



European  
Commission



# The Core Network Corridors

TRANS EUROPEAN TRANSPORT NETWORK 2013

Transport



## FOREWORD:



It is with great pleasure that I present the Core Network Corridors of the trans-European Transport Network (TEN-T).

The new regulations for the transport infrastructure, including also the Connecting Europe Facility (CEF), are very innovative and have a truly European dimension. The infrastructure investment strategy is itself a major innovation within the CEF. A fully functioning single market depends on modern high-performing infrastructure to connect Europe, above all in transport, energy and information and communication technologies.

However, experience shows that planning and budgets from a national perspective do not give a sufficiently high priority to multi-national cross-border investments to equip the single market with the infrastructure it needs. This is one more example of the added value of the EU budget. With the Connecting Europe Facility, it can secure funding for the pan-European projects that connect the centre and the periphery, to the benefit of all.

As for transport, the 9 Corridors - part of the TEN-T multimodal Core Network - will make sure that transport infrastructure is implemented efficiently with a genuine European dimension, from the Union's borders in the east to the ports in the west, from the North and Baltic Seas to the Mediterranean, from the Atlantic Ocean to central Europe. Parts of these corridors already exist, building on the success stories of the past TEN-T policy. But essential missing links, especially cross-border links, East-West connections, still need to be joined up.

The 2011 White Paper on Transport outlined that infrastructure has to be planned in a way that maximises the positive impact on economic growth and minimises the negative impact on the environment. The Core Network Corridors will provide the essential infrastructure for carrying freight and passenger traffic at high efficiency and with low emissions, making extensive use of more efficient transport modes in multimodal combinations. These Corridors will allow the investment to be coordinated with the use of infrastructure across borders, thereby optimising the investments' value.

In this document you will find a description of the nine Corridors as adopted following the Commission proposal, as well as the list of the pre-identified infrastructure projects (the missing links) to be funded by the Connecting Europe Facility.

The cost of developing EU infrastructure to complete the TEN-T Core Network requires about €500 billion, of which €250 billion would be for the removal of the main bottlenecks up to 2020. Creating the Connecting Europe Facility and implementing the Core Network Corridors will accelerate the infrastructure development needed by the EU, its businesses and its citizens, to strengthen economic recovery in each and every one of our Member States.

A handwritten signature in blue ink, which appears to read "Kallas", is positioned above the official title.

Vice-President of the European  
Commission in charge of Transport



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## The two layers of the TEN-T

The new TEN-T Guidelines define a dual layer approach to the trans-European transport network. The basic layer, or “Comprehensive Network”, should ensure accessibility of all regions of the Union. It includes road, rail, inland waterways, maritime and air infrastructure network components, as well as the connecting points between the modes.

The Comprehensive Network features minimum infrastructure standards, set out in the TEN-T Guidelines that aim at interoperability wherever necessary for seamless traffic flows across the network. All European citizens and economic operators would then be able to access the Core Network, via this Comprehensive Network, at comparable terms.

The second layer, the “Core Network” is constituted of the strategically most important parts of the Comprehensive Network, identified according to a specific methodology, transparently and coherently applied and on which project development and implementation will be supported with priority.

This will later allow the identification of key projects of European interest on a network configuration that already includes current missing links (including multimodal connection nodes and routes) and bottlenecks, and identifies needs for multimodal connecting platforms development.

The multimodal Core Network should enable a concentration of trans-national traffic and long-distance flows – both for freight and passengers – and, as a result of their integration, provide for a highly resource efficient infrastructure use.

Innovative information and management systems that form part of the network would support logistic functions, intermodal integration and sustainable operation in order to establish competitive door-to-door or, at least, terminal-to-terminal transport chains, according to user needs.



## INTRODUCTION

## The implementation tool: the Corridor Approach

The implementation of the Core Network will be facilitated by using a “Corridor Approach”. The Corridors will provide the basis for modal integration, interoperability and coordinated development and management of infrastructure.

The Corridors will allow investments and infrastructure works to be synchronised and support efficient, innovative and multimodal transport services – including rail services over medium and long distances – to implement the most complicated sections, interoperability and operational rules.

Covering at least three modes, these Corridors, based upon the Core Network, are set up starting from important entry points into the network, integrating the main cross-border sections and physical bottlenecks still to be realised, corresponding to the main trans-national traffic flows.

They will evolve to include multimodal corridors, integrating operators and, beyond the pure infrastructure, allow for the deployment of transport services along the Corridor. They are partially based upon the current TEN-T Priority Projects, the ERTMS corridors and the Rail Freight Corridors resulting from EC Regulation 913/2010, insofar as they belong to the Core Network.

They have been integrated in annex to the Connecting Europe Facility (CEF), regrouping essential projects of the Core Network.

The obligatory character of the Core Network is further enhanced by the Corridors: within one year of the entry into force of the Guidelines, for which corridor structures are established, a work plan will be adopted. This will allow to share between all stakeholders precise and common time horizons to be set for the Corridor implementation, thereby contributing to the respect of the 2030 horizon. The multi-annual Corridor work plan foreseen for each corridor will identify, within a coordinated timetable, the major investments required and smaller scale short-term improvements.

The European Coordinators, overwhelmingly seen as a major guarantee for coordination, cooperation and transparency, are directly linked to the Corridor instrument. They will chair the Corridor Forum that will bring together all stakeholders involved in the respective Corridor.



## BALTIC-ADRIATIC CORRIDOR

*Gdynia – Gdańsk – Katowice/Sławków  
 Gdańsk – Warszawa – Katowice  
 Katowice – Ostrava – Brno – Wien  
 Szczecin/Świnoujście – Poznań – Wrocław – Ostrava  
 Katowice – Žilina – Bratislava – Wien  
 Wien – Graz– Villach – Udine – Trieste  
 Udine – Venezia – Padova – Bologna – Ravenna  
 Graz – Maribor –Ljubljana – Koper/Trieste*

### Description

This 2400 km long corridor will connect the Baltic ports in Poland with the ports of the Adriatic Sea. It starts at the ports of Gdansk and Gdynia, connecting via strong economic centres like Warsaw, Vienna and Venice to Trieste and Ravenna. The corridor has some branches from Szczecin to Katowice, from Graz via Udine to Trieste as well as via Ljubljana to Trieste/Koper. The corridor will provide better access to Baltic and Adriatic seaports for the economic centres in Poland, the Czech Republic, Slovakia and Austria. It encompasses the present Priority Projects 23 and 25 and Rail Freight Corridor 5 (Gdansk-Ravenna).

### Main missing links

The main missing links of the Baltic – Adriatic Corridor are the cross-border sections and the Semmering- and Koralm tunnels in Austria for the Alpine crossing.

The multimodal cross-border connections between Vienna, Bratislava, Ostrava and Katowice need upgrading. Traffic management systems must be developed along the corridor and multimodal connections with the ports should also be developed.

### Success stories

During the last decade some road and rail sections along the Baltic-Adriatic-Corridor have been upgraded, renovated or build in Poland, Czech Republic and Slovakia. In Austria the works to eliminate bottlenecks or missing links started or are close to being terminated:

The building of the new Vienna railway station is going to be finished by 2015. The station was already partly opened in 2012.

The works at the 30 km long Koralm-Tunnel started in April 2011. This tunnel will provide the first direct rail link between Klagenfurt and Graz in Austria. Once operational in 2022, the travelling time from Vienna to Klagenfurt will be shortened from 4 to 2.5 hours. The travel time between Warsaw and Klagenfurt will be reduced by over 3 hours (compared to the current almost 12 hours to get from Warsaw to Klagenfurt, in 2025 it should take less than 9 hours).

The preparatory works at Semmering Base Tunnel (27.3 km, 230 km/hmax) started in April 2012.

In Italy, the so-called Pontebbana line has been double tracked, electrified and drastically improved in the 1990ies already.

