Comparison of corridor and network studies and initiatives

	ERTMS (European Rail Traffic Management System) **Corridors**
Operational/Study	Operational
Date	2005
Network/Corridor	Corridors
# corr	6 corridors
Freight/Passenger	Freight
km	12.750+ km
Description	A = Rotterdam-Genoa: 2.000 km B = Napoli-Stockholm: 3.760 km C = Antwerpen-Lyon/Basle:1.170 km D = Valencia-Ljubljana-Budapest: 2.270 km E) = Dresden-Prague-Bratislava-Budapest-*Bucharest*-*Constanta*: 1.620+ km F) = Aachen-Warszawa: 1.930 km
Background	Deployment of a single European standard called ERTMS/ETCS (European Train Control System) will make rail more competitive. It will help reduce transport costs, preserve the environment, improve safety, reduce congestion. Six corridors representing 6% of the TEN (Trans-European Network) track length and 20% of European freight traffic were established and targets were established in 2005. For the horizon 2012–2015, the main objective is to upgrade the 6 major freight corridors by deploying ERTMS/ETCS. A European Coordinator for ERTMS, Karel Vinck, oversees activities of the corridors and acts as liaison between stakeholders including the European Commission. For each corridor, more precise objectives have been defined in terms of regularity, reliability, quality of service and corridor capacity. Modernisation of existing infrastructure and harmonisation of operating rules are also common objectives. The Corridor-approach enables the management and coordination of implementation and cooperation and most corridors have set up an Executive Board and Management Committee.
Criteria	On the basis of data from the ERIM study, a core network of **high freight traffic-flow** was established. Independent major corridors representing as high a proportion of European **freight traffic** as possible (20%) and crossing through a maximum number of **Member States** (15) (+ Switzerland) were identified along that core network. Member State commitment by way of a Letter of Intent (LoI) lends credibility to each corridor initiative.
Approach	**Technical** (based on ERIM data, mapping of a core network representing at least 20% of European freight traffic); **Political** (identification of 6 key corridors, ensuring as wide a coverage of EU territory as possible).
Overview	
• Broad political support lends credibility • Involvement of MS, IM and RU in objective-setting and implementation • Established structures and concrete cooperation on some corridors	• Limited number of corridors which do not cover all MS • Length of corridors varies (some may be too long)

	ERIM - European Rail Infrastructure Masterplan
Operational/Study	Study (prepared by UIC Infrastructure Forum)
Date	2003 -
Network/Corridor	Network (Central European Railway Grid with sub-system of 4 high-speed and 6 conventional corridors)
# corr	32 countries
Freight/Passenger	Freight and Passenger
km	47.300 km (2006) and *forecast 49.700 km (2020)*
Description	See Map
Background	ERIM was launched in 2003 after a review process of previous work and in regular consultation with UIC member railways and representative bodies such as CER, EIM and RNE. It is based on the methodology for corridor analysis. The ERIM Project updated the UIC database "EurailDataMap" from 1998 in relation to the so-called ETCS-net with some additional line sections proposed by member railways. Contrary to TREND, ERIM includes business oriented infrastructure parameters for both rail freight and passenger services.
Criteria	Phased approach: Origin-destination analysis of international passenger and freight traffic, and identification of an international rail backbone – Central European Railway Grid; ERTMS corridor-based migration plan developed (UIC). This identified 4 high-speed corridors and 6 conventional corridors (starting from the viewpoint that long distance passenger and freight rail will become more attractive and commercially viable if seamless operations can be achieved on corridors passing through several networks; Cost-benefit analysis of ETCS migration strategies; Alignment of concept of European Railway Grid with actual railway network (TEN-T in particular); ERIM was harmonised with ETCS-net (Annex H of CCS TSI – Directive 2001/16/EC).
Approach	Iterative process primarily involving origin-destination analysis and cost-benefit criteria.

