programme is the establishment of a single, multimodal network covering both traditional ground-based structures and equipment (including intelligent transport systems) to enable safe and efficient traffic flows, by integrating the land, sea and air transport infrastructure components.
- 1.3 The TEN-T Programme requires commitment by the project promoters for EU financial aid and by the Member State(s) concerned to make a financial contribution to the project submitted, mobilising private funds if necessary. The TEN-T funding covers only a small part of the total funding requirement of the project cost. Funding is generally given in the form of a grant for studies or works, or loans and availability payment schemes.
- 1.4 The TEN-T funding is currently allocated through competitive calls for proposals either each year for the annual work programme and EERP or once per financial perspective (currently 2007-2013) for the multi-annual work programme. Proposals are selected according to a number of criteria such as project maturity, socio-economic and environmental effects, soundness of the financial package, etc.
- 1.5 The European Commission's Directorate-General for Mobility and Transport (DG MOVE) defines the policy, while the Trans-European Transport Network Executive Agency (TEN-T EA) implements and oversees the programme. The agency was established in October 2006 to manage the TEN-T programme on behalf of the European Commission until 31 December 2008, and later on extended to 2015.

ERTMS technology

- 1.6 There are currently more than 20 stand-alone train control (signalling) systems across the European Union that are not interoperable and this represents a significant barrier to trans-European interoperability. The European Rail Traffic Management System (ERTMS) is a major rail industry programme being implemented throughout Europe, which will serve to make rail transport safer, more competitive and support increases to rail network capacity. One component of ERTMS, the European Train Control System (ETCS), guarantees a common standard that enables trains to cross national borders and enhances safety.

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- 1.7 Common technical standards have been formalised at EU level through Technical Specifications for Interoperability (TSI), which include, *inter alia*, standards regarding ERTMS. The task of developing TSIs has been delegated by the Commission to the European Railway Agency.
- 1.8 ERTMS has two basic components:
- The European Train Control System (ETCS), an automatic train protection system to replace the existing national systems; and
 - GSM-R, a radio system for providing voice and data communication between the track and the train.
- 1.9 ETCS has 3 levels:
- Level 1 - this retains the existing fixed signalling system and fixed signals but complements this with radio beacons to transmit braking curves to trains to ensure safety;
 - Level 2 - this retains centralised signalling interlocking based upon block sections but no longer requires trackside signals or track circuits as movement authorities are transmitted to trains, which also report on their own positions; and
 - Level 3 - no longer requires block sections but operates on ‘moving block’ principles to keep a safe distance between trains.
- 1.10 Levels 2 and 3 hold the prospect of significant cost savings through not needing to install and maintain trackside equipment. However, this can only be achieved if every train operating over the network concerned is equipped with the necessary systems and infrastructure.
- ERTMS and TEN-T***
- 1.11 ERTMS is a key part of TEN-T Policy. Under the 2007-2013 TEN-T Programme, three dedicated ERTMS calls for proposals have been launched (excluding the fourth call launched on 28 November 2012), providing overall financial support of around €520 million for almost 50 projects, and € 9.3 million in the past financial perspective (up to 2006). These grants have focused on the equipment of rail infrastructure and trains, as well as activities covered by the industry Memorandum of Understanding (MoU), such as ERTMS testing and the definition of the technical specifications.
- 1.12 For ERTMS projects, the maximum amount of European Union aid which can be awarded to an individual action can be up to 50% for trackside (studies and works) or on board equipment proposals¹. However, some maximum limits have been introduced in the call text, whereby eligible costs for the equipment of a line will be limited to €150.000 per km of double-track and eligible costs will be limited to €150.000 per locomotive for the equipment of existing locomotives (retrofit) and to €100.000 for the equipment of new locomotives.
- 1.13 Following an intense ten year phase of research and development, validation of the ETCS standard was carried out between 2000 and 2007 using test/pilot

¹ Article 6.2 of the TEN Regulation (EC) No 680/2007

projects. Since 2005, feedback from these projects prompted the need to refine the specifications in order to apply them to ensure interoperability between all projects in Europe. The specification, as modified by a Commission Decision on 23 April 2008, will ensure that trains equipped with ETCS can operate over rail lines similarly equipped with ETCS and thereby facilitate efficient cross-border rail transport between Member States. On 22 July 2009 the Commission adopted a European Deployment Plan for ERTMS which provides for the progressive deployment of ERTMS on Europe's main freight corridors, such as Rotterdam-Genoa, Antwerp-Basel, and Barcelona-Lyon-Budapest-Constanța. This aims to reduce running costs and improve the system efficiency of rail transport over long cross-border distances.

- 1.14 During this deployment phase, in circumstances where ERTMS is not in operation along the entirety of a corridor and some sections continue to be served with only the existing system, locomotives will have to be fitted with both ERTMS and the existing systems and this implies increased installation and maintenance costs for the train operator. This would affect freight transport in particular, where locomotives are normally called upon to operate over a wider range of routes.
- 1.15 There are significant benefits of implementing ERTMS in terms of investment in rolling stock, an interoperable control and signalling system reduce (virtually eliminate) the need to have multiple systems on board trains to service routes which cross borders. Implementing ERTMS also affects travel time: in fact it eliminates the need to switch traction units at the national borders, which is a common practice in order to avoid equipping locomotives with costly multiple systems. Implementation of ERTMS means that the same amount of freight can be transported by using fewer traction units, in a shorter time. In short, the implementation of ERTMS should allow increased capacity, speed and competition on international corridors. The system also offers significant improvement in terms of safety.

Issues with the interoperability of ERTMS across Europe

- 1.16 However, there are some issues regarding interoperability and ERTMS. Initially, the functional specification of ERTMS left some margin for interpretation by the engineers of the companies supplying it (Baggen et al., 2010)². In the early years of implementation (2000-2005) no version of ERTMS met all the specifications of the various European countries.
- 1.17 De facto, there was no real standard for ERTMS: with different countries implementing the system slightly differently, eventually causing it to be non-interoperable. As a consequence, adjustments to the software on rolling stock equipped with ERTMS were needed in order to use railway tracks with ERTMS in different countries.
- 1.18 There were also system upgrades released, with the consequence that rolling stock equipped with an older version cannot use tracks with a newer version of ERTMS.

² Baggen, J. H., Vleugel J. M. & Stoop, J. A. A. M. (2010), *European experiences with ERTMS implementation: the case of the high-speed railway Amsterdam-Antwerp*. In Ning, B. (2010), *Advanced Train Control Systems*. WIT Press, Southampton (UK).

Backwards compatibility with older versions of the Software is ensured by ERTMS upgrades. This means that trains crossing borders need to be equipped with the version that is used in any of the tracks in the countries they pass.

Memorandum of Understanding

- 1.19 In March 2005, the European Commission, together with representatives of the rail industry, signed the first Memorandum of Understanding (MoU) establishing the basic principles of the EU’s ERTMS deployment strategy. Its objective was to define each stakeholder’s contribution to ensure the progressive implementation of an ERTMS equipped network within 10-12 years. In order to facilitate this work, the European Commission appointed Mr Karel Vinck as the ERTMS Coordinator in July 2005. Mr Vinck has promoted an approach based on the coordinated deployment of ERTMS along six important freight Corridors (A through F).
- 1.20 In 2008, the second MoU was signed by the Commission and the European railway associations (CER, UIC, UNIFE, EIM, GSM-R Industry Group and ERFA) to speed up the overall deployment of ERTMS. It focusses on using a single technology baseline, getting manufacturers to agree to include software updates in new contracts, agreeing on a programme enabling a new version of the specifications, improving and harmonising test procedures and accelerating the deployment of ERTMS.

FIGURE 1.1 MAP OF ERTMS DEPLOYMENT IN 2020



Source: DG MOVE, http://ec.europa.eu/transport/rail/interoperability/ertms/doc/edp/ertms_map_10_07_2009.pdf

- 1.21 In 2009, the Commission adopted the European Deployment Plan (Commission Decision COM (2009) 5607 final), setting out Member States' ERTMS deployment obligations for between 2015 and 2020. This plan provides for the progressive deployment of ERTMS along the main European rail routes and for almost 10,000 km of lines to be equipped by 2015. These lines will form an initial network with vital corridors for freight goods transport, such as Rotterdam-Genoa, Antwerp-Basel, and Barcelona-Lyon-Budapest-Constanța. By 2020 there should be a network of 25,000 km of rail lines linking the main European ports and freight terminals equipped with the ERTMS. However, many Member States have committed themselves, via their own national plans, to exceed their EU obligations, so there should be around 40,000 km equipped with ERTMS by then.
- 1.22 In April 2012, a third MoU was signed between the European Commission, the European Railway Agency and all relevant railway associations defining the joint approach after introduction of the latest version of ERTMS, Baseline 3. This MoU recognises that version 2.3.0d shall remain in force in the future, as it will protect the investments made by the sector and interoperability in countries that have chosen Baseline 2 as their reference. However it also successfully supports the adoption of a new Baseline 3 specification, which represents the latest set of ERTMS functionalities.

CCS TSI (Technical Specification for Interoperability, Control-Command and Signalling Subsystem)

- 1.23 Interoperability of the trans-European rail network depends in part on the ability of the on-board Control-Command equipment to work with various track-side equipment. This means that all subsystems and interoperability constituents including interfaces meet essential requirements such as technical compatibility, reliability and availability, safety, health and environmental protection. The CCS TSI defines the minimum requirements to achieve interoperability and Change Requests are part of the mandatory requirements of the TSI. All CRs that are part of the TSIs were part of the follow up analysis.
- 1.24 The development of TSIs, as set out in the Interoperability Directive (2008/57/EC), and the management of the Change Requests is a complex process. It is managed by the European Railway Agency. Change Requests may come from suppliers or other stakeholders.
- 1.25 Annex A to the TSI CCS refers to mandatory and recommended specifications. There are periodic updates of the Annex A which reflect the new versions of the specifications (subsets).

The need for this study

- 1.26 In 2007, the European Commission entered into a 4-year service framework contract TREN/E2/322-2008 (comprising several lots) with a maximum budget of €550,000 per year (or a maximum total of €2.2 million) to strengthen its capacity to monitor EU funded projects for the deployment of the ERTMS programme. In addition to EU financing for large-scale TEN-T rail infrastructure projects which incorporate ERTMS within the project, €520 million of targeted EU financing was also allocated for trackside and on-board deployment within the framework of the

TEN-T 2007-2013 multi-annual work programme under two separate calls for proposals launched in 2007 and 2009.

1.27 At the time of the launch of the call for tender for technical assistance, neither the TEN-T EA nor ERA were in a position to ensure the IOP monitoring as required in the Terms of Reference for the contract in subject. The mandate of the TEN-T EA covers monitoring of TEN-T co-financed projects' implementation and does not encompass detailed analysis of the IOP issues in ERTMS projects. And while it is within ERA's mandate to assess the interoperability of projects, ERA was clearly not in a position to do so in 2007-2008 when the tender was launched as it was heavily involved in stabilisation and development of the standard at the time.

1.28 The framework contracts for the technical follow-up and monitoring of ERTMS projects will come to an end in December 2012. The Commission is seeking to determine whether technical follow-up and monitoring of such projects (and possible future projects) should be continued from 2013 and if so, the best means of doing so.

The study

1.29 Steer Davies Gleave was appointed to conduct an ex-post evaluation of the technical follow-up of TEN-T funded ERTMS projects. The objectives of this evaluation were described by the Terms of Reference as to:

- Assess the effectiveness of the framework contracts (2008-2012) in delivering the technical expertise which enabled the mitigation and minimisation of interoperability threats to EU-funded ERTMS projects;
- Assess the most appropriate way to ensure that these projects (and future ERTMS projects - possibly also including projects which receive Structural Funds) are fully interoperable taking into account resource constraints faced by the Commission.

Structure of this document

1.30 The remainder of this document is structured as follows:

- Chapter 2 covers the specific objectives of the evaluation and its associated methodology;
- Chapter 3 provides an analysis on the past and current technical follow-up;
- Chapter 4 provides the findings on the future technical follow-up; and
- Chapter 5 presents the conclusions and recommendations of this study.

2 Methodology

Objectives

- 2.1 As explained above in 1.29 there were two principal objectives of the ex-post evaluation of the technical follow-up of TEN-T funded projects:
- Looking back by assessing the effectiveness of the framework contracts; and
 - Looking forward by assess the most appropriate way to ensure that these projects and future ones are fully interoperable.
- 2.2 The methodology developed has been based on the evaluation criteria defined in the EU evaluation guidelines: relevance, effectiveness, efficiency, utility and sustainability. Added value was also added.
- **Relevance** is the extent to which an intervention's objectives are pertinent to the needs, problems and issues to be addressed.
 - **Effectiveness** is the extent to which the set objectives are achieved. This also includes the functioning of management structures and the way they support the organisation in delivering results.
 - **Efficiency** is the extent to which desired effects are achieved at a reasonable cost. This also includes the management structures and the way they support a cost-effective implementation.
 - **Utility** is the extent to which effects achieved correspond with the needs, problems and issues to be addressed.
 - **Sustainability** is the extent to which positive effects are likely to last after an intervention has terminated.

Framework for evaluation

- 2.3 The evaluation framework that has been used here has of course been based around the evaluation criteria defined above, and has been used to direct the process of data collection and analysis.
- 2.4 A number of specific questions to answer alongside the two main objectives were listed in the Terms of Reference for this study and are detailed below. Some of these specific questions have been answered in Chapter 3 (backward looking section) whilst others have been answered in Chapter 4 (forward looking section).

TABLE 2.1 EVALUATION QUESTIONS

Criteria	Question	Addressed in
Relevance	To what extent there was a need for the technical follow-up of ERTMS projects?	Chapter 3
Relevance	To what extent has the objective of interoperability been fulfilled?	Chapter 3
Effectiveness	To what extent the team of experts was able to ensure technical follow-up to the projects?	Chapter 3

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Effectiveness	To what extent has technical follow-up of TEN-T funded ERTMS projects has been effective in reducing interoperability risks?	Chapter 3
Effectiveness	Did the experts identify technical or other solutions to mitigate the interoperability risks? What effects (impacts) have been obtained by these technical or other solutions?	Chapter 3
Effectiveness	Have these effects contributed to the achievement of the objective of minimising threats to interoperability?	Chapter 3
Effectiveness	Which factors have hindered the achievement of the objectives?	Chapter 3
Effectiveness	Does participation in/implementation of the action appear satisfactory?	Chapter 3
Effectiveness	Has geographical coverage been even?	Chapter 3
Efficiency	Were the results obtained at a reasonable cost?	Chapter 3
Efficiency	Was the size of budget appropriate and proportional to the objectives?	Chapter 3
Efficiency	Could the same results have been achieved with fewer resources (both financial and administrative)?	Chapter 3
Efficiency	Is it possible in the future to carry out the same actions within the allocated budget of the TEN-T Agency and/or ERA?	Chapter 4
Sustainability	Will the interoperability effects achieved last in the medium or long term?	Chapter 3
Sustainability	Are the outcomes of intervention fully exploited?	Chapter 3
Sustainability	To what extent have the results of technical support been disseminated to stakeholders?	Chapter 3
Utility	To what extent there is still a need for technical follow-up?	Chapter 4
Added value	Would it have been possible to achieve the same results without Commission-funded technical follow-up?	Chapter 3
Added value	To the extent that there may still be a need for technical follow-up, would it be possible without Commission-funded technical expertise?	Chapter 4

Data collection and documentation reviewing

- 2.5 We have carried out desk research to collect relevant information. This was started immediately after the kick-off meeting.
- 2.6 The desk review was conducted with the following objectives:
- To identify the data available and assist in the structure of the evaluation framework and the definition of Key Performance Indicators (KPI); and
 - To review the key issues highlighted by other studies and understand the context of the study;
- 2.7 It should be noted that this study is an ex-post evaluation of a technical follow-up programme and not an ex-post analysis of a policy study, and as such there is only a very limited amount of relevant documents to review.
- 2.8 Table 2.2 lists the documents that were reviewed and used for the study.