## BALTIC-ADRIATIC CORRIDOR

## CEF: Pre-identified projects

Gdynia - Katowice	Rail	Works
Gdynia, Gdańsk	Ports	port interconnections, (further) development of multimodal platforms
Warszawa - Katowice	Rail	Works
Wrocław - Poznań - Szczecin/Świnoujście	Rail	Works
Świnoujście, Szczecin	Port	port interconnections
Bielsko Biala - Žilina	Road	Works
Katowice - Ostrava - Brno - Wien & Katowice - Žilina - Bratislava - Wien	Rail	works, in particular cross-border sections PL-CZ, CZ-AT, PL-SK and SK-AT, Brno-Přerov line; (further) development of multimodal platforms and airport-rail interconnections
Wien - Graz - Klagenfurt - Udine - Venezia - Ravenna	Rail	partially construction of new lines (Semmering Base Tunnel and Koralm Railway line), rail upgrading; works on-going; (further) development of multimodal platforms; upgrading of existing two-track line between Udine - Cervignano and Trieste
Graz - Maribor - Pragersko	Rail	studies and works for second track
Trieste, Venice, Ravenna, Koper	Ports	port interconnections, (further) development of multimodal platforms



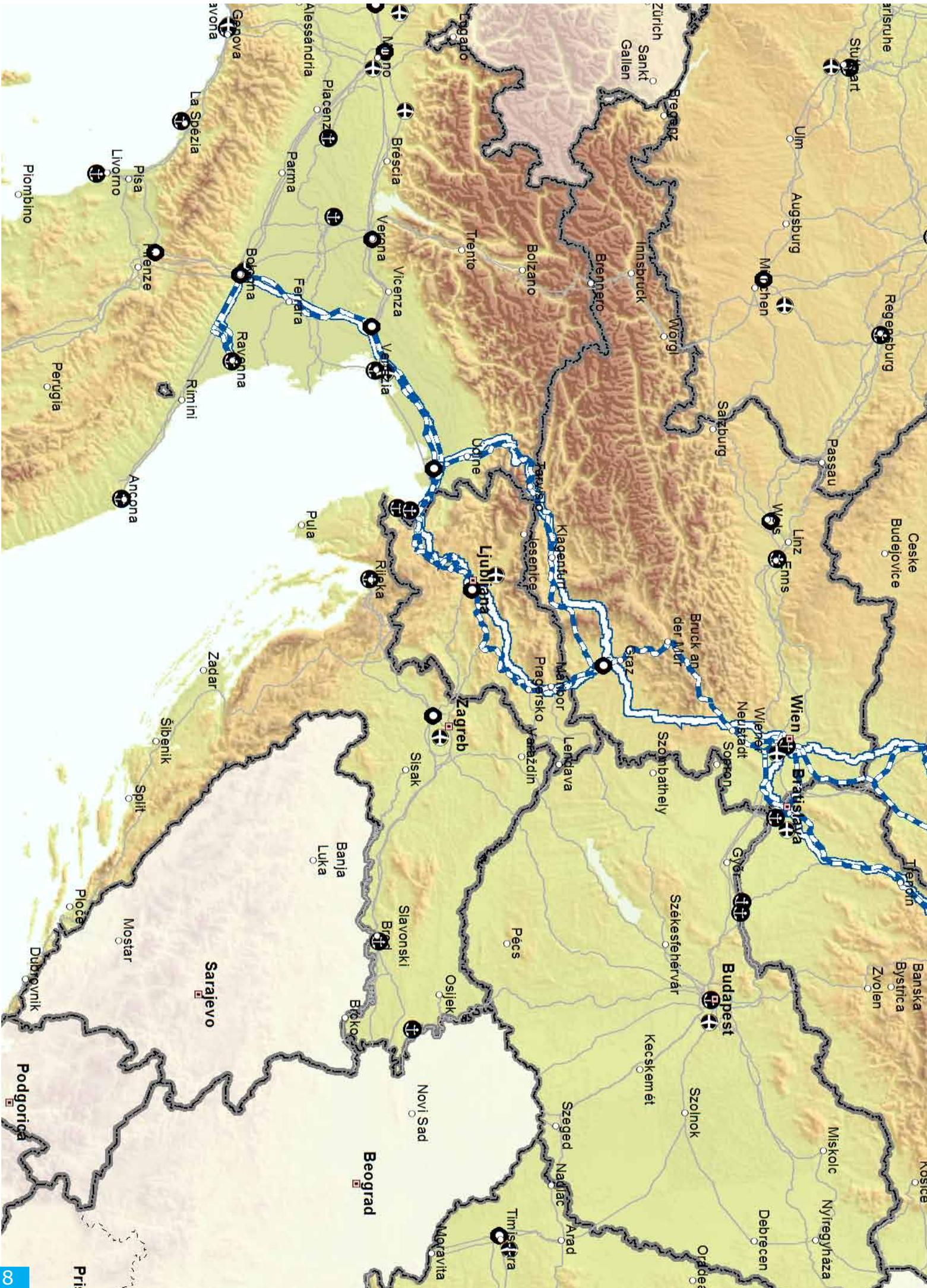
The historic Semmering railway - the very first mountain railway in Europe, opened 1854 - which will be replaced by the new Semmering base tunnel by 2024.



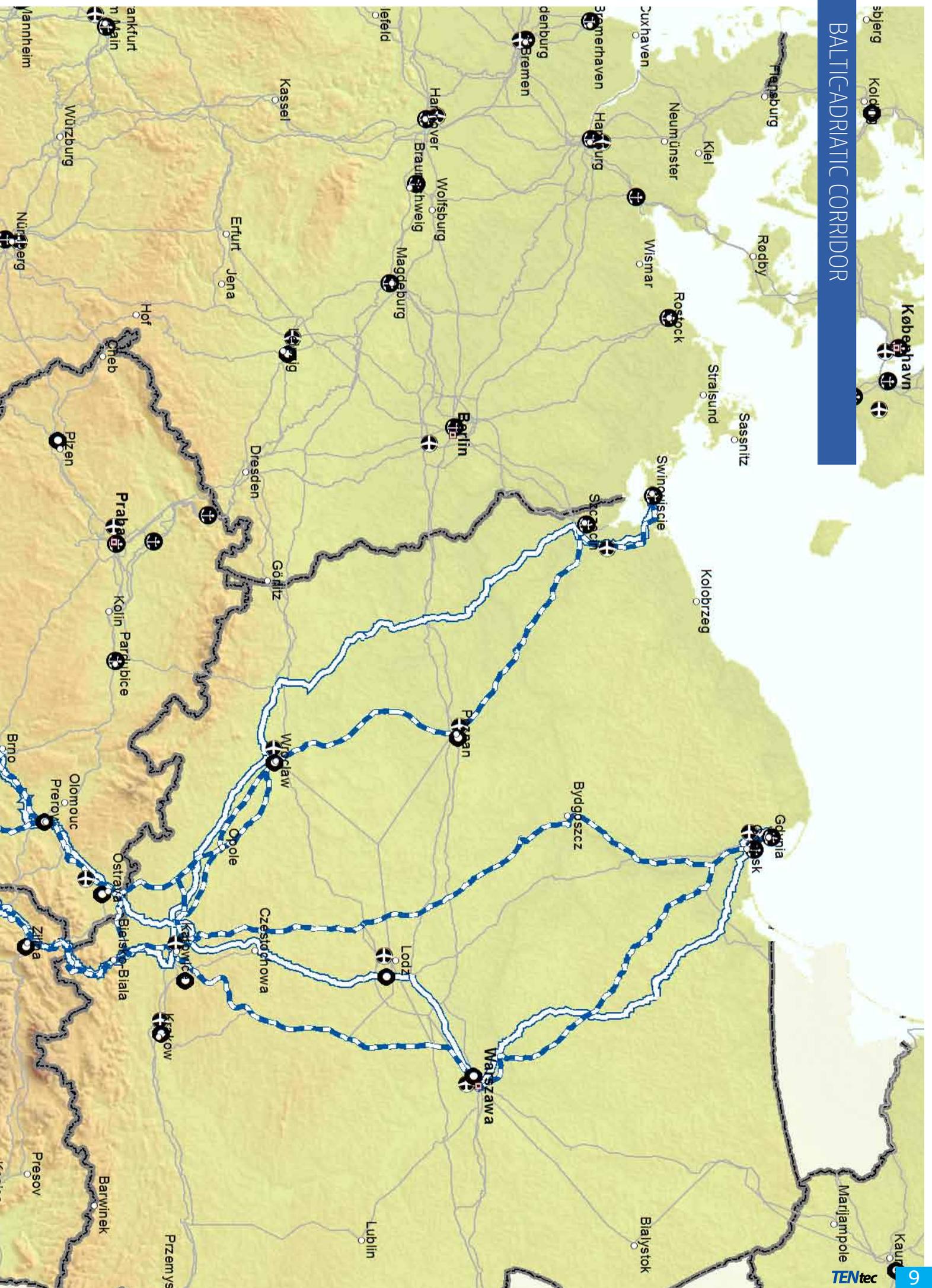
Koralm railway, Pilot Tunnel Mitterpichling