Overview

- Based on solid observable data
- Takes into account the economic viability of the proposed network in order to further refine it
- Good and robust study
- No political dimension
- No strategy for implementation

	TEN-T / Van Miert
Operational/Study	Operational
Date	2003
Network/Corridor	Network of Priority Projects
# corr	22 rail-related projects
Freight/Passenger	Freight and Passenger
km	24.350
Description	See Map
Background	The High-Level Group on the trans-European transport network (TEN-T) was mandated by the Vice-President of the Commission in charge of Transport and Energy to identify priority projects of the trans-European transport network up to 2020 on the basis of proposals from the Member States and acceding countries. The Group, which was chaired by Mr Karel Van Miert, consisted of one representative from each Member State, one observer from each acceding country and an observer from the European Investment Bank.
Criteria	**STAGE 1** – Being on a main trans-European axis pertinent to the internal market of the enlarged Europe, taking in particular into account projects crossing natural barriers, solving congestion problems or corresponding to missing links. – Having a European dimension in particular by meeting a threshold of €500 million for infrastructure. – The existence of evidence showing potential economic viability, other socioeconomic benefits (e.g. social, environmental), and firm commitments from the concerned Member States to carry out the required impact assessments with a view to completing the project within an agreed timeframe. **STAGE 2** – The European value added of the project, in terms of importance for facilitating exchanges between Member States, for instance improving interconnections and interoperability between national networks. – The strengthening of cohesion, either by better incorporating the future Member States into an enlarged Europe, or by connecting the main peripheral areas and the least developed regions to the rest of Europe. – The contribution to sustainable development of transport while tackling problems of safety and environmental protection and by promoting modal transfer.
Approach	On the basis of initial Member State pre-selection of projects, application of criteria which promote EU transport objectives in parallel with respect of certain broad principles (e.g. European added-value, cross-border impact, cohesion, sustainable development, modal transfer).

Overview

- Initial Member State pre-selection acts as filter
- European and endorsed by European Commission
- Tied to financing
- Long-term
- Encourage cooperation
- Limited technical criteria at stage of European-level evaluation
- Geographically-balanced projects
- Other financing sources (e.g. Cohesion funding may have influenced MS selection
- Infrastructure-focus which does not include service dimension

	CER: Business Cases for a Primary European Rail Freight Network
Operational/Study	Study (CER, with support of UIC and McKinsey)
Date	2007
Network/Corridor	Corridors
# corr	6
Freight/Passenger	Freight
km	24.450 km
Description	A = 2000 km B+- = 3500 km C/D+ = 8460 km D+- = 1850 km E+ = 5750 km F+ = 2890 km
Background	Based on concrete business cases, CER with the support of UIC and McKinsey, developed a picture of what a freight network could look like on six major trans-European freight corridors. In order to support economic growth and to guarantee a high level of service quality, European rail freight policy has to provide: 1) an infrastructure without an increasing number of bottlenecks 2) an infrastructure capable of accommodating longer trains; 3) an adequate network of freight terminals.
Criteria	• Corridors derived from ERTMS corridors A-F adjusted to accommodate realities of current traffic flow and to cover a larger share of total rail freight volumes. • The 6 corridors represent the core of the Primary European Rail Freight Network as promoted by CER. • Infrastructure parameter upgrades to enable optimal end-to-end usage of corridors leading to productivity gains were analysed. • Investments to relieve current and future bottlenecks will ensure sufficient capacity without reducing service quality. • Terminals (inter-modal) • ERTMS **Broad principles:** 1. Core rail network of freight-dedicated and mixed-traffic trans-European lines can be defined as the backbone of a wider network catering for rail freight needs = PERFN (Primary European Rail Freight Network) and originates in the 6 ERTMS corridors. 2. PERFN, should provide enough capacity to absorb a growth of up to 72% of rail freight until 2020. In the context of an expected general transport growth of 30% to 43% during the same period, this would mean an increase of the rail modal share from 17% in 2006 to potentially 21% - 23% in 2020

	3. 72% of extra capacity would be obtained: • 20% through the productivity gains of the railway system itself (future technological advances, optimisation of the use of existing capacity); • 41% through investments in relieving infrastructure bottlenecks; • 11% through infrastructure upgrades, notably, to accommodate trains of 750m and longer. 4. Up to € 145.4 billion investment over the next 15 years on the six corridors considered, of which € 35.5 are already committed in existing budgets. It is also likely that more funds will be needed to adapt the rest of the freight-relevant network. 5. Of the € 145.4 billion, a. Around 3.5% (€ 5.1 billion) would be spent on infrastructure upgrades, mostly to allow longer trains on the PERFN. b. Around 84.5% (€ 122.9 billion) would be spent on relieving bottlenecks (congested nodes and lines) and expanding existing freight terminals and marshalling yards. c. 12% (about € 17.4 billion) would be spent on ERTMS 1 fitting (including adaptations of "interlockings" in relevant countries and on-board equipment) 2. 6. In the years to come, ERTMS will play a major role as the common European signalling and train control system.
Approach	Business-case analysis based on pre-requisite conditions