TABLE 2.2 BIBLIOGRAPHY

Type	Document name
Legislative document	Memorandum of understanding concerning ERTMS, April 2012
External experts reports	Lot 1, Lot 2 and Lot 3 reports by the external consultants, 2009, 2010 and 2012
Policy document	European Railway Agency Evaluation, April 2011 European Railway Agency Impact Assessment, June 2012
Policy document	Mid-term evaluation of the TEN-T Executive Agency, June 2012
Policy document	Mid-term evaluation of the TEN-T Programme, March 2011
Other document	Progress with railway interoperability in the European Union, by European Railway Agency, 2011
Other document	Report on the certification of ERTMS equipment, by European Railway Agency, 2011

Stakeholder consultation

Questionnaires

- 2.9 In order to collect the views of the stakeholders and be able to answer the questions raised in the Terms of Reference of the study, a questionnaire was prepared. Because there were stakeholders with different levels of involvement with the technical follow-up and different objectives, the questionnaire was tailored for each category of stakeholders (EU institutions, external experts and all others)
- 2.10 The questionnaires were designed in order to help understand:

- The views of the stakeholders on the technical follow-up that took place since 2009 (where the stakeholders were involved with the technical follow-up);
- The views of the stakeholders on the need for further external assistance, and who would be best placed to undertake it or monitor it;
- The views of the external consultants on the most appropriate skills and expertise required for the technical follow-up;
- What has been most useful from the technical follow-up undertaken to date.

2.11 The questionnaires as issued to stakeholders are included for reference in Appendix A.

Responses and interviews

2.12 In order to gain a deeper understanding of the issues of the stakeholders of the industry, in agreement with the Commission we defined a programme of stakeholder interviews that would be held with the following organisations:

- DG MOVE;
- TEN-T Executive Agency;
- European Railway Agency;
- Technical consultants;
- Member States;
- National Safety Authorities (NSAs);
- Notified Bodies (NoBos);
- Railway Undertakings;
- Infrastructure Managers; and
- Other organisations.

2.13 The table below (Table 2.3) shows the result of the participating from stakeholders.

TABLE 2.3 RESPONSES OF STAKEHOLDERS IN RELATION TO QUESTIONNAIRE

Stakeholder Group	Specific organisation(s)	Status
EU Institutions	DG MOVE	Written responses submitted
	TEN-T EA	Written responses submitted
	ERA	Written responses submitted
External Consultants	SBB-GESTE	Written responses submitted
	INECO/TIFSA	Written responses submitted
Member States	Five Member States	Written responses submitted
National Safety Authorities	One National Safety Authority	Written responses submitted
	Four National Safety Authorities	Declined to participate

Notified Bodies	Six Notified Bodies	Declined to participate
Railway Undertakings	Two Railway Undertakings	Written responses submitted
	Three Railway Undertakings	Declined to participate
Infrastructure Managers	Five Infrastructure Managers	Written responses submitted
	Six Infrastructure Managers	Declined to participate
Other organisations	One trade organisation	Written responses submitted
	Two trade organisations	Oral responses provided

- 2.14 An interview mission was carried out in Brussels over two days on 11 and 12 October, 2012 and in Valenciennes with ERA on October 16th. Telephone interviews were also arranged for those individuals that could not be interviewed face to face.
- 2.15 Stakeholders interviewed (face-to-face or by telephone) came from the following organisations:
- DG MOVE;
 - TEN-T Executive Agency;
 - European Railway Agency;
 - SBB-GESTE;
 - INECO/TIFSA;
 - CER;
 - EIM;
 - UNIFE;
 - A Member State;
 - An Infrastructure Manager.

3 Looking back

Introduction

- 3.1 This chapter focusses on the past and current technical follow-up processes. It presents a review of the work carried out to date by the external experts and then presents the findings of our evaluation of the technical follow-up to date.

Review of the work carried to date

The Terms of Reference

- 3.2 We examined the brief that was given to the external experts. Written in 2008, it lists five key objectives, which are a “*non-exhaustive list*”:

- *Review of tenders issued within the framework of the above mentioned projects to verify compliance with the TSI CCS.*
- *Follow-up of the pre-contractual technical negotiations and analysis of the solutions provided by the manufacturers as regards their compatibility with the TSI CCS.*
- *Participation at regular meetings between manufacturers, infrastructure managers and/or rail undertakings in order to report on any decision that might have an impact on the implementation of the TSI CCS within the context of the project.*
- *Permanent and immediate reporting to the Commission on any major event related to the project, in particular as regards possible risks related to the interoperability or risks related to the planning.*
- *Formulation of proposals for possible mitigation measures to address risks related to interoperability or planning.*

- 3.3 The brief does not appear to provide a significant amount of additional information other than these five objectives. It mentions that the assistance sought after by the Commission will be detailed in each specific contract. We were provided with a copy of a specific contract which listed additional points to those above:

- *Analysis of the overall context of the projects (on-going projects at national level, technical specifications used on the projects, planned upgrades, compatibility with version 2.3.0d and any other relevant issues);*
- *Provision of technical support to the European Railway Agency in cases where technical issues which arise in the context of a project may have an impact on the European Technical Specifications for Interoperability relating to control-command and signalling;*
- *Involvement in activities relating to project 2007-EU-60040 (ERTMS User Group: Testing Activities) may also be necessary for activities having an impact on certain projects; and*
- *Additional tasks may be agreed between the parties at the kick-off meeting or during the duration of the Specific Contract.*

- 3.4 We found that there was no clear definition of what an “interoperable risk” is in the brief (fourth bullet refers to “*possible risks related to the interoperability or risks related to the planning*”). We suggest that the concept may mean different things to different parties and therefore requires further explanation and clarification. However, we were informed by DG MOVE that this was addressed during the kick-off meetings through discussion with each contractor.

Recommendation

- 3.5 We recommend the introduction of a clear and comprehensive definition of “interoperable risk” in the brief rather than through a discussion at each kick-off meeting

- 3.6 The brief needs to be more clearly defined to ensure that the technical follow-up delivers the desired outcomes.

The reports

- 3.7 The follow-up was undertaken in each year from 2009 to 2012. Monthly reports were prepared, as required by the brief, as well as notes of meetings attended. One month before the end of the contract year, the external experts submitted annual reports to DG MOVE, copies of which we reviewed.

- 3.8 There were significant differences between the two sets of reports in terms of their approach and outputs:
- i) Expert A provided detailed descriptions of the communications between its team and the project as well as with DG MOVE, whereas such communications are not described in the reports prepared by Expert B.
 - ii) Expert A provided a monthly summary of tasks undertaken during the course of the project while Expert B did not provide such information.
 - iii) Expert A has identified very few interoperability risks in comparison to Expert B. Expert A has described a large number of open points (discussion points) but have not explicitly identified these as risks. The distinction between open points and risks, which are separately reported in, respectively, Annex A and Annex B of their reports, is not made clear.
 - iv) Expert B produced concise reports with many recommendations and follow-up actions and identified the responsible party in each case. The structure of their reports has changed over time, with the 2012 report containing a separate description of the risk followed by a recommendation.
 - v) Expert B reports set out clear, well written actions, again identifying a responsible party in each case. The list of actions reduces over time, suggesting that stakeholder understanding of the required actions improved.
 - vi) Both experts have acted in a coordinating role, bringing all the parties together to discuss progress and provide updates. This process is well documented in the Expert A reports, whereas only the kick-off meetings are mentioned in the Expert B reports.
 - vii) Expert A reports only appear to consider matters related to the immediate implementation of the TSI CCS, with little consideration given to longer-

term issues; other critical aspects impacting interoperability (e.g. operations, cross acceptance, simulation and testing) received no mention.

- viii) Expert A provided a relatively detailed summary of conclusions while Expert B provided a briefer summary.
- ix) Expert B's conclusions are logical consistent realistic and achievable. They also address issues covering multiple projects and reflect the needs of industry and suppliers.
- x) Expert B recommendations concern implementation over the long term and offer the prospect of significant value in terms of future cost savings.
- xi) The appendices provided in Expert A reports are extensive, providing a range of supporting information including open-points, interoperability risks, copies of the monthly reports, meeting minutes, contact lists, timesheets, and country specific information. Expert B report appendices are more limited, including only project reports and questionnaires.

3.9 We found that in some cases it was not easy to understand the continuity of projects and/or recommendations, which is an important issue since ERTMS projects are long-terms and require follow-up over an extended period. Regarding the two sets of reports:

- i) Expert A has ensured clear continuity in recording open points, providing updates year-on-year and explicitly identifying new points. A similar approach is taken in respect of risks.
- ii) Expert B reports were less easy to follow in some respects. In the case of one project, detailed reports were prepared for 2009 and 2010, but not for 2012. It was also difficult to determine how the recommendations in 2009, 2010 and 2011 related to one another. In the case of another project, the 2009, 2010 specific reports contain the same recommendations but these were not consistent with those included in the overall summary report. The 2011 report was more detailed, however, and included direct links to the summary report.

3.10 We found that there seemed to be some confusion about what was reported as a risk, an open-point or a recommendation. Important information like mitigation measures was sometimes not clearly matched with the risks it tried to sort. We believe that it would be beneficial if the issues for each project were summarised in a consistent format, such as a table similar to the following:

TABLE 3.1 PROJECT RISK SUMMARY TABLE

#	Risk	Details	Who	Likelihood	Importance	Mitigation	By who	By when
		Detailed description of risk	Describes who is or would be impacted if risk materialised	Estimate of the likelihood of risk occurring (High, Medium, Low or traffic light signal)	Impact of risk occurring (High, Medium, Low or traffic light signal)	Describes the mitigation measures to be considered	Shows who is in charge of implementing mitigation measures	Show by when solution needs to be implemented

- 3.11 Recommendations would need to follow the project summary table.
- 3.12 According to the brief, each consultant provided a fiche for each project that they were asked to monitor.
- i) For Expert A, the fiches provided a good description of the project and current stage in terms of figures and timeline as well as the activities performed;
 - ii) For Expert B, we found that depending on the author, there were some variations in the level of detail of the fiches, but that this issue seemed to have been streamlined in 2011;

Summary

- 3.13 We found a lot of evidence of significant amount of work undertaken by both experts on the projects they followed-up.
- 3.14 However, the structure of the annual reports prepared was very different, making it difficult for readers to compare them and for those taking over responsibility for projects to understand the background. More specifically, we note that:
- Expert A focussed on providing technical assistance to the projects, particularly in respect of implementing the CCS TSI, but it is not clear from looking at the annual reports whether other issues such as operating processes or testing were considered in the technical follow-up. However some stakeholder indicated during the consultation that the quality of the work and support received by Expert A to be excellent and an important contribution to reducing interoperable risks. This is presented in 3.40 and 3.47.
 - Expert B was better than expert A at highlighting risks and recommendations.
- 3.15 Both interventions appear detailed and technical and seemed to provide an acceptable level of analysis and support.
- 3.16 On the basis of our review, we have identified a number of lessons learned and these are reported in the table below.

TABLE 3.2 LESSONS LEARNT

	Positive points	Negative points
Expert A	<p>Meetings are fully described, project fiches are useful, and the reports contain a lot of information useful for understanding the processes.</p> <p>The reports identify the technical assistance that was provided to the projects in terms of implementing the CCS TSI.</p>	<p>Difficult to see how open points and interoperability risks were defined. Actions and next steps are provided but often no indication of who should carry out action.</p> <p>The reports do not provide a lot of information on other interoperability risks.</p>
Expert B	<p>Recommendations are mainly technical. Consultants also carried out a coordinating role, as their communication between the various parties brought common interests together. Clear timelines for the recommendations, e.g. in the tender.</p>	<p>No detailed descriptions of meetings in the monthly reporting, however minutes of all meetings were submitted.</p> <p>The extent to which technical assistance was provided to the projects remains unclear based on the reports.</p>

Recommendations

- 3.17 We recommend that DG MOVE provides a more-defined structure for the annual reports to ensure better consistency in the format and content of the follow-up reporting; it would make easier reading to have a general progress report and then specific fiches per project.
- 3.18 We recommended establishing templates so that consultants can record information collected in a more consistent manner. The Commission provided us with an example of a standardised template which has been developed. It is presented in Appendix B.
- 3.19 Consultants should use common definitions to avoid confusion in the use of terms such as “open-points”, “risks” and recommendations”. We also suggest that a consistent table for reporting risks is used (see example in paragraph 3.8i)).
- 3.20 Consultants should be required to ensure that for each project followed-up over more than a year, there is clear continuity between reports and explicit recognition of any changes in recommendations from one year to the next.

We now examine each of the evaluation questions that were asked in the Terms of Reference, in terms of Relevance, Effectiveness, Efficiency, Sustainability, Utility and Added value.

Relevance

To what extent was there a need for the technical follow-up of TEN-T funded ERTMS projects?

- 3.21 Where public funds are invested, the granting authority always has a duty to ensure that they are used according to the rules and objectives governing their application. A significant amount of TEN-T Programme funds have been provided to ERTMS projects to promote interoperability of the rail network in Europe:

- € 9.3 million until the end of 2006;
- € 520 million in the 2007-2013 Programme (excluding 4th call published on 28/11/12);
- There is also a strong likelihood that more funds will be available in the 2014-2020 Programme.

- 3.22 However, experience has shown that installing ERTMS has not been achieved without problems, which in turn have hindered achievement of the objective of interoperability: the case study below of the implementation of ERTMS on the Amsterdam to Brussels corridor is an example:

The decision to deploy ERTMS on the HSL-Zuid was taken at the time when technical details of the system were still under discussion, so there was no practical experience with the new technology and no de facto standardisation.

In addition, two different suppliers were contracted by the two countries for the development and installation of ERTMS on the railway sections on each side of the border. Alcatel was tasked with the Dutch part of the railway section and Alstom for the Belgian side. Unfortunately, the technologies adopted by Alcatel and Alstom turned out to be incompatible (there are also incompatibility relating to the implementation of certain train-side and track-side technology).

Because of the lack of technological standardisation, the implementation of ERTMS became the main cause of serious delay in the development of cross-border services on the Amsterdam-Antwerp line. Eventually a special version of ERTMS (Version 2.3.0 Corridor) was developed at a significant cost, and trains were fitted with a “gateway” (a computer translating messages from one ERTMS system into the other), in order to address the problem. Further technological development subsequently allowed the line to operate at adequate levels of performance and interoperability.

- 3.23 Other reasons for a lack of ERTMS interoperability in Europe include those described below:

- Initially, the functional specification of ERTMS left some margin for interpretation by suppliers (Baggen et al., 2010)³. In the early years of implementation (2000-2005), no version of ERTMS met all the specifications of the various European countries.
- There was no real standard for ERTMS and different countries implemented the system in different ways such that the objective of inter-operability was not met. As a consequence, adjustments to the software on rolling stock equipped with ERTMS were needed in order to allow them to use infrastructure in different countries.
- There were also system upgrades released, with the consequence that rolling stock equipped with an older version could not use tracks with a newer version of ERTMS. This meant that trains crossing borders had to be equipped with the version used in each of the countries through which they passed.
- DG MOVE also considered that there was a high risk that managers of projects benefitting from EU funding would focus on budget and timetable and would not necessarily pay sufficient attention to ensuring compatibility with lines not yet connected to their own project.
- With subsequent dedicated ERTMS Calls for the 2007-13 financial perspective, increased emphasis was put on testing and verification of IOP. For instance, the MAP ERTMS 2011 Call encouraged a range of tests (with suppliers, infrastructure managers in neighbouring countries, laboratories, etc) to ensure interoperability. It defined strict testing requirements, including testing in at least two Member States on three different lines and the involvement of a supplier different to that providing on-board information. ERA is also consulted on principles during the calls, as well as during the definition of the final project so that it can ensure that evidence is provided to show that the applicable ERTMS legal framework has been followed.
- Effective implementation of ERTMS requires cooperation across borders and between private companies, national authorities and the EU. A large number of stakeholders with different objectives and cultures are involved, and it is important that there is good communication between all of them. The available evidence indicates that the level of communication has not always been adequate and particularly limited in the case of cross border projects with different project teams, reporting structures, budgets languages and cultures.
- Very few Member States perceived the need for a “system integrator” with responsibility to “safeguard” interoperability of the whole ERTMS system (trackside as well as on-board). Such an entity would oversee line-side testing, field-tests, cross-check of testing-protocols and analysis of inconsistencies. This was the case in Austria where such an independent system integrator was established, but this is an exception in Europe.

3.24 There was therefore a need to raise awareness at project level of the need to take full account of interoperability requirements.

³ Baggen, J. H., Vleugel J. M. & Stoop, J. A. A. M. (2010), *European experiences with ERTMS implementation: the case of the high-speed railway Amsterdam-Antwerp*. In Ning, B. (2010), *Advanced Train Control Systems*. WIT Press, Southampton (UK).