Koralm Railway, Graz-Puntigam node



# BALTIC-ADRIATIC CORRIDOR



## NORTH SEA-BALTIC CORRIDOR

*Helsinki – Tallinn – Riga  
 Ventspils – Riga  
 Riga – Kaunas  
 Klaipeda – Kaunas – Vilnius  
 Kaunas – Warszawa  
 BY border – Warszawa – Poznań – Frankfurt/Oder – Berlin – Hamburg  
 Berlin – Magdeburg – Braunschweig – Hannover  
 Hannover – Bremen – Bremerhaven/Wilhelmshaven  
 Hannover – Osnabrück – Hengelo – Almelo – Deventer – Utrecht  
 Utrecht – Amsterdam  
 Utrecht – Rotterdam – Antwerpen  
 Hannover – Köln – Antwerpen*

### Description

This 3200 km long corridor will connect the ports of the Eastern shore of the Baltic Sea with the ports of the North Sea. It starts at the modern ports on the Gulf of Finland of Helsinki (Vuosaari) and Tallinn (Muuga) passing south through the three Baltic States and North Eastern Poland until Warsaw. From there it follows the traditional East-West corridor to Lodz, Poznan and Berlin continuing to the ports on the North Sea coast. The corridor has branches to Ventspils in Latvia and to Klaipeda and Vilnius in Lithuania.

The corridor will provide modern transport links between Finland and the three Baltic States on the one hand and Poland, Germany and the Netherlands and Belgium on the other. It encompasses the present Priority Project 27 and Rail Freight Corridor 8 (Rotterdam - Kaunas).

### Main missing links

The main missing links of the North –Sea –Baltic Corridor are

- > A Rail Baltic 1435 mm gauge direct line from Tallinn to the Lithuanian/Polish border,
- > Lithuanian/Polish border to Bialystok upgrade,
- > Warsaw – Bialystok upgrade,
- > the cross-border operational systems, such as ERTMS (European Rail Traffic Management System) for rail and ITS (Intelligent Transport Systems) for road.

Traffic management systems must be developed along the corridor and multimodal connections with the ports should further be developed.

### Success stories

During the last five years there have been improvement works on the outskirts of Warsaw and major track upgrading on the existing 1520 mm alignment in Estonia. In Latvia, construction is ongoing on upgrading the 1520 mm line (Rail Baltica), both south and north of Riga. In Lithuania, following the economic crisis and the lack of funds available the authorities decided to install a dual gauge 1435/1520mm track between the Polish border and Kaunas rather than construct a new 1435 mm direct line. This dual gauge is complete from the Polish border to Sestokai and works have started on the remaining sections to Kaunas which need to be completed by 2015.

In Poland, work should start on a new direct 1435 mm line from Elk to the LT border and widening and modernising the line from Bialystok to Elk. The Polish authorities indicate that the new lines will be ready by 2023 the estimated date of the finishing of the Rail Baltic construction.

## NORTH SEA-BALTIC CORRIDOR

### CEF: Pre-identified projects

Helsinki - Tallinn	Ports, MoS	port interconnections, (further) development of multimodal platforms and their interconnections, icebreaking capacity, MoS
Tallinn - Riga - Kaunas - Warszawa	Rail	(detailed) studies for new UIC gauge fully interoperable line; works for new line to start before 2020; upgrading and new line on PL territory; rail – airports/ports interconnections, rail-road terminals, MoS
Ventspils – Riga	Rail	Upgrading, port interconnections, MoS
Klaipeda – Kaunas	Rail	Upgrading, port interconnections, MoS
Kaunas – Vilnius	Rail	Upgrading, airports interconnections, rail-road terminals
Via Baltica Corridor	Road	works for cross-border sections (EE, LV, LT, PL)
BY border - Warszawa - Poznań - DE border	Rail	works on existing line, studies for high speed rail
PL Border - Berlin - Hannover - Amsterdam/Rotterdam	Rail	studies and upgrading of several sections (Amsterdam – Utrecht – Arnhem; Hannover – Berlin)
Wilhelmshaven - Bremerhaven - Bremen	Rail	Studies and works
Berlin - Magdeburg – Hannover, Mittellandkanal, West-German Canals, Rhine, Waal, Noordzeekanaal, IJssel, Twentekanaal	IWW	studies, works for better navigability and upgrading waterways and locks
Amsterdam locks & Amsterdam - Rijnkanaal	IWW	locks studies ongoing; port: interconnections (studies and works, including Beatrix lock upgrade)



Laying the first of the new dual 1,435/1,520 track sections on the "Rail Baltica" line at Sestokai, Lithuania



The port of Tallinn

# NORTH SEA-BALTIC CORRIDOR





## MEDITERRANEAN CORRIDOR

Algeciras – Bobadilla – Madrid – Zaragoza – Tarragona  
 Sevilla – Bobadilla – Murcia  
 Cartagena – Murcia – Valencia – Tarragona  
 Tarragona – Barcelona – Perpignan – Marseille/Lyon – Torino – Novara – Milano – Verona – Padova – Venezia  
 – Ravenna/Trieste/Koper – Ljubljana – Budapest  
 Ljubljana/Rijeka – Zagreb – Budapest – UA border

### Description

The Mediterranean Corridor will link in the south western Mediterranean region up to the Ukrainian border with Hungary, following the coastlines of Spain, France, and crossing the Alps towards the east through Italy, Slovenia and Croatia.

This corridor of about 3,000 km, integrating Priority Projects 3 and 6, ERTMS corridor D and corresponding to Rail Freight Corridor 6, will provide a multimodal link to the ports of the western Mediterranean with the centre of the EU. It will also create an east-west link through the southern part of the EU, contribute to intermodality in sensitive areas such as the Pyrenees and the Alps and connect some of the major urban areas of the EU with high speed trains.

### Main missing links

The main missing sections are the new cross border rail links between France and Italy ("Lyon-Turin") and between Italy and Slovenia ("Trieste-Divača") and the finalisation of a completely upgraded rail link between Spain and France. Furthermore the inclusion of Croatia shall be taken into account. Multimodal connections with the ports in Spain have to be developed and some railway sections in Italy need to be upgraded in order to remove key bottlenecks. The coexistence of two gauges: 1668 mm in Spain, 1435mm in the other countries is another challenge for this corridor, which is gradually being tackled during the oncoming Financial Perspectives.