Overview

- Adds business-case element and ties concrete long-term objectives to existing corridors
- Stakeholder-driven
- In-depth analysis of bottlenecks
- Concrete proposals for implementation
- Presupposes very high investment
- Forward-looking (medium- to long-term)
- No soft measures for improvement

	TREND (Towards new Rail freight quality and concepts in the European Network in respect to market Demand)
Operational/Study	Study (funded under 6th Framework Programme)
Date	2005-2006
Network/Corridor	Corridors
# corr	7
Freight/Passenger	Freight
km	13.500-14.550km
Description	A – Italy-Slovenia-Hungary: 2300 km B west – NL-DE-CH-Italy: 1200 km B east – Scandinavia-DE-Austria-IT: 1600 km C – Germany-CZ-AT-SK-HU-Serbia/Romania-Bulgaria-Turkey: 2600-2900 km D – NL-Germany-Poland-Lithuania-Latvia-Estonia: 2500 km E – France-CH-Italy: 1100-1250 km F – Germany-France-Spain: 2200-2500 km
Background	TREND was a research project funded under the 6th Framework Programme with the aim to assess the general progress in the establishment of an European Railway Area. TREND objectives: provide an objective inventory of problems on the corridors; indicate their cause or combination of causes; place and rank the problems in areas e.g. legislative, organisational, technical problems, interoperability, distorted competition, etc; provide an expert vision on the relevance of problems with regard to the corridor's performance; derive jointly agreed comprehensive action plans; improve freight service and thus market share (modal shift); identify RTD needs with respect to the future integrated project.
Criteria	The extent and routing of the TREND corridors were discussed, fine-tuned and agreed upon in the 1st Corridor Workshop in Hannover, Germany in April 2005. The final corridor selection makes reference to the most important freight flows (in terms of current volume and growth potential) across Europe. The selection took account of previous projects and stakeholders interest. **Evaluation criteria** (5 groups and 11 criteria): **Corridor freight volume** separate for rail (1) and road (2) in million tonnes by 2002/3; **Estimated growth rates** for the increase of corridor volume separated for rail (3) and road (4) in % for the time horizon 2002/3 to 2008 (rates agreed upon with stakeholders); **Stakeholder evaluation** with respect to: (5) existing (infra) capacity problems identified in scope of corridor analysis, (6) potential for short-term improvement within the time frame of the integrated project (IP) (3-4 yrs), (7) experienced commitment of stakeholders to collaborate in a joint project; **Compliance with existing Commission initiatives** to implement TEN-T railway network (8) and ERTMS (9); **Congruence with specific aims of 4th call** namely to involve active new entrant railway undertakings (10) and new member states and candidate countries (11).

Approach	**Quantitative technical criteria** complemented by **qualitative feedback** from stakeholders; **Political coherence** with European objectives
Overview	
• Involvement of stakeholders • Forward-looking • European dimension • Technical criteria • Good "mapping"	• No solution/plan proposed or implementation strategy

	NEW OPERA Operating Project for a European Rail Freight Network
Operational/Study	Study (funded under the 6th Framework Programme)
Date	2005-2008
Network/Corridor	Network
# corr	
Freight/Passenger	Freight
km	
Description	See Map
Background	**Based on Project Deliverable D3.2 – Volumes 1 + 2** NEW OPERA Operating project for a European Rail Freight Network. Context of report is WP3 : Network Perspective with objectives: - to provide a framework which stresses the interactions between the different components of the rail system (between technical performance and development of new opportunities for commercial products; between different market segments; corridor vs network strategies; evolution from present to long term) - to progressively implement the dedicated freight network on a GIS including demand model, supply model and network assignment tool. (v.1, p.5-6)
Criteria	Assignment Model (v.2, p.52 ff) Model is applied to basic network developed by NESTEAR which is an intermodal network including links and nodes for rail, road, inland waterways and maritime routes. (Only rail entry points used). Principle of assignment - minimal path or best route according to predefined criteria: best time (average not max) - flows on rail network (flows on 400 rail entry points) - traffic density measures – density, dedication and capacity Main results of T3.2 study summed up in Maps showing New Opera Network (with core and connexion) p.66 Next step to be developed in WP5 is to foresee evolution of international flux through New Opera Network during next 15 years based on 4 New Opera scenarios.
Approach	**Supply and demand modelling** applied to pre-defined network of nodes and links