- 3.25 The European Commission and the TEN-T Executive Agency, through monitoring the work of the contractors, obtained valuable feedback of the situation "on the ground". The technical follow-up had some benefits for other stakeholders also. For ERA, the technical follow-up reports have been particularly useful in identifying shortcomings in a number of areas, notably awareness at local level of EU level activities (e.g. ERA/EC operational rules, guidance on certification and authorisation to put into service).
- 3.26 The TEN-T Executive Agency has also benefitted from the technical follow-up of the Interoperability (IOP) Tests Program issues, especially during the final stage of the project. With a final report a beneficiary is required to demonstrate that ERTMS was deployed according to IOP rules. Once the TEN-T Executive Agency is satisfied, it can authorise and process the final payment claim. The issue faced by the Agency, both currently and in the past, is that documents relating to the authorisation procedure, obtained as project deliverables, do not always provide clear confirmation whether the results are in line with the EC Decision (i.e. whether its objectives in terms of TSI CCS compliance have been achieved). Moreover, the authorisation procedures are often not transparent, sometimes duplicated (NoBo tests verified/repeated by NSA) and usually quite lengthy.
- 3.27 The TEN-T Executive Agency also noted that the technical follow-up had proved useful for the verification of certain milestones (such as IOP declaration or IOP verification) during the implementation of a project.

Conclusion

- 3.28 There is clear evidence that EU funded projects have not always delivered interoperable networks in spite of the procedures in place. Hence, there is a need for further measures to ensure that project funding is spent effectively in delivering the project goals.

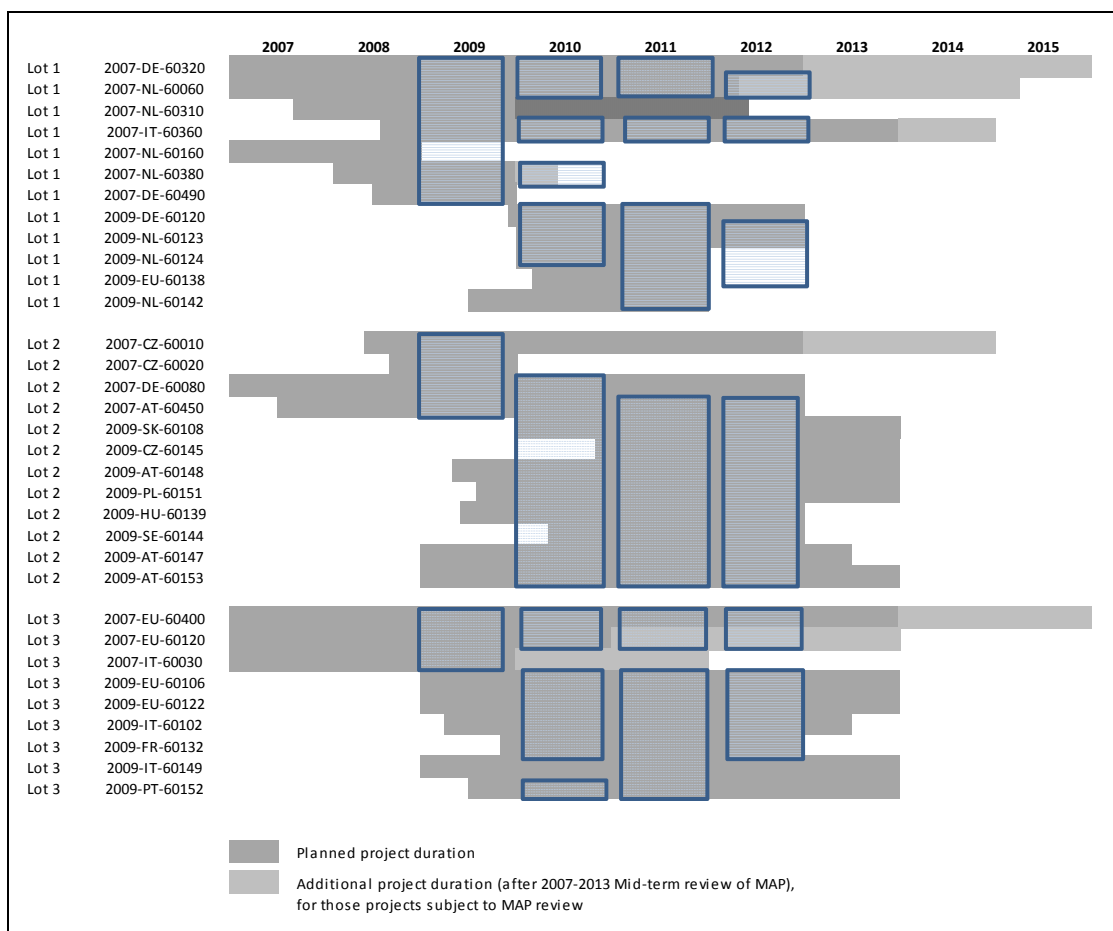
Recommendation

- 3.29 We recommend that the technical follow-up continues beyond December 2012 because there are no guarantees yet that beneficiaries and the various EU and national institutions will be able to rely on the current processes to avoid interoperable risks. This is discussed further in Chapter 4.

The general objective of the contract was to provide the European Commission with targeted technical assistance consisting of experts liaising with the corridor/project coordinators to ensure that technical solutions implemented within projects were fully consistent with the TSI CCS provisions. To what extent has this objective been fulfilled?

- 3.30 Fulfilling this objective is highly dependent on the maturity of the project and the collaboration from the beneficiary.
- 3.31 The external consultants who were engaged to undertake the technical follow-up were responsible for monitoring projects at various stages of completion. Some had not yet started, some were well advanced and others were reaching the end of their life, awaiting final payment from the TEN-T Executive Agency. The figure below shows the progress of the various projects reviewed through time.

FIGURE 3.1 STATE OF ADVANCEMENT OF ERTMS PROJECTS FOLLOWED



Source: SDG analysis of TEN-T EA data

- 3.32 When consultants intervened on projects that had already progressed to implementation, there was less scope for them to ensure that the technical solutions implemented were fully compliant with TSI CCS. By contrast, projects that were followed-up after the pre-tender phase benefitted to a much greater extent from the knowledge and experience of the experts.
- 3.33 The level of collaboration that external experts obtained from project beneficiaries also varied considerably: in some cases collaboration was good, in others it was largely absent. In addition, initially external consultants had difficulty obtaining information because of confidentiality issues, although this was resolved after DG MOVE intervention.
- 3.34 Beneficiaries of projects that were subject to technical follow-up shared different views as to the relevance of the assistance and its impact. The observations below are broadly representative of the range of opinion:
 - “We believe there is a need for an overall approach since there has only been few examples of national solutions, which makes interoperability more difficult. The technical follow-up is one good example of an overall approach”;
 - “Discussions were useful but did not change the implementation solutions”;

- “ERTMS projects are contracted nationally. Checks for EU interoperability are useful/ necessary”;
 - “Technical follow-up have followed this goal and supported its achievement”.
- 3.35 The experts were not in a position to require the project beneficiaries to implement the solutions identified. The mitigation of the risks is ultimately the responsibility of the project beneficiaries and their suppliers and the experts were only able to estimate whether risk mitigation measures were reasonable.

Conclusion

- 3.36 Whether or not technical solutions were fully consistent with TSI CCS provisions was strongly correlated with the stage of development of the project and the extent of collaboration of the project stakeholders. When consultants intervened on projects where beneficiaries were willing to participate, share information and alter their approach on the advice of consultants, then the objective was met. When collaboration limited or slow to emerge, the objective was only partially met. Similarly, in the case of projects that had been largely implemented or were nearing completion, consultants had little scope to propose actions to ensure the project was fully consistent with the TSI CCS.

Recommendation

- 3.37 Earlier intervention is preferable to late intervention if the requirements of the TSI CCS are to be met.
- 3.38 The participation of project beneficiaries in the technical follow-up should be compulsory. This could be made a requirement in the Call for Tender of the Multi Annual Programme (MAP).
- 3.39 Where the mitigation solution identified by the experts has not been followed, consideration should be given to requiring project beneficiaries to present a justification. This would place an incentive on the beneficiaries to take a more active role.

Effectiveness

To what extent the team of experts was able to ensure technical follow-up to the projects? Which factors have hindered the achievement of the objectives?

- 3.40 Experts were carefully selected by DG MOVE in order to have the adequate skills to undertake the follow-up. One Infrastructure Manager, a stakeholder in a project subject to follow-up, reported that “the competence of the consultants doing this work was very high and professional”.
- 3.41 DG MOVE also had the flexibility to choose different consultants each year for each lot if it became dissatisfied with the performance of those previously engaged. In practice both external experts were re-appointed each year, indicating that DG MOVE (and TEN-T EA and ERA as observers) was satisfied with the quality of their work.
- 3.42 However there were some obstacles to effective completion of the work:

- Lack of cooperation of stakeholders as discussed above. This meant that in some cases consultants wrote their reports with statements such as “No additional recommendations to date due to unavailability of information”.
- Confidentiality issues that slowed down the process particularly in the first year;
- Language and cultural barriers - in one instance the project beneficiaries were unable/unwilling to speak English, with the result that DG MOVE changed the consultants reviewing the project in question, disrupting the work and introducing discontinuity;
- Discontinuity of the project organisation, a common problem in studies requiring stakeholder consultation where establishing and maintaining adequate contact is anyway challenging;
- Projects at different stages of implementation (discussed above);
- The follow-up undertaken by the consultants was regular but periodic rather than continuous and DG MOVE would have preferred the experts to have been more involved in the “day-to-day” management of projects in some cases; and
- A limited budget per project in some cases, an issue highlighted by an Infrastructure Manager who considered that consultants were not given sufficient time during the year to provide effective support.

Conclusion

- 3.43 The external experts have been able to undertake effective technical follow-up on projects where project beneficiaries have shown a willingness to collaborate. In the absence of such collaboration, the technical follow-up was generally not effective. While both consultants and DG MOVE sought to overcome lack of stakeholder engagement, as participation in the technical follow-up is not compulsory, they were not always able to secure the necessary cooperation. Therefore we believe this objective was only partially achieved.

Recommendation

- 3.44 We have no specific recommendations here.

To what extent has the technical follow-up been effective in reducing interoperability risks?

- 3.45 Our review of the annual reports from Expert B indicates that the analysis of the facts, findings and conclusions address the most important issues relating to interoperability risks. For instance Chapter 4 of the 2010 report provides a summary addressing a broad spectrum of technical, specification, commercial and delivery issues that could pose a risk to interoperability. It includes:
- Identification of issues beyond the TSI CCS (for example, the harmonization of operational rules) and provides a sound basis for making informed decisions.
 - Implementation issues that are outside the scope of TSI CCS have also been captured. The discussion on test activities and the associated need to harmonize test scripts and data bases addresses the complexities experienced with the baseline 2 releases.

- The summary identifies problems with train-borne application. It also considers how the commercial implications of these issues in terms of uptake by the Railway Undertakings could affect the practical implementation of the TSI CCS.

3.46 Chapter 5 of the same report presents recommendations on a corridor by corridor basis. Identification of the cross boarded Radio Block Centre handover is correctly shown as posing the highest risk for the technical completion of the project. The recommendation to involve ERA in the resolution of the issues is also appropriate. The other recommendations in this section address broader issues including:

 - Availability of test slots on working lines;
 - Harmonisation of operating rules;
 - Cross border acceptance;
 - Commercial conditions for procurements;
 - Compatibility between v2.2.2 and 2.3.0d;
 - Key management activities;
 - Track train integration, safety targets along the corridor; and
 - The need to address interoperability.

3.47 A stakeholder also commented that “Expert A had a very good understanding of ERTMS and was able to give us some input on specific issues such as how the ETCS handles balise detection” or “the dialog with Expert A was a good input for some issues on a European level, when they confirmed for instance our concerns about a requirement to change hardware when upgrading to BL3”.

3.48 The number of identified risks and open-points identified by the consultants is displayed below. The experts used different approaches: Expert A reported open-points and risks in order to indicate the severity of the issue: this explains why there are significantly less “risks” than “open-points”. All issues identified by Expert B were classified as “risks”.

TABLE 3.3 NUMBER OF IDENTIFIED RISKS

	Name	2009	2010	2011
Expert A	Open-points*	27	41	77
	Risks	5	5	11
	Risks + open-points / project	8.0	4.2	8.8
	Risks + open-points / project size	0.32	0.46	0.88
Expert B	Risks	61	44	26
	Risks / project	6.1	3.1	1.6
	Risks / project size	0.24	0.18	0.10

Note: (*) open-points of Expert A include all open-points whether the issue was resolved or not.

Final Report

3.49 The table shows that the number of risks/project issued each year by Expert B decreased as project beneficiaries became more aware of the issues identified by the experts and undertook to address them. In the case of Expert A, the data for the number of open-points closed each year was only available for 2011, so no trend can be seen. However examining the table also shows that Expert A identified more issues in total per project regardless of the size, so it was beneficial to use a scale with level of severity as it allowed a better reporting of issues.

3.50 TEN-T EA noted that the information provided by the contractor was sometimes already known (due to ASRs received or on-going working correspondence) or too technical in detail for its actual needs. Verification of the compliance of the final project deliverables with applicable legislation (primarily TSI CCS) would have been useful. However, this issue concerns the brief rather than the work of the experts.

Conclusion

3.51 Reports show that experts have been able to raise awareness of the importance of interoperability and detect in a number of cases of interoperability risks (non-conformity with the specifications). Were these risks were corrected by project beneficiaries, then this objective was addressed in full, otherwise only partially.

Recommendation

3.52 We have no recommendations here.

Did the experts identify technical or other solutions to mitigate the interoperability risks? What effects (impacts) have been obtained by these technical or other solutions? Have these effects contributed to the achievement of the objective of minimising threats to interoperability?

3.53 As discussed in 3.45, experts were generally able to identify technical solutions including recommendations regarding modification of specifications, different approaches or the definition of additional tests, thereby helping to minimise threats to interoperability.

- i) For example, in an on-board project in Austria, one of the Experts analysed a Change Request list that was included in the latest software version upgrade of the on-board units. It identified that at least one of the Change Requests presented an interoperable risk and informed the stakeholder. The stakeholder updated the software which resulted in eliminating the potential interoperability risk that was underlined in the technical analysis performed by the Expert.
- ii) Experts also explained that in some cases of early intervention, they were able to review documents (such as tenders) with some stakeholders and were at that stage able to obtain good cooperation from them to address the issues raised: there was a transfer of “know-how” between experts and stakeholders.

3.54 An Infrastructure Manager stakeholder involved in the follow-up outlined the support provided by the expert in various cases: “we asked for their opinion in cases where we were not completely sure whether a certain solution would carry

risks or not. The expert was then consulted to assess whether or not the chosen solution carried risks, based on their knowledge and experience. In some cases the expert had no better solution, but could confirm that the probability for risks was low and that the chosen solution could be implemented”.

- 3.55 The mitigation of the risks remained the responsibility of the project beneficiaries. The external consultant was only responsible for assessing whether the measures proposed to mitigate risk were appropriate. Hence, the main impact of the follow-up has been dissemination of information rather than concrete solutions to project issues.
- 3.56 One expert also commented that “The interviewer acts as an intermediary between the different investigated projects and by doing so acts completely unintentionally in the role of a coordinator. Perception of common interests is actually induced by the interviews.

Conclusion

- 3.57 As mentioned previously, experts have been able to identify solutions to mitigate interoperable risks, but it was left to the beneficiaries to decide or not to implement these solutions. Therefore, the technical follow-up has helped to reduce interoperable risks, but it has not achieved in full its objective of technical solutions implemented in projects to be fully consistent with TSI CCS provisions.

Recommendation

- 3.58 We recommend that in the case where experts propose mitigation solutions which are not followed by the stakeholders, then stakeholders must justify why the recommendations have not been followed.

Does participation in/implementation of the action appear satisfactory?

- 3.59 Participation of stakeholders is considered in the discussion in paragraphs 3.33, 3.32 and 3.42.
- 3.60 The most significant issue in this regard was the inability of DG MOVE and the experts to ensure that the findings of the follow-up were implemented, as discussed in 3.35.

Conclusion

- 3.61 See conclusion discussed in 3.43 in relation to effectiveness.

Recommendation

- 3.62 We have no specific recommendations here.

Has geographic coverage been even?

- 3.63 At the time of the call for tender for external experts in 2007, it was recognised that the scope of work was potentially very broad and that few contractors would have a team of experts with the necessary language capacity to participate effectively in projects across the whole of Europe.
- 3.64 In addition, it was important to ensure the independence of experts from the beneficiaries of the projects for which technical assistance was being sought. It

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was recognised that few contractors would be able to ensure such independence in respect of projects being implemented across the whole of the EU.