### Success stories

The Madrid-Barcelona high speed line was opened in February 2008. This new 621 km line reduced the journey time between the two cities from 5 hours in 1996 to 2 hours 38 minutes today. It has attracted millions of passengers from air and road transport because of the standards of comfort and a seamless city to city connection. This line is now being extended towards France via the Perpignan-Figueras cross-border tunnel, linking Spain to the trans-European high speed network. The Madrid-Barcelona line has drastically cut back passenger numbers on the saturated air route between the two cities.



Rail connection between Girona and Figueres

## MEDITERRANEAN CORRIDOR

### CEF: Pre-identified projects

Algeciras - Madrid	Rail	studies ongoing, works to be launched before 2015, to be completed 2020
Sevilla - Antequera - Granada - Almería - Cartagena - Murcia - Alicante - Valencia	Rail	studies and works
Madrid-Zaragoza-Barcelona	Rail	Upgrading of existing lines (gauge, sidings, platforms)
Valencia - Tarragona - Barcelona	Rail	construction between 2014 - 2020
Barcelona	Port	interconnections rail with port and airport
Barcelona - Perpignan	Rail	cross-border section, works ongoing, new line completed by 2015, upgrading existing line (gauge, sidings, platforms)
Perpignan - Montpellier	Rail	bypass Nîmes - Montpellier to be operational in 2017, Montpellier - Perpignan for 2020
Lyon	Rail	Relieving Lyon bottlenecks: studies and works
Lyon - Avignon - Marseille	Rail	upgrading
Lyon - Torino	Rail	cross-border section, works base tunnel ; studies and works access routes
Milano - Brescia	Rail	partially upgrading, partially new high-speed line
Brescia - Venezia - Trieste	Rail	works to start before 2014 on several sections in synergy with upgrading actions undertaken in overlapping stretches as in Baltic Adriatic Corridor
Milano - Cremona- Mantova - Porto Levante/Venezia - Ravenna/Trieste	IWW	Studies and works
Cremona, Mantova, Venezia, Ravenna, Trieste	Inland Ports	Port interconnections, (further) development of multimodal platforms
Trieste - Divača	Rail	studies and partial upgrading ongoing; cross-border section to be realised until after 2020
Koper - Divača - Ljubljana - Pragersko	Rail	studies and upgrading/partially new line
Rijeka - Zagreb - Budapest	Rail	Studies and works (including construction of new track and second track between Rijeka and HU border )
Rijeka	Port	Infrastructure upgrading and development, development of multimodal platforms and interconnections
Ljubljana - Zagreb	Rail	Studies and works
Ljubljana node	Rail	rail node Ljubljana, including multi-modal platform; rail airport interconnection
Pragersko - Zalău	Rail	cross-border section: studies, works to start before 2020
Lendava - Letenye	Road	cross-border upgrading
Boba- Székesfehérvár	Rail	upgrading
Budapest-Miskolc-UA border	Rail	upgrading
Vásárosnamény-UA border	Road	cross-border upgrading

# MEDITERRANEAN CORRIDOR





## ORIENT/EAST-MED CORRIDOR

*Hamburg – Berlin  
 Rostock – Berlin – Dresden  
 Bremerhaven/Wilhelmshaven – Magdeburg – Dresden  
 Dresden – Ústí nad Labem – Melnik/Praha – Kolin  
 Kolin – Pardubice – Brno – Wien/Bratislava – Budapest – Arad – Timișoara – Craiova – Calafat – Vidin – Sofia  
 Sofia – Plovdiv – Burgas  
 Plovdiv – TR border  
 Sofia – Thessaloniki – Athina – Piraeus – Lemesos – Lefkosia  
 Athina – Patra/Igoumenitsa*

### Description

This long northwest-south eastern corridor will connect central Europe with the maritime interfaces of the North, Baltic, Black and Mediterranean seas, allowing to optimise the use of the ports concerned and the related Motorways of the Sea. This corridor will integrate Priority Projects 7 and 22, ERTMS corridor E and Rail Freight Corridor 7 (RFC 7). It will foster the development of those ports as major multimodal logistic platforms and will improve the multimodal connections of major economic centres in Central Europe to the coastlines, using rivers such as the Elbe. The corridor will also provide the link to Cyprus.

### Main missing links

Missing links are numerous, since most of the multimodal connections between Hungary, Bulgaria, Romania and Greece remain to be built or substantially upgraded. The Elbe also needs important upgrading to be able to attract traffic flows. Cross-border traffic management systems on rail and inland waterways are still to be implemented on many sections.

### Success stories

#### Rail development along the north – south line from Budapest until Athens

The Commission is already granting EU support for a study that will analyse traffic flows and potential development of a rail link that will connect Budapest with Sofia and Athens via Timisoara, Vidin-Calafat and Thessaloniki. The link is currently not fully operational and support is needed for creating the right preconditions for development along this line, preparing investments in the oncoming multi-annual financial framework. The cooperation between the Member States concerned by RFC 7, the various cofounding authorities is exemplary of what the future of the cooperation on the new corridor would be like.



The multimodal Danube Bridge between Vidin and Calafat at the Bulgarian Romanian border



Piraeus port in Greece

## ORIENT/EAST-MED CORRIDOR

## CEF: Pre-identified projects

Dresden - Praha	Rail	studies for high-speed rail
Praha	Rail	upgrading, freight bypass; rail connection airport
Praha – Breclav	Rail	upgrading
Hamburg – Dresden – Praha – Pardubice	IWW	Elbe and Vltava studies, works for better navigability and upgrading
Děčín locks	IWW	studies
Prague - Brno - Breclav	Rail	upgrading, including rail node Brno and multi-modal platform
Breclav – Bratislava	Rail	cross-border, upgrading
Bratislava – Hegyeshalom	Rail	cross-border, upgrading
Mosonmagyaróvár – SK Border	Road	cross border upgrading
Tata – Biatorbágy	Rail	upgrading
Budapest – Arad – Timișoara – Calafat	Rail	upgrading in HU nearly completed, ongoing in RO
Vidin – Sofia – Burgas/TR border Sofia – Thessaloniki – Athens/Piraeus	Rail	studies and works Vidin – Sofia – Thessaloniki - Athens; upgrading Sofia – Burgas/TR border
Vidin – Craiova	Road	Cross-border upgrading
Thessaloniki, Igoumenitsa	Port	Infrastructure upgrading and development, multimodal interconnections
Athens/Piraeus/Heraklion – Lemesos	Port, MoS	port capacity and multimodal interconnections
Lemesos – Lefkosia	Ports, multimodal platforms	upgrading of modal interconnection, including Lefkosia South Orbital, studies and works, traffic management systems
Lefkosia – Larnaca	Multimodal platforms	Multimodal interconnections and telematic applications systems
Patras	Port	Port interconnections, (further) development of multimodal platforms
Athina - Patras	Rail	studies and works, port interconnections

# ORIENT/EAST-MED CORRIDOR





## SCANDINAVIAN-MEDITERRANEAN CORRIDOR

*RU border – Hamina/Kotka – Helsinki – Turku/Naantali – Stockholm – Malmö  
Oslo – Göteborg – Malmö – Trelleborg  
Malmö – København – Kolding/Lübeck – Hamburg – Hannover  
Bremen – Hannover – Nürnberg  
Rostock – Berlin – Leipzig – München  
Nürnberg – München – Innsbruck – Verona – Bologna – Ancona/Firenze  
Livorno/La Spezia – Firenze – Roma – Napoli – Bari – Taranto – Valletta  
Napoli – Gioia Tauro – Palermo/Augusta – Valletta*

### Description

This north-south corridor will integrate Priority Projects (1, 11, 12 and 20), ERTMS corridor B and Rail Freight Corridor 3. It is a crucial axis for the European economy, linking the major urban centres in Germany and Italy to Scandinavia and the Mediterranean.