Overview

- Technically solid basis
- Next stage involves forward-looking analysis on the basis of a number of scenarios
- Variety of solutions/proposals
- Realistic approach
- Short- and long-term
- Geographically limited (e.g. not all MS covered)
- Involvement of stakeholders
- No proposed strategy for implementation of the solutions

	RNE - RailNetEurope
Operational/Study	Operational
Date	2004-
Network/Corridor	Corridors
# corr	10
Freight/Passenger	Freight and Passenger
km	Whole RNE network: 235.000 km
Description	01 – Oslo / Stockholm / Turku - Copenhagen – Hamburg 02 - Rotterdam / Antwerp - Ruhr Area - Milan - Genova 03 – Rotterdam / Antwerp - Ruhr Area - Warszawa 04 – Hamburg/Bremerhaven - Würzburg - München/Passau - Verona/Salzburg/Vienna 05 – Rotterdam / Gent / Antwerp - Luxembourg - Marseille / Basel 06 – Mannheim/Gremberg - Lyon - Nîmes - Perpignan - Barcelona - Valencia / Paris - Madrid - Lisboa 07 – Gdynia - Barlogi/Warszawa - Katowice - Vienna/Bratislawa - Trieste/Koper 08 – Lyon - Torino - Triest / Koper - Budapest 09 – Wien - Budapest - Bucarest - Konstanta / Sofia / Dimitrovgrad 10 – Malmö - Rostock - Berlin - Nürnberg / Prag - Bratislava - Budapest
Background	The main objective of RailNetEurope, which counts 31 members, is to improve operational issues in the field of international rail traffic. RailNetEurope is the next step from bi- and multilateral co-operation between European rail infrastructure companies towards one common organisation with a European focus. Together, the members of RailNetEurope are harmonising conditions and introducing corporate approaches to promote the European rail business from the rail infrastructure point of view and for the benefit of the entire rail industry. To achieve this, RailNetEurope focuses on the entire rail infrastructure production process. It starts by harmonising the members' medium and long-term planning, common marketing & sales approaches, and operations, and ends with RailNetEurope after-sales services, such as monitoring and reporting
Criteria	Market-driven
Approach	Market-driven
Overview	
• Clear operational objective, i.e. corridor-definition tied to actual traffic • Voluntary initiative emanating from IM • Fosters IM cooperation	• Limited number of participating IM

	EUFRANET
Operational/Study	Study (funded under the 4th Framework Programme)
Date	1998-2000
Network/Corridor	Network
# corr	
Freight/Passenger	Freight and Passenger
km	140.000 (whole) – 22% of network (30.500) would carry 60% of traffic volume
Description	See Map
Background	Research topic: Improving the Competitiveness of Rail Freight Services
Criteria	Basic network with 2.300 links and 1.700 nodes (140.000 km) established by identifying the three entry points with the highest traffic in each NUTS2 region. This results in fairly uniform coverage of Europe and means regions with low rail traffic are well represented. Core network and intermediate network developed from basic network through traffic density analysis – asking the following questions: Is the freight part of the network coherent from a physical point of view, as regards interconnectivity, interoperability and intermodality? How many lines have to be integrated within this part of the network? Is it possible to reduce the number of links without losing too much traffic? Particular concern was to remove existing bottlenecks and avoid distribution delays.
Approach	Quantitative technical and geographical approach Incorporating actual traffic density While maintaining interconnectivity, interoperability and intermodality
Overview	
• Good regional coverage of network	• Interconnectivity, interoperability and intermodality