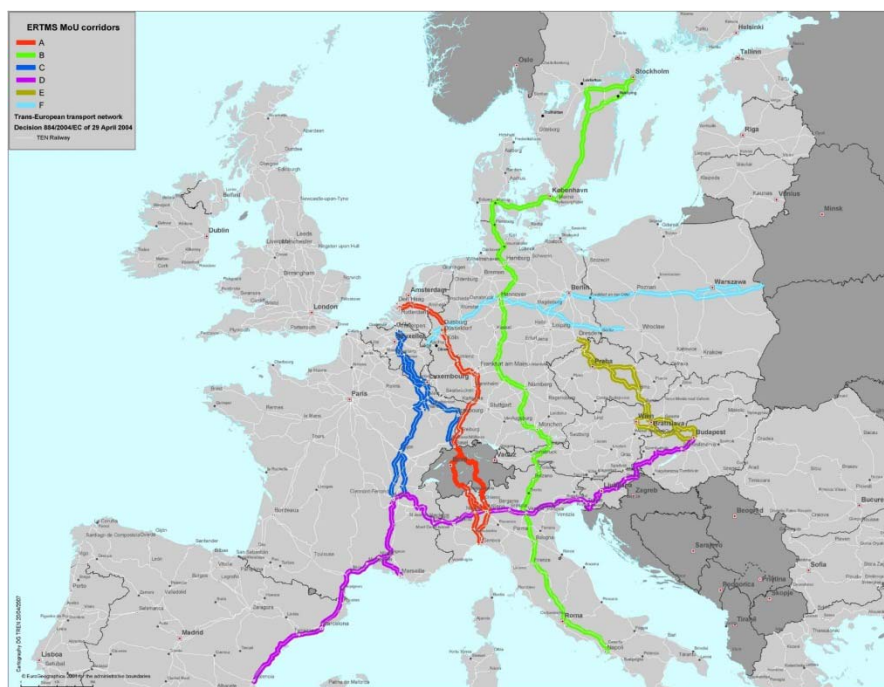
3.65 Consequently, the tender was divided into 3 lots covering different geographic areas and different ERTMS corridors.

- Lot 1: Corridor A and non-corridor projects in Austria, Estonia, Finland, Germany, Latvia, Lithuania and the Netherlands;
- Lot 2: Corridors B, E, F and any non-Corridor projects in Bulgaria, Czech Republic, Denmark, Greece, Hungary, Poland, Romania, the Slovak Republic and Sweden; and
- Lot 3: Corridors C, D and any non-corridor projects in Belgium, France, Ireland, Italy, Luxembourg, Portugal, Slovenia, Spain and the United Kingdom.

3.66 Some countries are included in more than one lot (e.g. Germany, which is part of 4 corridors - A, B, E and F). The European Deployment Plan identifies the following corridors:

- Corridor A: Rotterdam - Genoa;
- Corridor B: Stockholm - Naples;
- Corridor C: Antwerp - Basel - Lyon;
- Corridor D: Valencia - Lyon - Ljubljana - Budapest;
- Corridor E: Dresden - Prague - Budapest;
- Corridor F: Duisburg - Berlin - Warsaw;

FIGURE 3.2 MAP OF THE ERTMS CORRIDORS



Source: Annual activity report of ERTMS coordinator, 2007

Conclusion

- 3.67 The grouping of projects for the purposes of follow-up was on a corridor and language basis, which we consider appropriate. An Infrastructure Manager commented that “in general, it helps to discuss interoperability risks with ERTMS specialists who are involved in the implementation of ERTMS in a whole corridor”. Additionally, one of the key requirements for the grouping was to be grouped according to borders so that projects involving different Member States could be grouped together.
- 3.68 It was noted that one Scandinavian project was allocated to Lot 2 which seemed anomalous but nonetheless it was acceptable, since it was an isolated project, and it would have equally been anomalous with Lot 1 or 3.

Recommendation:

- 3.69 We recommend not changing the groupings of the projects.

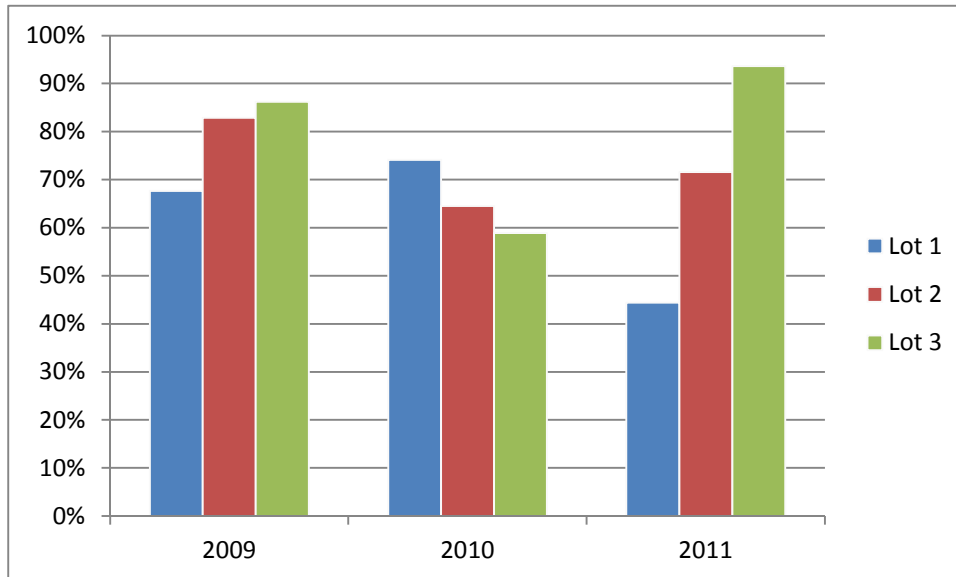
Efficiency***Were the results obtained at a reasonable cost? Was the size of the budget appropriate and proportional to the objectives?***

- 3.70 The daily rates quoted by the external consultants are within the relevant range of rates for EU institutions. Total payments to the external consultants were small when compared to the amount of EC support invested in the ERTMS projects subject to technical follow-up (€1.2 million for the experts (over 4 years) compared with €520 million support for the ERTMS projects, representing 0.2%). Consultant payments range from 0.2% for Lot 3, to 0.6% for Lot 1 (Lot 1 included the most important projects) with 0.3% for Lot 2.
- 3.71 We did not obtain a detailed financial assessment for DG MOVE. In terms of number of man-days used, DG MOVE reported 62 days:
- Launch of Call for Tender: 40 days in 2008;
 - Project management: around 12 days per year;
 - Meetings, preparation and follow-up: around 10 days per year;
 - Final reports work: around 6 days per year;
 - Financial contractual issues: around 20 days per year;
 - Secretarial support (notably as regards contract conclusion) : around 6 days per year; and
 - Unforeseen complications: around 8 days per year.
- 3.72 ERA and TEN-T Executive agency also reported some time associated with their role of observers of the technical follow-up in particular for:
- Initial launch of Call for Tender in 2008: 4 and 2 days respectively;
 - Project management: around 12 and 4 days per year respectively;
 - Meetings, preparation and follow-up: around 4 days per year for each entity.
- 3.73 This gives a total 46 days one-off in 2008 with an additional 86 days annually. This represents an estimated 56% of the annual time of a Policy Officer in 2008 (although one officer cannot possibly carry out all the different tasks as they require different competences and skills) and an estimated 36% in the subsequent

years where the tasks associated with the launch of Call for Tender do not take place.

3.74 Not all of the available resources for the external support set aside were used by DG MOVE, as shown below. DG MOVE had provisioned nearly €1.7 million versus €1.2 million spent (or 73%). This indicates careful financial management, recognising the importance of the outputs rather than simply utilising the available budget. External consultants only billed DG MOVE for the days effectively worked and in many cases did not reach the maximum amount available.

FIGURE 3.3 EXPENDITURE AS A PERCENTAGE OF COMMITTED BUDGET



Source: Steer Davies Gleave analysis of DG MOVE data

3.75 There is no clear emerging trend in expenditure. Analysis of the data shows that the amount spent per project decreased between 2008 and 2010, reflecting greater familiarity with the issues on the part of the experts as well as improvements in the quality of the specifications and the availability of test specifications. In addition, stakeholders became increasingly aware of the need to take interoperability constraints into account.

3.76 In the period 2009-2010, when the experts began project follow-up work, sound test specifications were not yet available. Specific tests to ensure fulfilment of the relevant specifications were designed for each project and close monitoring of projects was required. Monitoring requirements subsequently became less onerous. DG MOVE has noted that it considered the available budget was probably too limited at the beginning of the follow-up initiative, although this is not entirely consistent with the results of our analysis. For example, as shown in the table below, there are variations between Lots 1 and 3 for which there is no ready explanation.

TABLE 3.4 SPENT AMOUNT VS. NUMBER OF PROJECTS (€/PROJECTS)

	2009	2010	2011	2012	Average per lot
Lot 1	22,755	25,324	11,650	9,320	17,643
Lot 2	18,523	6,310	9,005	9,336	9,340
Lot 3	43,080	13,754	16,730	14,742	18,659
Annual average	25,901	13,718	12,196	10,877	14,547

Note: The figure of €43,080 for Lot 3 in 2009 is explained by the small number of projects monitored that year (3 projects) but their complexity justified a proportionally higher number of person-days. This is in line with the committed amounts that were allocated to these projects in 2009. Further analysis indicates that 86% of the committed amount was used for Lot 3 in 2009, whereas the same contractor used only 68% of the committed amount for Lot 1.

- 3.77 We understand the maximum possible number of person-days per Lot (Lot 1: 150 days, Lots 2 and 3: 100 man-days) was estimated by DG MOVE based on an assessment of the complexity and number of projects in each lot, with Lot 1 (and particularly Corridor A) being the highest priority and perceived as the most complex.

Conclusion

- 3.78 The results appear to have been obtained at a reasonable cost. Adequate financial management was applied by DG MOVE.

Recommendation

- 3.79 We have no recommendations here.

Could the same results have been achieved with fewer resources (both financial and administrative)?

- 3.80 Financial resources are discussed in the above paragraphs.
- 3.81 Due to the structure of the framework contract (the only legal option for DG TREN at the time of the call for tender for a project involving long-term service provision), involving three lots and selection of successful contractors "in cascade", the need to conclude specific contracts every year (requiring a request for services, an offer and a signature of contract) created a substantial administrative burden.
- 3.82 Contractors were required to provide monthly reports (reports were provided bimonthly at a later stage) and a final report at the end of each contract year. Hence, although follow-up was intended to be a continuous process, reporting requirements did not necessarily align with the deliverables. Consultants used different approaches for the final report: one merged all monthly reports into one document, whereas the other issued a short summary document.
- 3.83 There was also a significant administrative burden on DG MOVE, which spent an estimated 26 days resolving financial and contractual issues. The level of the

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administrative overhead was considered “reasonable” by one consultant but “inappropriate” by the other.

- 3.84 It appears that DG MOVE and the consultants established and maintained a constructive relationship. Consultants were made aware of the importance of reporting continuously rather than simply at year-end.
- 3.85 The TEN-T Executive Agency also received information from project beneficiaries, coordinators and Member States who considered that the requirements of the technical follow-up were an additional administrative burden over and above the requirements of individual funding decisions. As already noted, the invitation to participate in the technical follow-up was unclear at the time decisions were taken. Nonetheless, when stakeholders regard administrative requirements as a burden, this tends to work against establishing a collaborative relationship with experts.
- 3.86 The information sought by experts included:
- Responses to a questionnaire (for example 40 questions on requirements, tests, DMI in the case of an on-board product);
 - Strategic Action Plan (SAP);
 - Requirement for Tender and copies of Tenders;
 - Management plan, safety plan and hazard log;
 - Certificates from Nobos and other parties;
 - Quality plan;
 - Validation dossier; and
 - Maintenance plan;
- 3.87 The external experts indicated that much of this information should have been readily available to beneficiaries and that it should not have been necessary to prepare specific information (although completing the questionnaire was an additional activity). Hence, the administrative burden should have been limited in most if not all cases.
- 3.88 Project beneficiaries also maintained that some project managers were asked for similar information from TEN-T Executive Agency staff (when liaising on TEN-T project management issues), external consultants during the technical follow-up or DG REGIO (in relation to Cohesion and Structural funded projects). From the perspective of beneficiaries not aware of the differences between these various “Commission” requests, the apparent lack of coherence tended to enhance perceptions of onerous administration.

Conclusion

- 3.89 The level of administrative activity was substantial for DG MOVE and, in the case of most projects, for the external experts. However, both parties were able to establish good working practices that supported rather than hindered the overall objective of the intervention. In the case of other stakeholders, the burden was limited but some considered it unreasonable as the relevant requirements were not made sufficiently clear at the outset.

Recommendation

- 3.90 Bimonthly reporting appears adequate and should be maintained.
- 3.91 We recommend measures to ensure more guidance for the production of reports or the use of templates to store project information so as to reduce the administrative burden of different entities taking part in the management of the technical follow-up.
- 3.92 We also recommend that cooperating with project follow-up is explicitly mentioned as a requirement when individual funding Decisions are made. An illustrative list of documents to prepare for the technical follow-up could also be added, on the understanding that the list might need to be refined once the follow-up work has commenced.

Sustainability and Utility***Will the interoperability effects achieved last in the medium or long term? Are the outcomes of the intervention fully exploited?***

- 3.93 The effects of rail interoperability in Europe will be sustained over the long term and can be expected to improve the sustainability and utility of the EU transport system.
- 3.94 One of the key outcomes of the intervention of the technical follow-up has been to inform project beneficiaries of the need for corrective action in the interests of supporting the objective of interoperability. For instance, one EU-12 Member State noted that the technical follow-up had been particularly useful during *“the process of elaborating the technical requirements for tender dossier (TD) and for the design phase of the projects”*. Corrective action was particularly successful where beneficiaries had sufficient time and resources to implement changes or mitigate risks in a way that helped to deliver the long term vision of interoperability.
- 3.95 A secondary, albeit important, outcome has been the dissemination of information to DG MOVE, TEN-T Executive Agency and ERA. These organisations observed that the outcome of the technical follow-up could have been better exploited if the associated timeline had been better aligned with the project lifecycles.
- 3.96 At present, project beneficiaries cannot be mandated to address the issues and associated mitigating solutions highlighted by the external experts, even in a worst case scenario involving forfeiting Commission funds.
- 3.97 Moreover, interoperable effects in the long-term also depend on the future decisions regarding ERTMS. This is supported by the stakeholders, since it was agreed in April 2012 in the new Memorandum of Understanding (MoU) between the European Railway Associations and DG MOVE that *“once adopted, Baseline 3 will provide a stable basis. We do not consider the need to envisage a new Baseline in the foreseeable future”* (Article 37).

Conclusion

- 3.98 Where the intervention was successful (through early detection of, and willingness to address, issues on the part of stakeholders), the benefits in terms of interoperability can be expected to be sustained over the long term. However, since the technical follow-up, in its present form, cannot result in stakeholders

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being mandated to implement interoperable solutions, and as technical solution implementation depends on legislative requirements, the objective of the initiative was only partially achieved.

Recommendation

3.99 We have no specific recommendation here.

To what extent have the results of the technical support been disseminated to stakeholders?

3.100 While ERA and TEN-T EA each received copies of the final reports and acted as observers during the technical follow-up, the dissemination of information has generally been limited. Project beneficiaries who had meetings with the external experts did have access to meeting minutes and were made aware of interoperability issues if any were found. In the early years, they did not receive copies of the reports compiled by the external consultants on their project. One Infrastructure Manager stakeholder observed that *“it is difficult to see the outcome of the technical follow-up, since we had reduced visibility of the reports produced”*. We understand that since early 2011, project beneficiaries have been sent a copy of the draft report received by DG MOVE so that any reporting mistakes could be corrected.

3.101 The decision not to circulate reports to stakeholders was made by DG MOVE as it considered that effective and honest reporting on the part of the external experts might be compromised if there were complete transparency. DG MOVE were particularly concerned that if the reports prepared by external experts were read by stakeholders, the quality of the insights might be undermined. In addition, the issue of commercial confidentiality had been raised by certain project managers and the contract with the external contractors included provisions on confidentiality, meaning that broad dissemination of the reports was not possible.

3.102 We understand that there has been little communication on the technical follow-up. One Member State contacted observed that *“it is not clear to us in what way the technical follow up was performed in our country in the past, and what parties were involved. Although we are responsible for the ASR⁴, together with the Infrastructure Manager, we do not know of any external follow up. If you could give information on this it would interest us.”* We indicated to this Member State which projects had been followed-up, with the result that they were able to identify the project beneficiaries.

Conclusion

3.103 In the early stages of the follow-up, there was only a limited amount of information disseminated to stakeholders, but this was subsequently enhanced. There was no external communication and therefore, apart from the few stakeholders directly involved with the follow-up, there is little awareness of the benefits of the follow-up.

⁴ ASR: Action Status Report. The ASR is used by project beneficiary to report on the technical as compared to the initial plan, as well as the associated budget consumption. It is the main document used by the TEN-T Executive Agency to follow and review the progress of a given project.

Recommendation

- 3.104 We recommend that some consideration is given to greater transparency on a project basis for project beneficiaries and on a larger scale for the benefit of the intervention and the community of stakeholders with interests in ERTMS interoperability.