The longest of the Core Network Corridors starts at the Finnish-Russian border, and goes via Helsinki, Stockholm and Malmö to the European mainland. There it continues via the German seaports of Hamburg and Rostock, following the major traffic flows in the west of Germany, via Hannover, and the east, via Berlin and Leipzig. The eastern and western sections come together in Nuremberg and continue to the south to Munich, following the Brenner Corridor to Verona. In Italy, the corridor continues via Bologna, Rome and Naples, with branches to the ports of Genova, Livorno, Bari and Taranto, before going to Palermo. The last section connects Italy with Malta via Motorways of the Sea.

### Main bottlenecks

#### *The Brenner Base Tunnel*

The cross-border section between Munich and Verona going through the Alps is a major bottleneck on the Scandinavian - Mediterranean Corridor. The removal of this bottleneck is crucial for the realisation of the entire corridor.

Moreover, the realisation of the Brenner Corridor will have an effect on other rail networks linking northern and southern Europe. Together with the Gotthard-Monte Ceneri axis in Switzerland and the Lyon-Turin rail connection, the Brenner Corridor will establish a complex of high-capacity rail links. They will help achieve the environmental objectives set by the EU and ensure the modal shift from road to rail so necessary for the future of the ecologically sensitive Alpine region.

#### *The Fehmarn Belt crossing*

The Fehmarn Belt crossing is a key component in the main north-south route between central Europe and the Nordic countries. This cross-border bottleneck will be removed by the construction of the new immersed rail/road tunnel under the 19 km wide Fehmarn strait between Rødby in Denmark and Puttgarden in Germany. After the completion of the project, the travel time between Copenhagen and Hamburg will be reduced by approximately one hour, and for rail freight transport by approximately two hours.

### Success stories

#### *A Scandinavian success story: the Øresund fixed link*

The Øresund Bridge is a combined two track rail and four lane road bridge and tunnel across the Øresund Strait between Sweden and Denmark. It is the longest combined road and rail bridge in Europe. Works started in 1995 and the link was opened to traffic on 1 July 2000, with a project cost of €2.7 billion. Railway and road transport have developed quickly, mainly as a result of the increased integration between the areas in both sides of the link.

#### *An Italian success: The Milano – Napoli high speed line*

The Milano – Roma – Napoli high speed line became fully operational with the completion of the section between Bologna and Firenze at the end of 2009. The travelling time between Milano and Roma has been reduced from 5 hours to 2 hours 45 minutes. This high speed section now takes 60% of the total passenger traffic flow between the two cities. The passenger volume between Milan and Napoli has increased by approximately 25%. In 2010, almost 20 million passengers used this line.

## SCANDINAVIAN-MEDITERRANEAN CORRIDOR

### CEF: Pre-identified projects

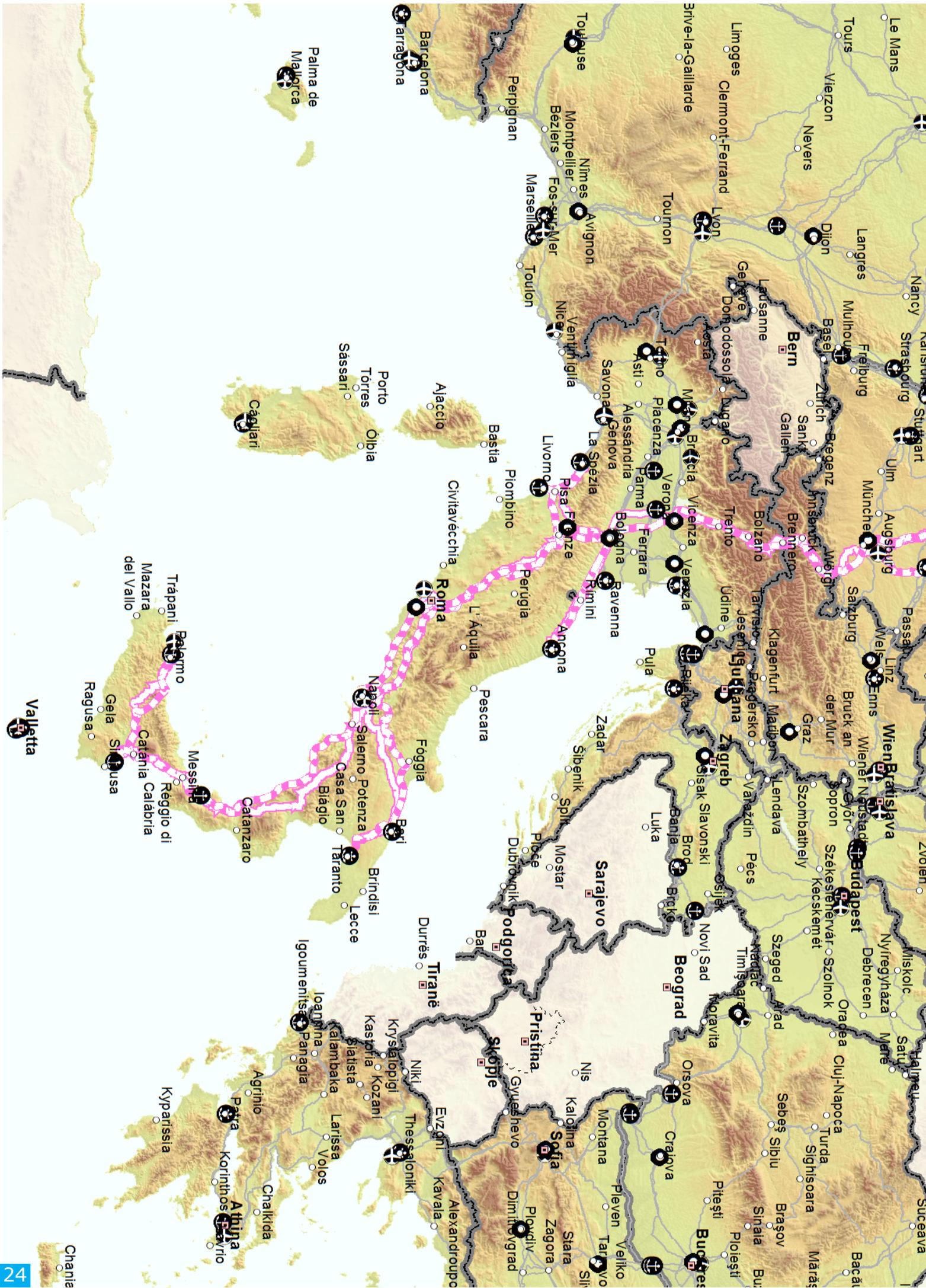
Hamina/Kotka – Helsinki	Port, rail	port interconnections, rail upgrading, icebreaking capacities
Helsinki	Rail	airport-rail connection
RU border – Helsinki	Rail	Works ongoing
Helsinki – Turku	Rail	Upgrading
Turku/Naantali – Stockholm	Ports, MoS	port interconnections, icebraking capacity
Stockholm - Malmö (Nordic Triangle)	Rail	Works ongoing on specific sections
Trelleborg - Malmö – Göteborg – NO border	Rail, port, MoS	Works, multimodal platforms and port hinterland connections
Fehmarn	Rail	studies ongoing, construction works Fehmarn Belt fixed link to start in 2015
København - Hamburg via Fehmarn: access routes	Rail	access routes DK to be completed by 2020, access routes Germany to be completed in 2 steps: one track electrification with the completion of the fixed link and two-track seven years later
Rostock	Ports, MoS	interconnections ports with rail; low-emission ferries; ice-breaking capacity
Rostock - Berlin - Nürnberg	Rail	studies and upgrading
Hamburg/Bremen - Hannover	Rail	studies ongoing
Halle – Leipzig – Nürnberg	Rail	works ongoing, to be completed by 2017
München – Wörgl	Rail	access to Brenner Base Tunnel and cross-border section: studies
Brenner Base Tunnel	Rail	studies and works
Fortezza - Verona	Rail	studies and works
Napoli - Bari	Rail	studies and works
Napoli – Reggio Calabria	Rail	Upgrading
Verona – Bologna	Rail	Upgrading ongoing
Ancona, Napoli, Bari, La Spezia, Livorno	Ports	Port interconnections, (further) development of multimodal platforms
Messina - Catania – Augusta/Palermo	Rail	upgrading (remaining sections)
Palermo/Taranto - Valletta/Marsaxlokk	Ports, MoS	port interconnections
Valletta - Marsaxlokk	Port, airport	upgrading of modal interconnection, including Marsaxlokk-Luqa-Valletta
Bologna – Ancona	Rail	upgrading



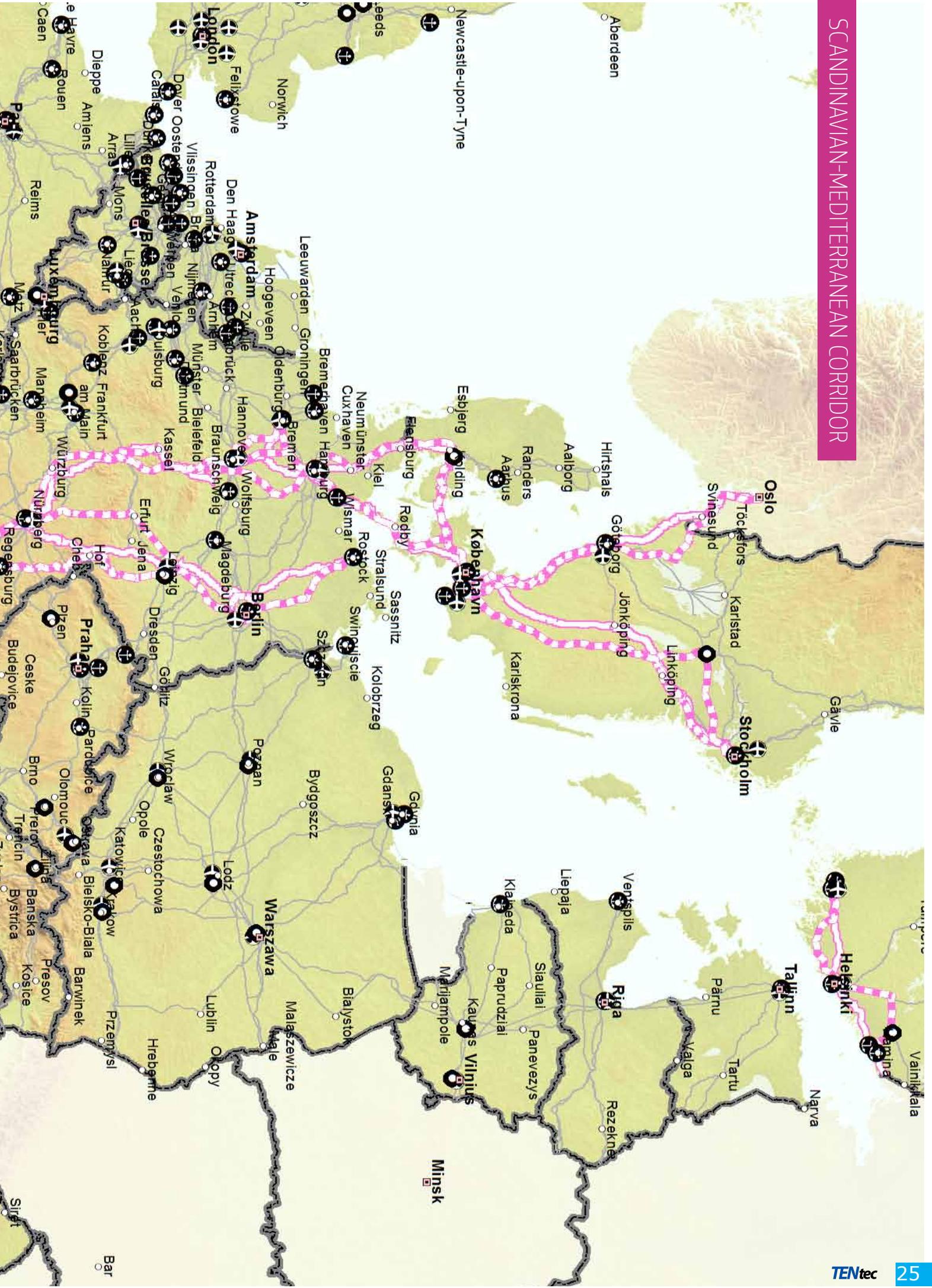
Works on the Brenner exploratory tunnel



Tunnel element for the Fehmarn Belt crossing



SCANDINAVIAN-MEDITERRANEAN CORRIDOR



## RHINE-ALPINE CORRIDOR

*Genova – Milano – Lugano – Basel  
 Genova – Novara – Brig – Bern – Basel – Karlsruhe – Mannheim – Mainz – Koblenz – Köln  
 Köln – Düsseldorf – Duisburg – Nijmegen/Arnhem – Utrecht – Amsterdam  
 Nijmegen – Rotterdam – Vlissingen  
 Köln – Liège – Bruxelles/Brussel – Gent  
 Liège – Antwerpen – Gent – Zeebrugge*

### Description

This north–south corridor will integrate Priority Projects 5 and 24, ERTMS Corridor A and Rail Freight Corridor 1. It constitutes one of the busiest freight routes of Europe, connecting the North Sea ports of Rotterdam and Antwerp to the Mediterranean basin in Genoa, via Switzerland and some of the major economic centres of the western EU. This multimodal corridor that includes the Rhine basin, will also provide connections to several east–west axes.

### Main missing links

The main missing links on this corridor are the bottlenecks in Germany and Italy, where capacity upgrades are required, and a better interconnection between the Belgian and Dutch networks with the German one, particularly between Emmerich and Oberhausen. In addition, the access routes to the Swiss tunnels on EU (Karlsruhe-Basel and CH-Milano/ Novara) territory need to swiftly progress, as the Gotthard and Monte Ceneri tunnels will create a flat trajectory for rail freight through the ecologically sensitive Alps as of 2019. Capacity upgrades as well as better multimodal connections in the ports are also necessary.

### Success stories

#### **The Betuwelijn (Betuwe Line - Priority Project 5)**

The Betuwe Line is a 143 km long, two track railroad dedicated to freight linking the port of Rotterdam to the German border. It was put into service in June 2007. Since then, traffic on the Betuwe Line is progressing. A further increase of demand for train paths is expected to occur due to the entry into service of the Maasvlakte 2 in the Port of Rotterdam. The cost of the infrastructure amounted to €4.7 billion, with EU contributions amounting to €179 million since the year 2000.

#### **The Lötschberg Tunnel**

Part of the AlpTransit Project, the Lötschberg Base Tunnel is a 35 km long railway tunnel cutting through the Swiss Alps. It is currently the world's longest land tunnel in use and accommodates both passenger and freight trains. Breakthrough was made in April 2005 and construction ended in 2006 for a full scale operation in December 2007. It is a centrepiece of the corridor: built to ease lorry traffic on Swiss roads, the tunnel allows an increased number of lorries and trailers to be loaded onto trains in Germany, pass through Switzerland on rail and be unloaded in Italy. It is also used for bringing tourists to the Alpine resorts by train as well as for local commuting. About 110 trains per day use the Lötschberg Base Tunnel, including passenger trains and intermodal freight transport plus heavy freight trains.