Added value*Would it have been possible to achieve the same results without Commission-funded technical follow-up?*

- 3.105 In the period 2006-2008 the Commission sought to encourage suppliers to increase their co-operation with independent laboratories in order to ensure the availability of efficient testing tools and procedures allowing verification of the compatibility of new lines with all already existing on-board equipment. This approach proved to be very long to implement (this is still not the case) so it does not seem that other approaches were feasible.
- 3.106 At the time of the call for tender for technical assistance, neither ERA nor TEN-T Executive Agency were in a position to ensure the IOP monitoring as required in the Terms of Reference. The mandate of the TEN-T EA covers monitoring of the implementation of TEN-T co-financed projects and does not encompass detailed analysis of the IOP issues in ERTMS projects. At that time ERA was heavily involved in stabilisation and development of the standard. ERA is an Agency funded from the EU budget. There is currently no mention in the work programme of ERA that relates specifically to the activities performed by the external experts, nor do they have a budget allocation within their budget for these activities. The TEN-T Executive Agency funding comes directly from the TEN-T Programme. The Executive Agency budget for 2012 is €9.805 million (value of the Commission subsidy).
- 3.107 Some stakeholders who have set up project management and organisation arrangements to ensure that interoperability is achieved have stated that the same results could have been achieved on their projects without Commission-funded follow-up. Other stakeholders disagreed.

Conclusion

- 3.108 It is encouraging to see some stakeholders believed that there was no need for the Commission to ensure technical follow-up. However, the evidence suggests that only a minority of project beneficiaries are able to deliver fully interoperable solutions, and we consider that similar results could not have been achieved on other projects without technical follow-up.

Recommendation

- 3.109 We recommend that the technical follow-up is maintained beyond 2012. This is further discussed in the next Chapter.

4 Looking forward

Introduction

- 4.1 In this chapter we examine the need or not for a technical follow-up beyond 2012. We also present key aspects of what is required for an adequate follow-up in terms of skills, resources, timeline, etc. We then consider and evaluate the options available for the entity(ies) in charge of the follow-up.

To what extent is there still a need for technical follow-up?

- 4.2 There are a number of points to take into account when assessing the need to an extension of the technical follow-up beyond December 2012.
- 4.3 First of all, it appears that the risk of funding "non-interoperable projects" is still high and could seriously undermine the effectiveness of the projects. This would also contribute to a negative image of the Commission if this was the case since ERTMS is a technology that been led "top-down" to an extent by EU Directives on Interoperability (but "bottom-up" as well by the suppliers).
- 4.4 As far as ERTMS implementation is concerned, this is a critical moment where some countries will be implementing the 2.3.0.d version while others will start with baseline 3. Some countries have now the benefit of a significant amount of experience with ERTMS, whilst some others have ERTMS programmes to be started. Implementation in the ERTMS corridors is also only at a preliminary stage. Given the limited extent of knowledge exchange and cooperation within and between ERTMS projects, there is a case for ensuring that countries implementing ERTMS can benefit from some technical follow-up.
- 4.5 When comparing the cost of the current technical follow-up with the amount of funding offered to ERTMS projects (€1.25 million spent for the follow-up against €520 million of committed EU funds for the ERTMS projects, i.e. 0.2% of the committed funds), it shows that the financial weight of the technical follow-up is small relative to the benefits achieved (even if partial). Since it is expected that ERTMS projects will benefit from funding in the next Financial Period and because the technical context remains not so different to the one that prevailed in 2007, the case for continuing the follow-up is strong.
- 4.6 Various stakeholders also stated that it is still the case that certificates issued by the Notified Bodies cannot be relied upon. There are some issues with the quality of the EC certificates which has an effect on the authorisation issued. These stakeholders felt that "there is still the need for someone on the ground to make sure things work". Technical support remains crucial for the assessment, verification of the milestones and deliverables of ERTMS projects, which is undertaken by the TEN-T EA in cooperation with ERA.
- 4.7 It is important to have a mechanism that is able to ensure that tenders launched by Infrastructure Managers or Railway Undertakings as a result of TEN-T funding are fully ERTMS compliant. For the European Railway Agency early detection of problems or difficulties remains important.

- 4.8 Nonetheless, it is expected that risks related to interoperability will, in the long term, gradually reduce through improvements to the technical specifications, the upgrading of the fleet to the last interoperable baseline, better selection procedures, stabilisation of the baseline, increased awareness of stakeholders of the benefits of participating in the follow-up and early intervention.

Conclusion

- 4.9 We believe there is still a serious and necessary on-going need for the level of support that has been provided by the technical follow-up of TEN-T funded ERTMS projects. We expect this need to gradually phase out. Since ERTMS projects are still going to be implemented up to 2022 (two years after the end of the 2014-2020 Funding Period which includes ERTMS support), we would expect the phase out to take place after the end of the 2014-2020 Funding Period rather than before.

Recommendation

- 4.10 We recommend that the technical follow-up should be extended beyond 2012 and phased out at the end of the 2014-2020 Funding Period. The length of the technical follow-up would need to be assessed against the timeline of the projects to be followed-up.

What is required for a successful Technical Follow-up

The roles required

- 4.11 Undertaking a successful follow-up requires a number of roles to be undertaken by the Commission and/or its Agencies and/or external consultants. Understanding and clarifying what the roles are is helpful in order to understand which entity is better placed to undertake it.
- 4.12 The following roles detailed below were all required during the technical follow-up and would continue to be required if it were extended.
- **Specify:** this requires DG MOVE or the entity in charge to detail what the requirements of the technical follow-up are (the need for more detailed Terms of Reference). It requires good knowledge of the objectives to be achieved as well as the skills to “translate” this into a detailed requirement and specification for works.
 - **Monitor:** regular monitoring to check that the task is conducted according to expectations, but also that the terms of reference were adequately expressed so that corrections to the outputs can be provided if necessary. Also requires detailed technical knowledge in order to be able to challenge the outputs provided.
 - **Undertake:** liaising with project beneficiaries, obtaining and gathering information, analysing documents, distilling information, formulating proposals and mitigation measures, writing reports and provision of technical support to ERA.
 - **Contract:** financial contractual matters for DG MOVE, including support for contract conclusions;
- 4.13 There are some other roles that are less important but have emerged from the discussion with stakeholders:

- Disseminate information: Requires a good understanding between the various entities in order to make sure that the information is correctly disseminated and that the internal stakeholders are aware of the work conducted.
- Provide additional support to the project beneficiaries: it was felt by some stakeholders (including ERA) that there is a need not just for the technical follow-up as it already exists but for some additional support for beneficiaries so that the technical follow-up should be a win-win situation for EU institutions and project beneficiaries; it could take the form of workshops but would need to be very targeted and very technical. Workshops could also provide an opportunity for project beneficiaries from different corridors to collaborate in sharing knowledge and experience.

Adequate skills

- 4.14 There is no doubt that the most paramount skill in undertaking the technical follow-up is detailed knowledge of ERTMS specifications and TSI CCS. However other skills that are important to a successful and efficient follow-up are:
- Legal understanding: it is important to understand what the current legal framework for ERTMS is in Europe, because just knowing about ERTMS technology would not be sufficient. This requires the need to keep up to date with Change Requests and any other developments;
 - Associated understanding: an understanding of the commercial and specific national issues (including contractual requirements) would also be helpful as well as knowledge of the role of each entity involved with the TEN-T Programme.
 - Stakeholder consultation skills: to liaise adequately and effectively with stakeholders, in order to build good relationships and ensure continuous monitoring rather than on a periodic basis;
 - Adequate language skills and culture knowledge to follow-up projects in different EU countries, especially in those where English is not spoken or regarded as a language of international communication.

Adequate timeline

- 4.15 To be efficient the timeline of the technical monitoring needs to be aligned with the timeline of the projects to be monitored. ERA highlighted that it thought the “timeline of the technical follow-up is critical”.
- 4.16 Most stakeholders have mentioned that to be fully efficient, technical monitoring should start in the tendering phase to be able to raise awareness on interoperability issues even at this stage and last until the testing phase or at worse the beginning of the implementation phase. It is better to invest upfront when risks and mitigation measures can be identified, whereas the impact of later activities has more limited effectiveness.
- 4.17 While agreeing with “the earlier, the better” principle, the TEN-T EA confirmed that for its purposes the technical follow-up would be extremely useful at the final payment stage to assist in verifying completion of the deliverables”.
- 4.18 The aim of the follow-up was to provide continuous reporting to DG MOVE so that any issue could be flagged up in time and a mitigating measure offered as soon as

possible. In practice the monitoring was periodical, taking place once or twice a year. It should be recommended that the follow-up is effectively continuous. This would require slightly more days per project than has been used previously.

- 4.19 As to whether the technical follow-up should be done when projects already reached the middle of their lifecycle, ERA felt it was difficult to conclude because it depends on project conditions such as project size, special or general interest, past experience of the Member State, first time or not that a project is subject to technical follow-up, so we recommend that a pragmatic approach remains.

Adequate resources

- 4.20 It is important that the level of resources is correctly planned in order to maximise efficiency and returns and minimise waste. We reviewed the level of resources in Chapter 3 and came to the conclusion that most resources were adequate for the mandate provided. At this stage it is also useful to envisage that there may or may not be a need to use external experts. This would of course have an impact on the level of resourcing required. Based on the roles defined above and the assumption that staff have the adequate skills, we believe the following level of resources could be envisaged

- **Specify:** The launch of Call for Tender initially took approximately 40 man-days in 2008 for DG MOVE, a further 4 man-days for ERA and 2 man-days for the TEN-T Executive agency, giving 46 days in total. This included defining the specifications and writing the brief (assumed to be 30 days), as well as the proposal selection process (assumed to be 16 days). As there is now a better understanding of what is expected and a draft brief, the number of days associated would be expected to go down. If the use of consultants is retained, then there is no possible reduction in the number of days for the selection process. If instead the work were carried out internally by DG MOVE or another entity, then the time used for the selection of consultants would likely to be needed for internal recruitment processes instead.
- **Monitor:** DG MOVE estimated that project management took an average of 4 man-days per year per lot and that meetings attendance and the associated preparation would take a further 3.3 man-days per lot per year. The final report review accounted for 2 man-days per lot. This implies a total of 28 man-days or 9.3 man-days per lot for DG MOVE. ERA and TEN-T Executive Agency respectively reported an average of 4 man-days per year per lot and an average of 1.3 man-days for project management. For meetings attendance and the associated preparation, they each reported 1.3 man-days per year per lot. This implies a total of 16 man-days per year for ERA and 8 man-days per year for TEN-T EA. Overall EU institution time associated with project management and meetings is therefore estimated at 52 man-days per year.
- **Undertake:** both sets of consultants have quoted an average of 10 man-days each year per project to follow-up. This is of course an average and based on the state of development, complexity and priority of the project, and thus will vary by specific project. This implies a periodic reporting and does not allow for some regular time to be in touch with the project beneficiaries. We estimate that an additional 3 man-days per project would be required.

- **Contract:** contracting and administrative matters were quite complex and required a large amount of time from DG MOVE: 20 man-days for contractual issues, as well as 6 man-days for secretarial support. No contracting time was reported by ERA or TEN-T EA.
- **Disseminate information:** We would estimate that this would require 1.5 man-days per project per year
- **Support:** depending on the form that the additional support would take, we would assume that it would take 10 man-days per workshop.
- **Contingencies:** In the past there have been some unforeseen complications (such as change in the team members, mergers of contractors) requiring, in some cases, amendments to the contract.

4.21 In summary, based on the number of projects to follow-up in the 2011-2012 contract period (8 for Lot 1, 10 for Lot 2 and 8 for Lot 3), then the total man-days required to undertake all of the above would be of the order of 447 man-days in the case where there is no need for external experts. With external experts the total number of man-days is estimated to be 529 man-days. In terms of FTE⁵ (Full-time equivalent) per year, it represents 1.9 FTE and 2.2 FTE respectively as shown in the table below. This means that the difference in resourcing required depending on the use of external experts is 82 man-days or the third of the annual time of a EU officer.

TABLE 4.1 ESTIMATE OF ANNUAL RESOURCES REQUIRED

Role	Effective in 2011-2012	Assumed achievable in future	
		without the need for external experts	with the need for external experts
Specify	46 man-days	20 man-days	36 man-days
Monitor	52 man-days	12 man-days	52 man-days
Undertake	244 ⁶ man-days	338 man-days	338 man-days
Contract	26 man-days		26 man-days
Disseminate	0 man-days	39 man-days	39 man-days
Support	0 man-days	30 man-days	30 man-days
Contingencies	8 man-days	8 man-days	8 man-days
Total	376 man-days	447 man-days	529 man-days

Source: Steer Davies Gleave estimates, based on data provided by DG MOVE, ERA and TEN-T EA

Notes: In the scenario where there is no need for experts, we assumed no man-days for translations and have assumed that there are no language issues. In this scenario, we have

⁵ We assume that there 5 working days per week less 25 days of leave per year.

⁶ As reported in time-sheets

assumed that even though there is no need to contract out, write a brief or select experts, there is still a need for detailed Terms of Reference, definition of outputs, timelines, performance measurements, etc. In this scenario, we have also assumed that even though there is no need to monitor the work of the entity in charge, we have assumed that the other EU institutions remain as observers and would therefore need a limited number of man-days to carry out this task.

4.22 Responses from stakeholders about FTE required are of the same order of magnitude:

- A technical expert quoted 2-3 FTE;
- An EU institution quoted 3-4 FTE. This is twice the amount provided here, but given the level of detail that this organisation would be willing to go into may explain a higher figure. The fact also that it is a public institution with more reporting constraints and administrative processes may explain this difference.

Buy-in from stakeholders

- 4.23 Without cooperation from stakeholders it is difficult or very slow to ensure participation in a programme designed to ensure that the European money invested serves its correct purpose. Therefore, there is a need to raise the awareness of the Technical Follow-up and its benefits for all. One of the expert consultants reported that at the start of a follow-up project with an Infrastructure Manager (IM) they attended meetings with 12 individuals from this organisation, including Financial Directors, engineers and lawyers, whereas one or two technically competent people would have been enough. It appeared that this IM had expected an adversary meeting to address non-compliance or non-conformities, rather than the intended purpose of a technical discussion to highlight issues and discuss corrective measures.
- 4.24 For future ERTMS Calls, there is the simple possibility of making participation in the technical follow-up a compulsory requirement. The technical follow-up should at least be described to project beneficiaries in the tender documents, so that its associated costs (particularly those driven by resource time) can be taken into consideration by the project managers in their bid budgets. It would help to reduce the feeling of additional burden imposed onto them by DG MOVE later on.
- 4.25 For projects that are currently funded and subject to technical follow-up, more information dissemination could be done. Cross-border projects and corridor projects would benefit from communication from project to project. In some cases, the meetings for the technical follow up with the external experts were the initial contact between the countries involved. This is of course not an isolated issue and there is a large amount of evidence that shows that different countries involved in cross-border TEN-T Programme projects have not been proactive in these matters. Nonetheless the technical follow-up is a tool that could be used to further enhance the European cooperation.
- 4.26 One stakeholder also thought that there is currently no clear mechanism between the political level commended by the EU ERTMS Coordinator and the technical level and this was felt to be an area to be addressed.

- 4.27 A stakeholder also pointed out that it is important to ensure coherence and avoid fragmentation for the project beneficiaries so that they are not asked the same questions for the technical follow-up, then by TEN-T EA and possibly by DG REGIO.

Should all projects be subject to monitoring actions, or would it be more efficient to target actions?

- 4.28 There is no question that the state of ERTMS implementation varies across countries and corridors and that there are some countries which are seen as proactive while some others have not started ERTMS implementation. The recent 2011 ERA report “*Progress with railway interoperability in the European Union*” showed that the deployment of ETCS track-side in countries like Spain, Bulgaria, Luxembourg or Italy had progressed since 2008. Some of the reasons used to justify slow or no progress include a reluctance to invest in a new expensive technology for those Member States that have recently fitted modern non-ERTMS signalling systems, or physical network separation, such as due to non-standard track gauge or geography (e.g. location on an island).
- 4.29 In our view all the projects that are benefitting from European funding should expect to be subject to technical follow-up.
- 4.30 Besides, implementation of ERTMS projects in Europe is not yet in a situation where EU institutions can “sit back and relax”. There is no guarantee that past compliance will ensure compliance in the future, even for projects in the same country because they may comprise different teams or organisations.
- 4.31 Nonetheless, the public resources available to the follow-up are finite and from an efficiency point of view targeted action would be more useful. It could be useful to distinguish between monitoring, which should be routine practice, and a specific technical follow-up. In these conditions, a targeted technical follow-up would be reasonable. Some Member States, such as Austria, have designated an independent system integrator whose mandate encompasses the safeguard of interoperability, so in this case monitoring only would be sufficient once DG MOVE is satisfied that the system integrator will be able to perform according to its mandate.