#### **A success story under construction: the Gotthard Tunnel**

Also part of the AlpTransit project, the Gotthard Base Tunnel is a railway tunnel beneath the Swiss Alps. With a route length of 57 km and a total of 151.84 km of tunnels, shafts and passages, it is the world's longest rail tunnel. The construction works of the tunnel began in 1996 and the tunnel should be operational in 2017, cutting the 3.5-hour travel time from Zurich to Milan by an hour.

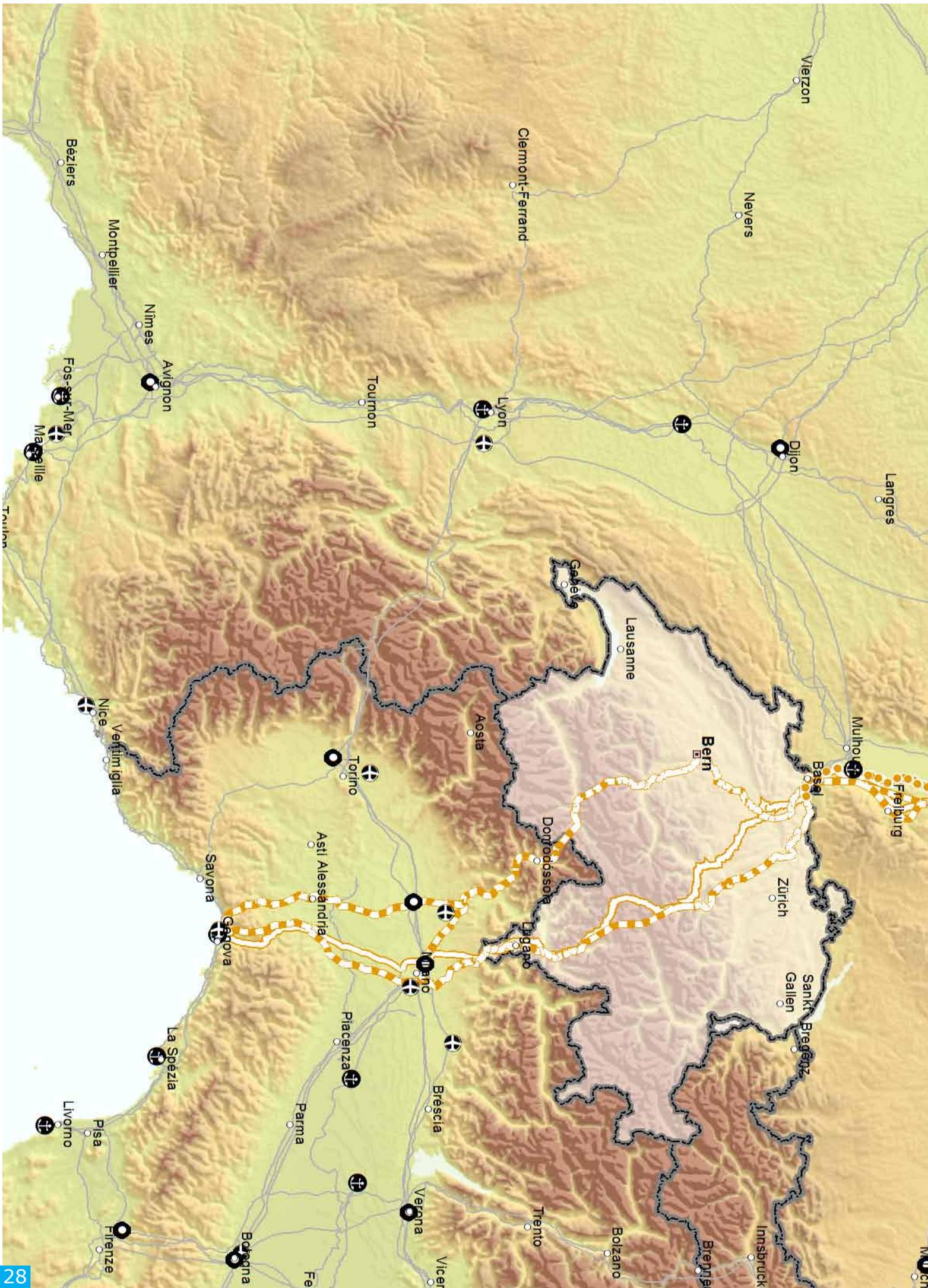
## RHINE-ALPINE CORRIDOR

## CEF: Pre-identified projects

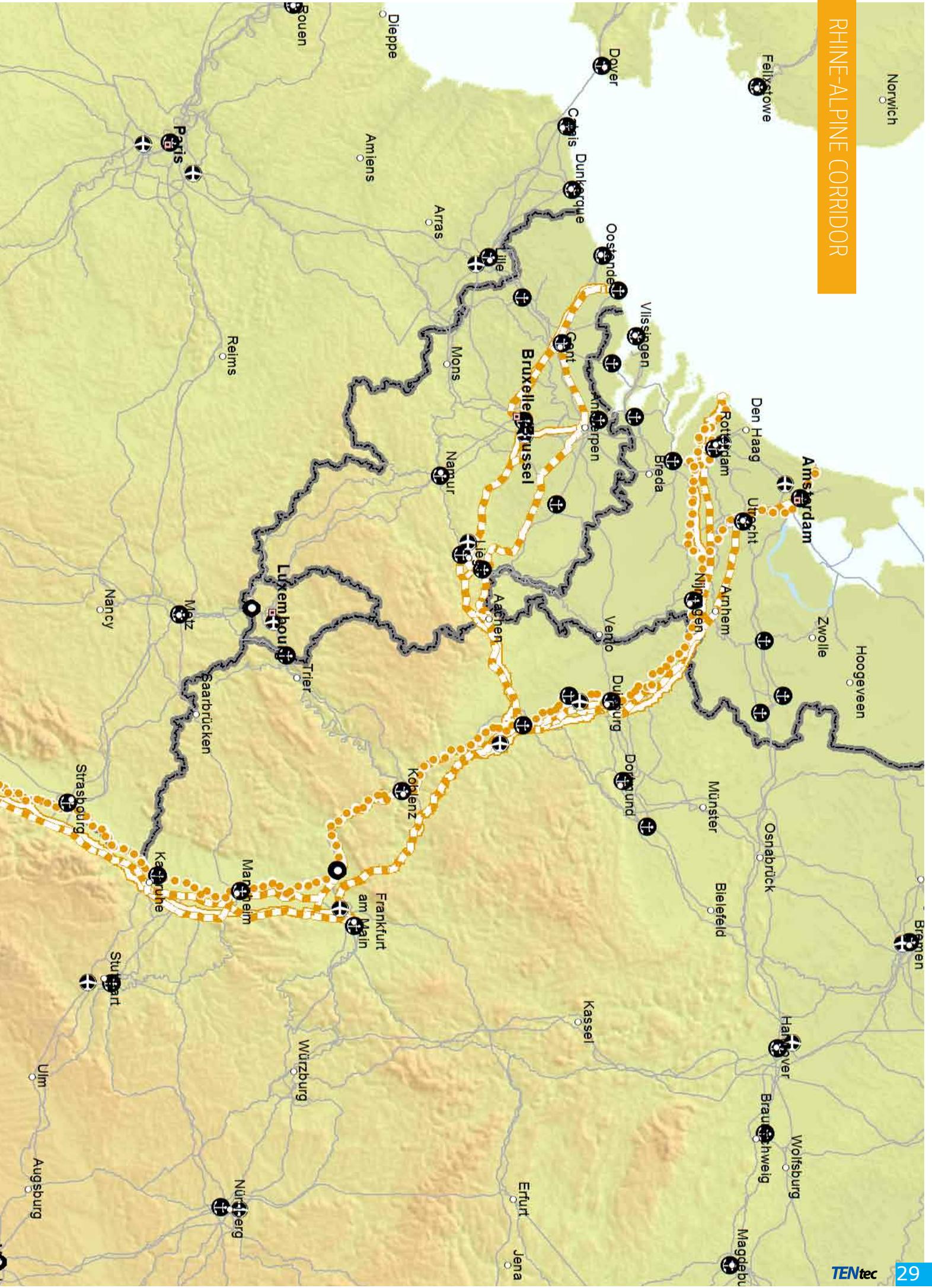
Genova	Port	Port interconnections
Genova - Milano/Novara - CH border	Rail	studies; works starting before 2020
Basel – Antwerpen/Rotterdam - Amsterdam	IWW	works for better navigability
Karlsruhe - Basel	Rail	works ongoing
Frankfurt - Mannheim	Rail	studies ongoing
Liège	Rail	port and airport rail connection
Rotterdam – Zevenaar	Rail	studies ongoing, upgrading
Zevenaar - Emmerich - Oberhausen	Rail	works ongoing
Zeebrugge – Gent – Antwerp - DE border	Rail	Upgrading



Y-junction (TV-WS, Tunnelverzweigung West-Süd) in the western tube of the Gotthard Base Tunnel at Multi-Function Station Faido, Canton Ticino, Switzerland.