Conclusion

- 4.32 Targeted technical follow-up should offer a better use of European funds. However EU institutions should be able to have a regular monitoring of all the technical issues of projects.

Should the technical follow-up actions be aimed directly at project level or indirectly at Notified Body level?

- 4.33 All the Notified Bodies that we approached to participate in the study either declined to participate or ignored the opportunity to participate, so unfortunately the comments below do not include the views of the Notified Bodies.
- 4.34 A Notified Body (NoBo) is a body that has been deemed competent by a Member State to verify the compliance of Interoperability Constituents and Subsystems with the relevant specifications, and to certify their compliance. To qualify for notification, a prospective Notified Body must also demonstrate that it fulfils the criteria set down in Directive 2008/57/EC, which deal with independence,

integrity, confidentiality and competence. A body which is deemed to meet these criteria is then notified as such to the European Commission, and hence becomes a Notified Body.

4.35 In practice the role of a Notified Body is to issue certificates: EC declaration of IC conformity and EC declaration of verification of a CCS sub-system. It requires Notified Bodies to check that:

- (IC Conformity) All mandatory functions applicable to the interoperability of the constituent have been implemented;
- (IC Conformity) Which optional functions applicable to the interoperability of the constituent have been implemented;
- (IC Conformity) Any additional functions implemented are not in conflict with the implemented relevant TSI CCS functions;
- (CCS subsystem) Check that the interfaces (either into a vehicle or into a line) and the assigned functionalities are working properly; and
- (CCS subsystem) Check of the compatibility between track and train.

4.36 It can indeed be seen from the list above that the role and tasks that Notified Bodies are appointed for are extremely useful in the context of the technical follow-up. However there was a strong consensus among the stakeholders who responded that the technical follow-up actions should be aimed directly at project level rather than indirectly at Notified Body level. The reasons are:

- Having a Notified Body certificate is not yet sufficient for interoperability. There are still some issues remaining concerning the Notified Body certification process. This view was mentioned in the 2011 report of ERA “*Report on the certification of ERTMS equipment*”.
- Notified Bodies intervene at the end of the project, and therefore there is little chance that corrective actions can be made easily.

Conclusion

4.37 It appears that it is preferable for the follow-up to be aimed directly at project level. However this should not prevent the involvement of Notified Bodies where relevant.

EU funding instruments for the TEN-T network

4.38 The TEN-T Programme is not the only source of EU funding for the TEN-T network: the Cohesion fund and the Regional development fund contribute to the TEN-T network too. These funds are financial tools that aim at reducing regional disparities and imbalances in terms of income, wealth and opportunities.

4.39 The Cohesion Funds are aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the EU average. They provide financial assistance to transport infrastructure-related studies and works aimed at having a leveraging effect on other sources of funding (both public and private).

4.40 For the period 2014-2020, the Commission has proposed that €31.7 billion be invested, via the Connecting Europe Facility (CEF), to support the TEN-T development. This includes €10 billion ring fenced in the Cohesion Fund exclusively for transport projects in the countries eligible to the Cohesion Fund. The

remaining €21.7 billion will be available for all Member States, including those eligible to Cohesion Fund support, for investing in TEN-T infrastructure. DG MOVE is responsible for the TEN-T Programme whilst DG REGIO is in charge of the Cohesion and Structural funds. The governance and the regulations of the Funds differ as illustrated in the table below.

TABLE 4.2 EU INSTRUMENTS SUPPORTING TEN-T PROJECTS

	TEN-T Programme	Cohesion and Structural Funds
Responsibility of	DG MOVE	DG REGIO
Management of projects	Centralised management by TEN-T EA.	Shared management with Member States
Selection of projects	Project selection through calls with the support of external evaluators (TEN-T EA).	Programmes agreed with Member States and project selection by Member States. Support to project preparation through JASPERS (joint facility with EIB). Ex-ante approval for major Projects (over EUR 50 m).
Geographical focus	EU27 with majority of the grants in EU15.	EU27 but focus on EU12 and less developed areas of EU15
Co-funding	Varies depending on project type and importance; Up to 50%. ERTMS projects up to 50%.	Up to 85% of cost of eligible work.
Performance management	Close project follow-up and high payment execution.	MS limited capacity in preparing mature projects and in absorbing the EU funds. Issues are detected during ex-post control.

Source: Mid-term evaluation of TEN-T Executive Agency, July 2012

- 4.41 ERTMS projects like the one described in the box below are funded with Cohesion Funds. The project started in 2011. Experience has shown that ERTMS projects are complex and require very strong commitment from Member States, EU institutions, NSAs and Notified Bodies to deliver truly interoperable networks. Even with an adequate project management from the TEN-T EA, DG MOVE ERTMS projects have benefited from the technical follow-up. It is difficult to see why DG REGIO funded projects would not benefit from the same sort of technical follow-up that DG MOVE has implemented.

The installation and testing of ERTMS Level 2 will be done on a 37 km stretch of the Bucharest to Brasov railway line. It forms part of the TEN-T Priority Axis 22 railway line, which runs from Constanta in Romania to the border with Hungary (close to Curtici). This is a 4.5 year pilot project ahead of nation-wide deployment of a value of € 51 million with EU co-funding amount of €43.5 million. It includes the installation of track-side transmitters, on-board equipment in a minimum of six passenger service locomotives from CFR Calatori, and installation of a rail-based GSM radio network (GSM-R).

- 4.42 There are some negative points about including DG REGIO project to those of DG MOVE, but they appear minor and short-term only: it would mean that the technical follow-up would be more complex in the short-term because projects have been managed with two set of rules. It would also require enhance collaboration between DG MOVE and DG REGIO which is a positive aspect but may have teething problems at first. The budget for the technical follow-up would also need to reflect the addition of DG REGIO projects.

Conclusion

- 4.43 There does not appear to be a clear rationale justifying why the technical follow-up to TEN-T funded projects cannot also apply to projects funded by the Regional Development and Cohesion Funds.

Summary of conclusion

- 4.44 In order to have a successful follow-up, we recommend that the adequate shape of the technical follow-up should be:

- Continuous;
- Flexible to adapt to changing circumstances;
- As transparent as possible for stakeholders;
- Aimed directly at project level; and
- Include DG REGIO projects.

Which entity should be in charge of the technical follow-up?

- 4.45 We have been asked in the Terms of Reference to consider which entity could most effectively identify interoperability risks on TEN-T funded ERTMS projects. We discuss the possible options below.

No change scenario

- 4.46 This scenario means no change compared to the current situation: DG MOVE is the entity in charge of specifying, monitoring, and contracting. External consultants would be in charge of undertaking the technical monitoring and if required, disseminating the information and providing additional support to project beneficiaries. ERA and TEN-T Executive Agency remain observers.

TEN-T Executive Agency in charge

- 4.47 This scenario means that the TEN-T Executive Agency would be in charge of specifying, monitoring, and contracting the follow-up. TEN-T Executive Agency would hire technical staff with the adequate technical and other skills discussed earlier. These internal experts would be able to undertake the technical follow-up and could support TEN-T EA in its search for information at project closure. In the short-term TEN-T EA would need to hire external experts if the recruitment process was too slow, because the Agency would currently be unable to undertake the technical follow-up. TEN-T EA would also be in charge of disseminating the information and providing additional support to project beneficiaries. DG MOVE and ERA would be observers.

European Railway Agency in charge

- 4.48 The technical follow-up is already a priority for ERA because of the benefits it brings, but it is not currently part of the ERA Work Programme. ERA already have adequate ERTMS skills in-house but would need to allocate more specialist staff to be able to undertake the technical follow-up, which may not be possible in the short-term. Therefore we consider the following variants:
- i) European Railway Agency solely in charge: in this scenario, ERA would be in charge of the whole follow-up i.e. specifying, undertaking supporting and disseminating. There would be no need for man-days associated with monitoring or contracting, because ERA would use its own in-house experts and would not need to rely on and manage external consultants. DG MOVE and TEN-T EA would be observers;
 - ii) European Railway Agency and external consultants: in this scenario, ERA would use external consultants to undertake the technical follow-up, because it would not be able to allocate its skilled staff to the technical follow-up. ERA would be in charge of specifying, monitoring and contracting. The external experts would also be employed for disseminating the information and providing additional support to project beneficiaries. DG MOVE and TEN-T EA would be observers;
 - iii) Joint management of ERA and TEN-T Executive Agency with external experts: this scenario would employ external consultants to undertake the technical follow-up, because ERA would still not be able to allocate its skilled staff to the technical follow-up. In this scenario, however, ERA would focus on the relationship and knowledge exchange with the external experts by being in charge of specifying and monitoring only, leaving another EU entity (TEN-T Executive agency) to be in charge of contracting. The external experts would also be employed for disseminating the information and providing additional support to project beneficiaries. DG MOVE remains an observer;
 - iv) Joint management of ERA and DG MOVE with external experts: same as above scenario (Joint management of ERA and TEN-T Executive Agency with external experts), but it would be DG MOVE who would undertake the contracting, rather than TEN-T Executive Agency.

Shifting the responsibility of the technical follow-up to project beneficiaries

- 4.49 This scenario means that project beneficiaries or Member States would be in charge of undertaking the Technical follow-up themselves. This would be a requirement of the Call Decision. They would need to hire external experts that would report to them and then project beneficiaries would have to send this information to TEN-T EA. Beneficiaries or Member States would need to be in charge of contracting and monitoring. TEN-T EA would be in charge of specifying. There would be no need to have entities in charge of the disseminating and additional support since this could be provided directly to the beneficiaries by their consultants. DG MOVE and ERA would be observers.

Build on the strength of the ERTMS European Coordinator

- 4.50 This scenario means that the ERTMS European Coordinator (Mr. Karel Vinck) would need to ensure that each of the project beneficiaries abides by the ERTMS and interoperability rules. His role would remain political but also include additional technical responsibilities. He would need to be supported by external experts, would be in charge of undertaking the technical monitoring and if required, disseminating the information and providing additional support to project beneficiaries. Because the European Coordinator has no power to hire experts (unless his mandate was to change), DG MOVE would need to be in charge of contracting and to an extent specifying. The European Coordinator would be in charge of monitoring. ERA and TEN-T Executive Agency remain observers.

Assessment of the best entity to be in charge

- 4.51 We present in this part our analysis of the entities that could be in charge, based on the scenarios that are described above and the criteria for assessment which are detailed below.

Assessment criteria

- Relevance: how does undertaking the technical follow-up fits with the mission of the entity?
- Effectiveness: how effective would the entity in charge be at delivering a successful technical follow-up and ensuring that projects are fully interoperable?
- Efficiency: what would be the cost efficiency of the scenario (for EU institutions)?
- Sustainability: to what extent would the outcomes of the intervention fully exploited and contribute to the objective of interoperability?

- 4.52 The table below presents the results of the assessment. It is largely qualitative owing to the lack of quantitative data. We detail after the table how we arrived at these results. We compare each option versus the reference option which is “no change: DG MOVE remains in charge”.

TABLE 4.3 OPTION ASSESSMENT

OPTION	Relevance	Effectiveness	Efficiency	Sustainability
No change: DG MOVE + experts	0	0	0	0
TEN-T EA in charge + experts	++	--	0	0
ERA solely in charge	++++	++	+	++
ERA + experts	++++	++	0	++
Joint management ERA/TEN-T EA + experts	+++	+	-	++
Joint management ERA/DG MOVE + experts	+++	+	-	++
Project beneficiaries + experts	++	----	++	----
ERTMS Coordinator in charge + experts	++	----	0	0

Note: Ratings reflect degree of better (+ symbols) or worse (-symbols) relative to base line of no change

Relevance

- 4.53 There is no doubt that ensuring interoperability is one of the objectives of each of the EU institutions. This is why all have been rated neutral or positively. DG MOVE is the pilot at the helm of the TEN-T Programme, including interoperability. Its mission objective consists of *“Building the EU’s core trans-European infrastructure network as the backbone of a multimodal sustainable transport system capable of delivering fast, affordable and reliable transport solutions to serve Europe’s transcontinental corridors as well as the needs of its urban centres”*. It is not specifically in charge of the management of the interoperable risks.
- 4.54 The mission of TEN-T Executive Agency is to “turn DG MOVE policy into action. Its mission consists of ensuring the technical and financial management of the projects and the successful implementation of the TEN-T Programme”. It monitors the TEN-T funded ERTMS projects. It also aims at providing benefits to the beneficiaries of the TEN-T project funding by (among others) increasing the types of services offered, targeting the flow of information and improving the visibility for EU support to infrastructure projects through dissemination activities. Because it is specifically in charge of delivering the successful implementation of the Programme (which would include interoperable issues), it has been ranked more relevant than DG MOVE.
- 4.55 One of the core objectives of The European Railway Agency is “improving the interoperability of the European rail system by developing the conditions for the free and uninterrupted movement of trains through technical and operational

- harmonization, including conditions for mutual acceptance of railway vehicles” which explains why it has been rated as the highest of all. ERTMS is part of the core activities of the Agency, having a Unit dedicated to it that is held in high regard by the stakeholders who took part in this study. The role of this unit is to monitor the work done by the equipment suppliers who are both collaborators and competitors.
- 4.56 One current objective of ERA is to streamline the current procedure of testing and authorisation in order to ensure full application of the existing legislation and thus progressively reach a point where all procedures related to testing and authorisation of ETCS and GSM-R on-board units can be completed by means of a common, unique and cost-effective procedure.
- 4.57 The activities relating to the technical follow-up are not part of the current Work Programme of ERA, although are compatible with it.
- 4.58 Steer Davies Gleave has recently completed an impact assessment of the future role of ERA for the European Commission. This study is not as yet public but confirms the need for a greater role for the Agency within the sector. ERA in charge of the technical follow-up would not be incompatible with the conclusions of the study. However, it is important to note that this specific issue was not considered at the time of that study and therefore has not been taken into consideration when calculating changes in resource requirements notwithstanding the comments set out above.
- 4.59 Therefore, undertaking the technical follow-up would provide a good “fit” with ERA’s current activities.
- i) In the case where ERA is solely in charge, this has been rated the highest.
 - ii) In the case of ERA and external experts, this has also been rated as high as ERA solely in charge, because it does not change the relevance of the intervention.
 - iii) In the case of joint management of ERA with TEN-T Executive agency and use of experts, we believe it is a slightly less good “fit” than the two options above, because the contribution of TEN-T Executive Agency to the follow-up is less evident from the mission statement of TEN-T EA.
 - iv) We believe that the same rationale applies for DG MOVE.
- 4.60 The mission statement of the European Coordinator for ERTMS writes/puts interoperability at the heart of his role. Therefore, we have rated the European Coordinator as high as the TEN-T Executive Agency.
- 4.61 Project beneficiaries of ERTMS calls have been rated positively, because they are actually receiving EU funding to implement an interoperable technology. Interoperability is part of the Call requirement and should therefore be a high priority of their deliverables.

Effectiveness

- 4.62 We believe that DG MOVE, ERA or TEN-T EA would offer the most effective solutions. DG MOVE would be an effective solution having handled the process previously. We see no added benefits with TEN-T EA in terms of effectiveness compared to DG MOVE: it would need to rely on external consultants to achieve the objectives of the follow-up in the short-term, and even if it hired staff in the medium-term, there is a risk that these staff would only be necessary for a couple of years (until the follow-up is phased out). This is why TEN-T EA has been rated lower than DG MOVE.
- 4.63 Overall, when ERA is in charge, we believe that the effectiveness of the intervention is increased. We rated ERA to have a higher effectiveness than DG MOVE or TEN-T EA because ERA has all the required skills in-house. Also, ERA would have an incentive to deliver an effective follow-up as the process supports ERA's objectives of improving interoperability through implementation of an effective ERTMS. ERA is already an observer to the follow-up process, so is aware of the relevant issues project by project.
- i) Where ERA is solely in charge and where ERA used external consultants, we believe that these are the most effective solutions.
 - ii) For all the scenarios where ERA is involved, we see little difference in effectiveness because in all cases ERA will always be in charge of delivering an effective technical follow-up (and ultimately interoperability).
 - iii) Where there is joint management of ERA and TEN-T Executive Agency, it is actually ERA who is the entity in charge of delivering an effective follow-up whereas the involvement of TEN-T EA remains removed from the monitoring of projects or their management since it is only focussed on the contracting activities. In this case we believe that there is only a limited risk of interference and therefore estimate that the effectiveness of this scenario should be nearly as good as the ones above.
 - iv) The same rationale applies for the joint management of ERA with DG MOVE.
- 4.64 We rated project beneficiaries very negatively because we believe that ensuring interoperability is part of their goals under DG MOVE (and DG REGIO) funding rules and therefore in theory there should be no need for a follow-up. It is also hard to imagine how effective it would be on the ground: a large variety of independent experts would have to be hired, which may not be easy or the quality of the advice provided may not be adequate. The reporting style and level of detail provided to TEN-T EA could also be a significant issue. TEN-T EA may not even be able to understand the technical information of the reports and would need external advice too. In the case of cross border projects, only one set of experts would need to be hired in order to ensure interoperability but that would be difficult to achieve in practice for different beneficiaries.
- 4.65 The ERTMS coordinator has also been rated negatively because even though it could achieve a positive outcome with the help of external consultants and its good access to Member States, it could be detrimental to its important political

mission. The practical set-up is also quite complex with consultants having to be contracted by DG MOVE, but being monitored by the ERTMS coordinator who has little detailed technical knowledge to do this effectively.

Efficiency

- 4.66 In terms of pure efficiency, shifting the responsibility of the technical follow-up to project beneficiaries is a very simple way to remove any financial cost to EU institutions. However because follow-up would be required as part of the Call, this cost would be internalised by project beneficiaries and may be part of the cost of the project, so in this case there would be no immediate financial gain for the EU.
- 4.67 The cost of external consultants would be of the same order of magnitude in the case where DG MOVE or the ERTMS coordinator would be in charge. The cost of TEN-T EA hiring staff to undertake the follow-up is also estimated to be of a similar order of magnitude.
- 4.68 In the case of ERA, the results vary by option.
- i) When ERA is solely in charge, there are already in-house staff with relevant expertise, so in this case the issue is more about resource allocation rather than resource increases. Compared to all other options with EU institutions, we believe the cost would be lower. However, this would require some increase in ERA's resource budget if the other areas of ERA's work programme were not to be compromised.
 - ii) When there is the need to hire external experts with ERA managing them, we see no real difference in cost efficiency compared to the current scenario.
 - iii) When there is the need to hire external experts with ERA managing them, and joint management with TEN-T Executive agency or DG MOVE, we believe this is unlikely to be as cost effective as the current arrangements, since two EU entities would be involved with some administrative and contracting requirements for each of them.

Sustainability

- 4.69 The European Railway Agency is the System Authority for the European Rail Traffic Management System (ERTMS).
- i) ERA was ranked the highest when it is in charge of the entire follow-up. It would allow ERA to have a greater strategic oversight of the process of enhancing the level of interoperability, a key objective placed on the Agency by the Regulation 881/2004/EC and the subsequent amendment of 135/2008/EC.
 - ii) Where ERA would use external consultants in its relationships with stakeholders, we believe that it would not be as sustainable as ERA solely in charge. There would be no direct contact between the stakeholders and ERA, nonetheless stakeholders would understand that ERA is the authority in charge of the follow-up, and not just an observer as of today. The same rationale applies to joint management of ERA and TEN-T Executive agency/DG MOVE.

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- iii) The joint management of TEN-T Executive agency and ERA was ranked as high as ERA solely in charge for the same reasons, since there would be no real difference in the eyes of the beneficiaries about who is in charge of piloting the study.
- iv) For the same reason, the joint management of DG MOVE and ERA was similarly ranked.

4.70 All other EU institutions have also been rated neutral because there is no doubt that all have similar interest to DG MOVE in improving interoperability: TEN-T EA more from a project management point of view the European Coordinator is more focussed on the overall picture.

4.71 As discussed above, project beneficiaries have not been, up to now, particularly proactive at removing interoperability issues and have been negatively rated.

Weighting the criteria

4.72 Deciding on the weighting of each aspect of the follow-up is required: whilst all aspects could be considered equal, one may argue that some would be more important than others and may need to be reflected in the scoring mechanism.

4.73 Here we took the view that because the criteria are large and encompass many aspects of the evaluation, the same weight would be applied to each of them. Results are displayed in the table below:

- +1 point per “++”
- -1 point per “- -“

TABLE 4.4 OPTION WEIGHTING

	Relevance	Effectiveness	Efficiency	Sustainability	Total
No change: DG MOVE + experts	0	0	0	0	0
TEN-T EA in charge + experts	1	-1	0	0	0
ERA solely in charge	2	1	+0.5	1	4.5
ERA + experts	2	1	0	1	4
Joint management ERA/TEN-T EA + experts	1.5	+0.5	-0.5	1	2.5
Joint management ERA/DG MOVE + experts	1.5	+0.5	-0.5	1	2.5
Project beneficiaries + experts	1	-2	1	-2	-2
ERTMS Coordinator in charge + experts	1	-2	0	0	-1

Short and longer term

- 4.74 The next Multi-annual Financial Framework will not start before 2014. In the meantime and whilst the budgets for each EU entity are not yet confirmed, we understand that some of the scenarios above cannot be realistically considered because of a lack of funding. For instance there is no possibility for DG MOVE or the European Coordinator to obtain a budget to appoint external advisors in the short term.
- 4.75 Similarly, we understand that ERA could undertake the technical follow-up in the short-term, but this would mean that ERA would need to reallocate staff from other functions to employ them on the ERTMS follow-up, which may not be a practical. ERA explained that the technical follow-up is already a priority for them because of the benefits it brings, but it is not currently part of the ERA Work Programme.
- 4.76 Therefore we were asked to advise on the best entity to be in charge in the short term (where resources are constrained) and in the longer term, where it is anticipated that funding constraints will be eased. The table below presents the scenarios that can be considered.

TABLE 4.5 OPTIONS POSSIBLE IN SHORT AND LONG-TERM

	Short-term	Long-term
No change: DG MOVE + experts	Appointment of external experts not possible	Possible
TEN-T EA in charge + experts	Possible if the budget for experts can be secured	Possible
ERA solely in charge	Possible but with need to reallocate ERA resources significantly; impact on other ERA tasks	Possible
ERA + experts	Possible if the budget for experts can be secured	Possible
Joint management ERA/TEN-T EA + experts	Possible if the budget for experts can be secured	Possible
Joint management ERA/DG MOVE + experts	Possible if the budget for experts can be secured	Possible
Project beneficiaries	Possible	Possible
ERTMS Coordinator in charge	Appointment of external experts not possible	Possible

Conclusion on the assessment of the best entity to be in charge

- 4.77 Based on the analysis of the scenario and their respective merits, we believe that the best option is “ERA solely in charge”. This option brings most benefits in terms of effectiveness and efficiency compared to other options involving EU institutions. This is also the option that was most often quoted by the stakeholders who took part and coincide with DG MOVE agenda for externalisation from 2014.
- 4.78 When resourcing constraints are taken into account, this option does not appear to be ideal as it would necessitate a reallocation of resources within ERA to the potential detriment of other work areas. It therefore appears preferable to recommend that ERA appoints external consultants under these conditions. In the long term, when resources are less constrained, the best option to consider remains, in our view, ERA solely in charge.
- 4.79 The scenarios where there is joint management of ERA are interesting in that they provide another solution if the amount of resources required at ERA for contracting and managing the experts were deemed too high. Whether TEN-T Executive Agency or DG MOVE is in charge does not change the results. In our view, having two entities in joint management is less desirable than just one, but this needs to be contrasted with ERA resource savings of not having to contract with the experts. Based on the resource estimations of Chapter 3, we estimate that this scenario would spare ERA of 50 man-days in the first year and 34 in subsequent years. This is based on 16 man-days for the selection of experts (one-off), 26 annual man-days for contracting with external experts and 8 annual man-days for contingencies.

5 Conclusions and Recommendations

5.1 The Terms of Reference described the key objectives of this ex-post evaluation as:

- How effective have the framework contracts (2008-2012) been in delivering the technical expertise and enabling the mitigation and minimisation of interoperability threats to EU-funded ERTMS projects?
- What is the most appropriate way to ensure that these projects (and future ERTMS projects - possibly also including projects which receive Structural Funds) are fully interoperable taking into account resource constraints faced by the Commission?

Conclusions

Conclusion of the present evaluation

5.2 Reports show that the experts have been able to raise awareness of the importance of interoperability and detect in a number of cases interoperability risks. They were also able to identify solutions to mitigate interoperable risks and maintain regular contacts with stakeholders. In some cases, the intervention of experts led to solutions that would not otherwise have been implemented in order to mitigate risks.

Relevance

5.3 There is clear evidence that EU funded projects have not always delivered interoperable networks in spite of the procedures in place. Hence, there was a need for further measures to ensure that project funding was effectively spent in delivering the project goals.

5.4 One of the key questions when looking at the success of the European Union technical intervention on the ERTMS projects funded with TEN-T is the extent of what the intervention has had compared to what the Member States would have been doing without it.

5.5 Lack of interoperability derives from nationalistic technological and operational developments and practices that have been taking place independently at a national level within Europe for many years. The fact that harmonization of operations was not stable until a long time after the introduction of the CCS TSI meant that interoperability had a different interpretation for each country. There is no doubt that in this context a European follow-up has been a successful intervention in that it looked at ensuring full interoperability.

5.6 Therefore we have concluded that the technical follow-up was highly relevant to the goal of reducing or removing interoperability risks in Europe.

Effectiveness

5.7 The external experts have been able to undertake effective technical follow-up on projects where project beneficiaries have shown a willingness to collaborate. In the absence of such collaboration, the technical follow-up was generally not very effective. While both consultants and DG MOVE sought to overcome lack of

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stakeholder engagement, as participation in the technical follow-up is not compulsory, they were not always able to secure the necessary cooperation.

- 5.8 Whether or not technical solutions were fully consistent with TSI CCS provisions was also strongly correlated with the stage of development of the project and the extent of collaboration of the project stakeholders. In the case of projects that had been largely implemented or were nearing completion, consultants had little scope to propose actions to ensure the project was fully consistent with the TSI CCS.
- 5.9 The grouping of projects for the purposes of follow-up was on a corridor and language basis, which we consider appropriate.
- 5.10 Experts have been able to identify solutions to mitigate interoperable risks on projects where there was still scope for change and stakeholder willingness to address, but it was left to the beneficiaries to decide or not to implement these solutions. Therefore, the technical follow-up has helped to reduce interoperable risks, but it has not achieved in full its effectiveness objective of ensuring technical solutions that deliver projects fully consistent with TSI CCS provisions.

Efficiency

- 5.11 The level of administrative requirements was excessive for DG MOVE and in most cases for the external experts, however both parties were able to establish good working practices that did not stop them from the overall objective of the intervention. In the case of other stakeholders, the burden was limited but some stakeholders still resented having to participate in the technical follow-up.
- 5.12 Adequate financial management was applied by DG MOVE and the size of the budget appears proportional to the objectives.
- 5.13 We conclude that the follow-up results were obtained at reasonable costs and that the objective of financial efficiency was achieved whereas administrative efficiency was undermined by burdens.

Sustainability

- 5.14 Where the intervention was successful (early detection and willingness to address by stakeholders), then the effects will last in the near or longer term. Since the technical follow-up is not able in its present form to force stakeholders to implement interoperable solutions, and that technical solutions depend on the legislative requirements, the objective of long-term effect of the follow-up was only partially achieved.
- 5.15 In the early stages of the follow-up, there was only a limited amount of information disseminated to stakeholders, but this was enhanced later on, which we believe was a positive. No external communication was generated which means that apart from the few stakeholders directly involved with the follow-up, no other parties were aware of the benefits of the follow-up. We believe that the outcomes of the intervention in this case were only partially exploited.

Added-value

- 5.16 It is encouraging to see some stakeholders believed that there was no need for the Commission to ensure technical follow-up. Unfortunately there is plenty of

evidence that only a minority of project beneficiaries were able to deliver truly interoperable solutions, so for all the other projects we believe the same results could not have been achieved without Commission-funding.

Conclusion on the need for future technical follow-up

- 5.17 We believe there is still a serious and necessary need for the level of support that has been provided by the technical follow-up of TEN-T funded ERTMS projects. This is because the risk of funding "non-interoperable projects" is still high and potentially damaging for EU institutions, because ERTMS implementation is still in a critical phase in particular on ERTMS corridors and because there are still some concerns with Notified Body certificates. Besides the cost of the follow-up compared to the amount of funding provided to ERTMS projects is very small.
- 5.18 As regard to the TEN-T network, EU funding is fragmented between the TEN-T Programme, the Cohesion and the Regional development fund. The White Paper recognises that *"better coordination of the Cohesion and Structural funds with the transport policy objectives is needed"*. There does not appear to be a clear rationale justifying why the technical follow-up to TEN-T funded projects cannot also apply to projects funded by the Regional development and Cohesion Funds.
- 5.19 However, we expect the need for the follow-up to be gradually phasing out alongside support for ERTMS projects from the Commission. Since ERTMS projects are still going to be implemented up to 2022, we would expect the phase out to take place after the end of the 2014-2020 Funding Period rather than before.
- 5.20 Based on our analysis, we believe the best entity to be in charge of the technical follow-up should be the European Railway Agency. This option brings most benefits in terms of effectiveness and efficiency compared to other options involving EU institutions. ERA is also the System Authority for ERTMS and would benefit from detailed knowledge of the situation on projects. ERA also benefits from ERTMS skills in-house and appears to be a cost effective option compared to the others. This is also the option that was most often quoted by the stakeholders who took part in the consultation for this study and coincides with the DG MOVE agenda for externalisation from 2014.
- 5.21 Selecting this option has a "domino" effect on ERA's ability to resource other tasks. Because of significant resource constraints in the short-term, we came to the conclusion that "ERA in charge" may not be a practical solution in the short-term. Therefore, in our view, the best alternative option, at least in the short-term, would consist of ERA being in charge supported by external consultants. This option would cause less disruption for ERA and scored highly in relevance, effectiveness and sustainability.

Recommendations

- 5.22 We present below our recommendations. The rationale that we used to reach these recommendations is displayed in Chapter 3 and 4.

Recommendations regarding the existing technical follow-up

On the Terms of Reference

- 5.23 We recommend the introduction of a clear and comprehensive definition of “interoperable risk”, rather than relying on clarification at the kick-off meeting.
- 5.24 The Terms of Reference need to be more clearly defined to ensure that the technical follow-up delivers the desired outcomes.

On the reports

- 5.25 We believe that it would be beneficial if the issues for each project were summarised in a consistent format, such as what is suggested in Table 3.1.
- 5.26 We recommend that DG MOVE provides a more-defined structure for the annual reports to ensure better consistency in the format and content of the follow-up reporting; it would make easier reading to have a general progress report and then specific fiches per project.
- 5.27 We recommended using the template that has been developed so that experts can record information collected in a more consistent manner.
- 5.28 Consultants should use common definitions to avoid confusion in the use of terms like “open-points”, “risks” and “recommendations”.
- 5.29 Consultants should be required to ensure that for each project followed-up over more than a year, there is clear continuity between reports and explicit recognition of any changes in recommendations from one year to the next.

Recommendations regarding the future technical follow-up

- 5.30 We recommend that the technical follow-up should be extended beyond 2013 and 2014 until after 2020.
- 5.31 We recommend that the technical follow-up should be conducted as early as possible on projects, even in the pre-tender phase. However, projects that have already been launched or started implementation should not be automatically removed from the scope of the follow-up. The follow-up should be flexible enough to be able to adapt to different project circumstances.
- 5.32 The follow-up should be as continuous as possible rather than periodic. If it needs to remain periodic, then bimonthly reporting appears adequate with immediate information of DG MOVE and ERA of significant issues and risks.
- 5.33 The roles required during the technical follow-up need to be clarified, and in particular whether or not there is a need to follow the outputs of the stakeholder consultation showing that information dissemination and additional support to stakeholders are valued by stakeholders.

- 5.34 We recommend that skills such as legal, stakeholder consultation and adequate language and cultural knowledge are part of the skill requirement of the entity in charge, alongside proven and detailed knowledge of ERTMS technical issues.
- 5.35 The adequate level of resources for the technical follow-up has been estimated to approximately 530 annual man-days.
- 5.36 We recommend not changing the geographic groupings of projects.
- 5.37 The buy-in from stakeholders should be enhanced: firstly by making participation in the technical follow-up a compulsory requirement at Call time, secondly by requiring them to justify deviation from solutions offered by the entity in charge. An illustrative list of documents to prepare for the technical follow-up could also be added, but it would need to make clear that this list can be expected to be refined. The buy-in from stakeholders would also be enhanced if they felt associated to the follow-up and not just “subject” to it. This could take the form of greater communication (by providing them with a copy or lighter version of the reports on their projects) or enhanced cooperation on a corridor or cross-border project basis.
- 5.38 More coherence should be ensured between DG REGIO and DG MOVE: in their requirements to stakeholders but more importantly on ensuring that all ERTMS projects are subject to follow-up irrespective of their source of funding. All projects that are benefitting from European funding should expect to be subject to technical follow-up.
- 5.39 Consider distinguishing between monitoring, which should be routine practice, and specific technical follow-up in order to target better actions to the situations “on the ground”.
- 5.40 The follow-up should be aimed directly at project level, but this should not prevent the involvement of Notified Bodies where relevant.

APPENDIX

A

QUESTIONNAIRE USED

Questionnaire for EU institutions

General

- 1.1 Could you please describe the role and activities of DG MOVE (including a description of the project officers who coordinated the lots, etc) and the interactions with ERA and the TEN-T EA during the technical follow-up?
- 1.2 And with the MS, NSA and NoBo?
- 1.3 Could you please explain to me what happened after the annual reports were received from the consultants? Who received a copy, what happened to the list of actions listed, etc? Did the individual reports feed into any overall programme review?

Looking back**Relevance**

- 1.4 To what extent do you think there was a need for the technical follow-up of TEN-T funded ERTMS projects?
- 1.5 The general objective of the contract was to provide the European Commission and the TEN-T EA with targeted technical assistance consisting of experts liaising with the corridor/project coordinators to ensure that technical solutions implemented within projects were fully consistent with the TSI CCS provisions. To what extent do you think this objective was fulfilled?
- 1.6 To what extent do you think the technical follow-up has contributed to reduce interoperable risks during the course of the framework?

Effectiveness

- 1.7 In your opinion what were the key skills required for the successful delivery of the technical follow-up? (Technical understanding, stakeholder consultation, coordination skills, project management, etc...)
- 1.8 To what extent do you think the timeline of the technical monitoring was adequate? Would you recommend any changes? To what extent were new findings to be found in each set of annual reports?
- 1.9 Do you think the grouping of projects made sense, has geographic coverage been even? If not, how would you enhance it?
- 1.10 In your opinion, what were the key challenges met by the technical consultants during the course of the 3 years? In terms of access and coordination of stakeholders, technical issues, timeframe, budget, etc...
- 1.11 To what extent do you think were the external consultants able to identify technical or other solutions to mitigate the interoperability risks?
- 1.12 What effects (impacts) have been obtained by these technical or other solutions?
- 1.13 Have these effects contributed to the achievement of the objective of minimising threats to interoperability?
- 1.14 Which factors have hindered the achievement of the objectives?

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- 1.15 How useful would you say were the reports for DG MOVE? And the other stakeholders?
- 1.16 To what extent were the Commission decisions based on the external consultants' report conclusions?
- 1.17 Does participation in/implementation of the action appear satisfactory?

Efficiency

- 1.18 Do you feel there was an administrative burden on the management of the technical follow-up, or was it adequate?
- 1.19 Do you think the budget provided to the external consultants was appropriate and proportional to the objectives? If not, which constraints did they have? What figure would you recommend next?
- 1.20 Could the same results have been achieved with fewer resources?
- 1.21 What internal costs (in terms of person-time) have been associated with undertaking the technical follow up?
- 1.22 Would it have been possible to achieve the same results without Commission-funded technical follow-up?

Sustainability

- 1.23 To what extent do you think the outcomes of the intervention are fully exploited?
- 1.24 What impact have the technical follow ups had on the key stakeholders such as ERA, TEN-T EA, MS, project promoters, etc? To what extent has the coordination between Member States on ERTMS been improved by the follow up?
- 1.25 Will the interoperability effects achieved last in the medium or long term?

Added value

- 1.26 Does the technical follow up have sufficient, political and financial power to deliver its objectives?

Supervising the technical follow-up

- 1.27 Do you think DG MOVE was the best placed actor to coordinate the technical monitoring or do you think another actor would have been better? If so, who?
- 1.28 Do you feel that DG MOVE/TEN-T EA had enough technical understanding in order to coordinate the work of the consultants? If not, how did you mitigate it and did you have to make any adjustments to the reports or the methodology?

Other

- 1.29 Do you think there were some requirements in the bid that were not particularly useful for the overall objective of reducing interoperable risks?
- 1.30 Was the level of analysis in the reports appropriate?
- 1.31 Was there any divergence in views between the two consultancies that undertook the technical monitoring during the framework period?

- 1.32 Do you feel DG MOVE/TEN-T EA provided the external consultants with enough support when they undertook the technical follow-up? If not, what would you recommend?
- 1.33 Which recommendations would you make for further enhancements of the follow-up? (in terms of the brief, the delivery process, the reporting process, access to data, more/less milestones, etc...)

Looking forward

- 1.34 Could you please describe the mission of your organisation and in particular its role in supporting TEN-T funded ERTMS projects?

Relevance

- 1.35 To what extent do you think there is still a need for technical support? Why?
- 1.36 To what extent do you think the objective of the technical follow-up of the TEN-T funded ERTMS projects is aligned with the mission of your organisation?

Effectiveness

- 1.37 Do you think all projects should be subject to monitoring actions, or would it be more efficient to target actions, since we know that projects in some MS are more likely to be compliant than in others? Why?
- 1.38 Do you think the technical follow-up actions should be aimed directly at project level or indirectly at Notified Body level? Why?

Efficiency

- 1.39 What are the skills of the staff in your organisation in relation to ERTMS and general project liaison with the stakeholders?

Supervision of the follow-up

- 1.40 Which entity do you think would be best placed to monitor the deliverables of the technical follow-up? (DG MOVE, TEN-T EA, ERA or other to be specified)
- 1.41 Do you think this entity would also be able to coordinate the work of the technical follow-up in order to make sure that the information is correctly disseminated and the internal stakeholders are aware of the work conducted? If not, who should do it?
- 1.42 Do you think this entity would also be able to specify the requirements of the technical follow-up? If not, who should do it?
- 1.43 (If different entities were quoted) - What are the risks with different entities involved on a complex project such as this one?

Undertaking the follow-up (we are now talking about who does it, not who supervises it)

- 1.44 To what extent do you think your organisation would be able to undertake the technical follow-up itself (without external consultants)?

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- 1.45 And to what extent do you think your organisation would be willing to undertake the technical follow-up itself (without external consultants)? Why?
- 1.46 To what extent would your agency be able to reduce operational risks if it were to undertake the technical follow-up itself?
- 1.47 To what extent would your agency be able to identify solutions to mitigate risks if it were to undertake the technical follow-up itself?
- 1.48 To what extent may your agency have conflict of interest that would hinder its actions if it were to undertake the technical follow-up itself?
- 1.49 To what extent would your agency be able to cover the whole range of projects across all Member States (in terms of language, familiarity with the issues, cultural or technological issues, etc)?
- 1.50 To what extent would your internal procedures relating to administrative tasks, reporting, financing, staffing subcontractors, etc be able to support or hamper the adequate technical follow-up, if your organisation were to undertake it?
- 1.51 What level of additional costs would you expect if your organisation were to undertake the technical follow-up?
- 1.52 To which degree additional budget would be available for supporting the technical monitoring?
- 1.53 Do you think external consultants should continue to undertake the technical follow-up, or could this be undertaken internally by DG MOVE, ERA or TEN-T EA?
- 1.54 Why? In terms of:
- i) In terms of ability/skills?
 - ii) Willingness?
 - iii) Ability to reduce interoperability risks?
 - iv) Ability to offer mitigation measures?
 - v) Conflict of interest?
 - vi) Geographic coverage?
 - vii) Internal procedures?
 - viii) More balanced client/supplier relationship?
 - ix) Additional costs?
 - x) Ability to find the budget?

Thank you very much for your time and cooperation

Questionnaire for External consultants

General

- 1.1 Please could you describe the role of your company and what you undertook during the technical follow-up?
- 1.2 Could you please describe the interactions between your company, DG MOVE, and any other stakeholders (such as ERA, TEN-T EA, NSA, MS and NoBo)?
- 1.3 Could you also please clarify the role played by the NSA and Nobo?

Looking back**Relevance**

- 1.4 To what extent do you think there was a need for the technical follow-up of TEN-T funded ERTMS projects?
- 1.5 To what extent do you think the technical follow-up has contributed to reduce interoperable risks during the course of the framework?

Effectiveness

- 1.6 In your opinion what were the key skills required for the successful delivery of the project? (Technical understanding, stakeholder consultation, coordination skills, project management, etc...)
 - 1.7 To what extent do you think the timeline of the technical monitoring was adequate? Would you recommend any changes?
 - 1.8 Do you think the grouping of projects that you were asked to monitor made sense? If not, how would you enhance it?
 - 1.9 What were the key challenges that you met during the course of the 3 years? In terms of access and coordination of stakeholders, technical issues, timeframe, budget, etc...
 - 1.10 To what extent do you think were you able to identify technical or other solutions to mitigate the interoperability risks?
 - 1.11 Have these solutions contributed to the achievement of the objective of minimising threats to interoperability?
 - 1.12 Which factors have hindered the achievement of the objectives of the technical follow-up?
 - 1.13 In your perception, how useful were the reports for DG MOVE? And the other stakeholders?
 - 1.14 As far as you are aware, to what extent were the Commission decisions based on your reports conclusions?
- Efficiency**
- 1.15 Do you feel there was an administrative burden on the management of the technical follow-up, or was it adequate?

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1.16 Do you think the budget provided to you was appropriate and proportional to the objectives? If not, which constraints did it have? What figure would you recommend next?

1.17 Could the same results been achieved with fewer resources?

Sustainability

1.18 Do you think the outcomes of the intervention have been fully exploited? (By DG MOVE and by others)

1.19 What impact have the technical follow ups had on the key stakeholders such as ERA, TEN-T EA, MS, project promoters, etc? To what extent has the coordination between Member States on ERTMS been improved by the follow up?

1.20 Will the interoperability effects achieved last in the medium or long term?

Added value

1.21 Does the technical follow up have sufficient, political and financial power to deliver its objectives?

Supervising the technical follow-up

1.22 Do you think DG MOVE was the best placed actor to specify, coordinate and monitor the technical monitoring or do you think another actor would have been better? If so, who?

1.23 Did you feel you had enough support from DG MOVE when you undertook the technical follow-up? If not, what would you recommend?

1.24 Did you feel that DG MOVE/ERA/TEN-T EA had enough technical understanding? If not, how did you mitigate it and did you have to make any adjustments to the reports or the methodology?

Other

1.25 Do you think there were some requirements in the bid that were not particularly useful for the overall objective of reducing interoperable risks?

1.26 Which recommendations would you make for further enhancements of the follow-up? (in terms of the brief, the delivery process, the reporting process, access to data, more/less milestones, etc...)

1.27 To what extent do you feel the structure and the methodology of the report was influenced by the policy officers in charge of your Lots?

Looking forward

Relevance

1.28 To what extent do you think there is still a need for technical support? Why?

Effectiveness

1.29 Do you think all the projects should be subject to monitoring actions, or would it be more efficient to target actions, since some projects in some MS are more likely to be compliant than in others? Why?

- 1.30 Do you think the technical follow-up actions should be aimed directly at project level or indirectly at Notified Body level? Why?

Supervision of the follow-up

- 1.31 Which entity do you think would be best placed to monitor the deliverables of the technical follow-up? (DG MOVE, TEN-T EA, ERA or other to be specified)
- 1.32 Do you think this entity would also be able to coordinate the work of the technical follow-up in order to make sure that the information is correctly disseminated and the internal stakeholders are aware of the work conducted? If not, who should do it?
- 1.33 Do you think this entity would also be able to specify the requirements of the technical follow-up? If not, who should do it?
- 1.34 (If different entities were quoted) - What are the risks with different entities involved on a complex project such as this one?

Undertaking the follow-up

- 1.35 Do you think external consultants should continue to undertake the technical follow-up, or could this be undertaken internally by DG MOVE, ERA or TEN-T EA?
- 1.36 Why? In terms of:
- i) In terms of ability/skills?
 - ii) Willingness?
 - iii) Ability to reduce interoperability risks?
 - iv) Ability to offer mitigation measures?
 - v) Conflict of interest?
 - vi) Geographic coverage?
 - vii) Internal procedures?
 - viii) More balanced client/supplier relationship?
 - ix) Additional costs?
 - x) Ability to find the budget?

Thank you very much for your time and cooperation

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Questionnaire for all other stakeholders

General

- 1.1 Could you please describe the mission and activities of your organisation?
- 1.2 Could you please detail the activities of your organisation regarding ERTMS implementation in Europe and the objective of reducing interoperable risks?
- 1.3 Could you please describe the relationships that your organisation may have with stakeholders such as DG MOVE, TEN-T EA, ERA, the Member States, NSAs and NoBos?
- 1.4 Could you please describe the involvement of your organisation with the technical follow-up of TEN-T funded ERTMS projects?

Questions 1.5 to 1.10 are only asked if the stakeholder was involved with the 2008-2012 technical follow-up of ERTMS projects. Otherwise go to 1.13

- 1.5 To what extent do you think there was a need for the technical follow-up of TEN-T funded ERTMS projects?
- 1.6 The general objective of the contract was to provide the European Commission and the TEN-T EA with targeted technical assistance consisting of experts liaising with the corridor/project coordinators to ensure that technical solutions implemented within projects were fully consistent with the TSI CCS provisions. To what extent do you think this objective was fulfilled?
- 1.7 To what extent do you think the technical follow-up has contributed to reduce interoperable risks during the course of the framework?
- 1.8 In your perception, are the outcomes of the intervention fully exploited?
- 1.9 Would it have been possible to achieve the same results without Commission-funded technical follow-up?
- 1.10 Does the technical follow up have sufficient, political and financial power to deliver its objectives?
- 1.11 Which recommendations would you make for further enhancements of the technical follow-up?

Looking forward

Explain the objective of the technical follow-up and quote its brief.

Relevance

- 1.12 To what extent do you think there is still a need for technical support? Why?

Effectiveness

- 1.13 Do you think all the projects should be subject to monitoring actions, or would it be more efficient to target actions, since some projects in some MS are more likely to be compliant than in others? Why?
- 1.14 Do you think the technical follow-up actions should be aimed directly at project level or indirectly at Notified Body level? Why?

Efficiency

- 1.15 In your opinion what are the key skills required for the successful delivery of the technical follow-up? (Technical understanding, stakeholder consultation, coordination skills, project management, etc...)
- 1.16 In your opinion, what are the key challenges that will be met by those who undertake the technical follow-up? In terms of access and coordination of stakeholders, technical issues, timeframe, budget, etc...
- 1.17 To what extent do you think there is a need of doing the technical follow-up every year? How about every 6 months? Or every 2 years?

Supervision of the follow-up

- 1.18 Which entity do you think would be best placed to monitor the deliverables of the technical follow-up? (DG MOVE, TEN-T EA, ERA or other to be specified)
- 1.19 Do you think this entity would also be able to coordinate the work of the technical follow-up in order to make sure that the information is correctly disseminated and the internal stakeholders are aware of the work conducted? If not, who should do it?
- 1.20 Do you think this entity would also be able to specify the requirements of the technical follow-up? If not, who should do it?
- 1.21 (If different entities were quoted) - What are the risks with different entities involved on a complex project such as this one?

Undertaking the follow-up

- 1.22 Do you think external consultants should continue to undertake the technical follow-up, or could this be undertaken internally by DG MOVE, ERA or TEN-T EA?
- 1.23 Why? In terms of:
 - i) In terms of ability/skills?
 - ii) Willingness?
 - iii) Ability to reduce interoperability risks?
 - iv) Ability to offer mitigation measures?
 - v) Conflict of interest?
 - vi) Geographic coverage?
 - vii) Internal procedures?
 - viii) More balanced client/supplier relationship?
 - ix) Additional costs?
 - x) Ability to find the budget?

Thank you very much for your time and cooperation

APPENDIX

B

PROJECT TEMPLATE

Technical follow-up sheet - TEN-T financed ERTMS projects

{Project Code including year} - {Project Title}

PROJECT UNDER REVIEW

Project description

{Insert text}

Contact persons and details

{Insert text}

Relevant technical follow-up documents

{Insert text}

Essential project data

{Insert text}

Project status

{Insert text}

INTEROPERABILITY RISK ANALYSIS

General observations

{Insert text}

Main interoperability issues

Nr.	Interoperability issue	Major/ Minor issue	Description	Mitigation measures proposed to date	Further recommendation(s)	Responsible actor(s)
1.						
2.						

Note: Issues are classified as “major” (“+”) if a clear deviation from a mandatory requirement has been identified, as “minor” (“-”) if it is unclear whether a mandatory requirement will be fulfilled or not and caution is therefore required.

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NEXT STEPS

<i>Nr.</i>	<i>Action</i>	<i>Description</i>	<i>Timing</i>	<i>Responsible actor(s)</i>
1.				
2.				

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