# RHINE-ALPINE CORRIDOR



## ATLANTIC CORRIDOR

*Algeciras – Bobadilla – Madrid  
Sines / Lisboa – Madrid – Valladolid  
Lisboa – Aveiro – Leixões/Porto  
Aveiro – Valladolid – Vitoria – Bergara – Bilbao/Bordeaux – Paris – Le Havre/Metz – Mannheim/Strasbourg*

## Description

This diagonal corridor will link the Iberian Peninsula to France and Germany, with high speed rail lines and parallel conventional ones, providing for the continuity of the networks between Lisbon, Madrid, Paris and Strasbourg/ Mannheim.

Largely based upon the Atlantic and Iberian branches of Priority Project 3, these interoperable links will improve the connections between the most important urban zones of the area and foster a shift of traffic from the congested air and road transport to rail. It will provide for a better use of the conventional network for freight trains by making the best use of Rail Freight Corridor 4.

The maritime dimension plays a crucial role in this corridor, which links and enhances the role of the westernmost core ports of continental Europe (Sines, Lisboa/Setubal, Leixoes-Porto), and is connected with the North Sea through a multimodal axis Paris-Le Havre (inland waterways, railways and roads). The route of the corridor includes also key ports of Cantabria /Biscay bay, like Bilbao and Bordeaux.

## Main missing links

The main missing link is the cross-border connection between Lisboa and Madrid. The section **Porto – Valladolid** is affected by the lack of electrification on the Spanish side. Additionally problems of interoperability (difference in gauge, electrification, signalling systems and train length) affect the existing **San Sebastian – Bordeaux** section, where the new line has not reached the development consent. Still unclear is also the question of the optimal path for an interoperable route for freight across Madrid and from there to Burgos, and the subsequent needs for infrastructure development. With regards to roads, the electronic tolling systems are not interoperable yet, although Portugal and Spain are starting interoperable systems along the Atlantic coast.

## Success stories

In June 2011, with the contribution of the European Commission and the European Investment Bank (EIB), the €7.8 billion Tours-Bordeaux high speed rail line Public Private Partnership (PPP) project officially reached financial close. It is the first high speed rail PPP ever signed in France. The service should start by 2018. The 50-year concession contract covers the financing, design, construction, operation and maintenance of the high speed rail line between Tours and Bordeaux.

The EIB is contributing €1.2 billion via the combination of the senior debt, an equity bridge loan and the Loan Guarantee on TEN-T projects (LGTT), an instrument put in place jointly with the European Commission. This is the largest loan ever awarded in France by the EIB.

The concession financing also includes public subsidies made by the French government, local communities and the EU for a total amount of €3 billion, plus a contribution from Réseau Ferré de France (RFF) of around €1 billion, the other €2.6 billion.

## ATLANTIC CORRIDOR

## CEF: Pre-identified projects

High Speed rail Sines/Lisboa - Madrid	Rail, ports	studies and works ongoing, upgrading of modal interconnection ports of Sines/Lisboa
High speed rail Porto - Lisboa	Rail	studies ongoing
Rail connection Aveiro – Salamanca – Medina del Campo	Rail	cross-border: works ongoing
Rail Connection Bergara - San Sebastián - Bayonne	Rail	completion expected in ES by 2016, in FR by 2020
Bayonne - Bordeaux	Rail	ongoing public consultation
Bordeaux - Tours	Rail	works ongoing
Paris	Rail	southern high-speed bypass
Baudrecourt - Mannheim	Rail	upgrading
Baudrecourt - Strasbourg	Rail	works ongoing, to be completed 2016
Le Havre - Paris	IWW	Upgrading
Le Havre - Paris	Rail	Studies, upgrading
Le Havre	Port, Rail	Studies and works on port capacity, MoS and interconnections



Alcazer bypass, connecting Sines to the Atlantic Corridor (copyright MOPTC)

# ATLANTIC CORRIDOR





## NORTH SEA-MEDITERRANEAN CORRIDOR

*Belfast – Dublin – Cork  
Glasgow/Edinburgh – Liverpool/Manchester –  
Birmingham  
Birmingham – Felixstowe/London/Southampton  
London – Lille – Brussel/Bruxelles*

*Amsterdam – Rotterdam – Antwerp –  
Brussel/Bruxelles – Luxembourg  
Luxembourg – Metz – Dijon – Macon – Lyon – Marseille  
Luxembourg – Metz – Strasbourg – Basel  
Antwerpen/Zeebrugge – Gent – Dunkerque/Lille – Paris*

### Description

The North Sea-Mediterranean Corridor stretches from Ireland and the north of the United Kingdom through The Netherlands, Belgium and Luxembourg to the Mediterranean Sea in the south of France. This multimodal corridor is encompassing a range of Priority Projects (PP 2, 13, 14, 26, 28 and 30). It aims not only at offering better multimodal services between the North Sea ports, along the Maas, Rhine, Scheldt, Seine, Saone and Rhone river basins but also better interconnecting the British Isles with continental Europe. The goals are reducing travel times and offering a larger modal choice and better services for passengers and freight.

### Main missing links

The main missing links on the “continental part” are the inland waterways bottlenecks and missing links between Seine and Scheldt as well as between the Rhine and the Rhone with the Canal Seine-Escaut as the most well-known project under development. The cross-border rail connections between Brussels – Luxembourg and Lyon need to be upgraded to be able to compete with road transport. The main missing links in the United Kingdom and Ireland are rail connections. In particular the connection between the Belfast-Dublin and the Dublin-Cork rail lines is being developed under the “DART” project.

### Success stories

#### High speed network London – Brussels – Paris and beyond

Europe’s first cross-border high speed passenger rail project (Priority Project 2, Paris – Brussels – Köln – Amsterdam – London), linking major cities in Belgium, France, Germany, The Netherlands and the United Kingdom became fully operational in 2010. This project, which includes major cross-border initiatives such as the Channel Tunnel, fostered major changes in the traffic flows between these economic centres.

An important growth in traffic occurred in parallel with a strong modal shift from air and road transport to rail, due to the important gain in time and frequency. The Eurostar attracts more than 60% of the traffic between London and Paris.

#### The eastern branch of the high speed line Rhine-Rhône

The full high speed line Rhine-Rhone project encloses three branches (east, west, south) that will connect the high speed network around Lyon to those of eastern France and with Switzerland and Germany. The first phase of the new eastern branch Dijon - Mulhouse (190 km) was opened on 11 December 2011. This significantly cut travel times: 3 hours 40 minutes from Strasbourg to Lyon instead of 4 hours 45 minutes and minus 75 minutes from Frankfurt to Lyon (5 hours 55 minutes). The financing of the second phase (50 km) was agreed on national level on 18 January 2012, the works are expected to start in 2014.

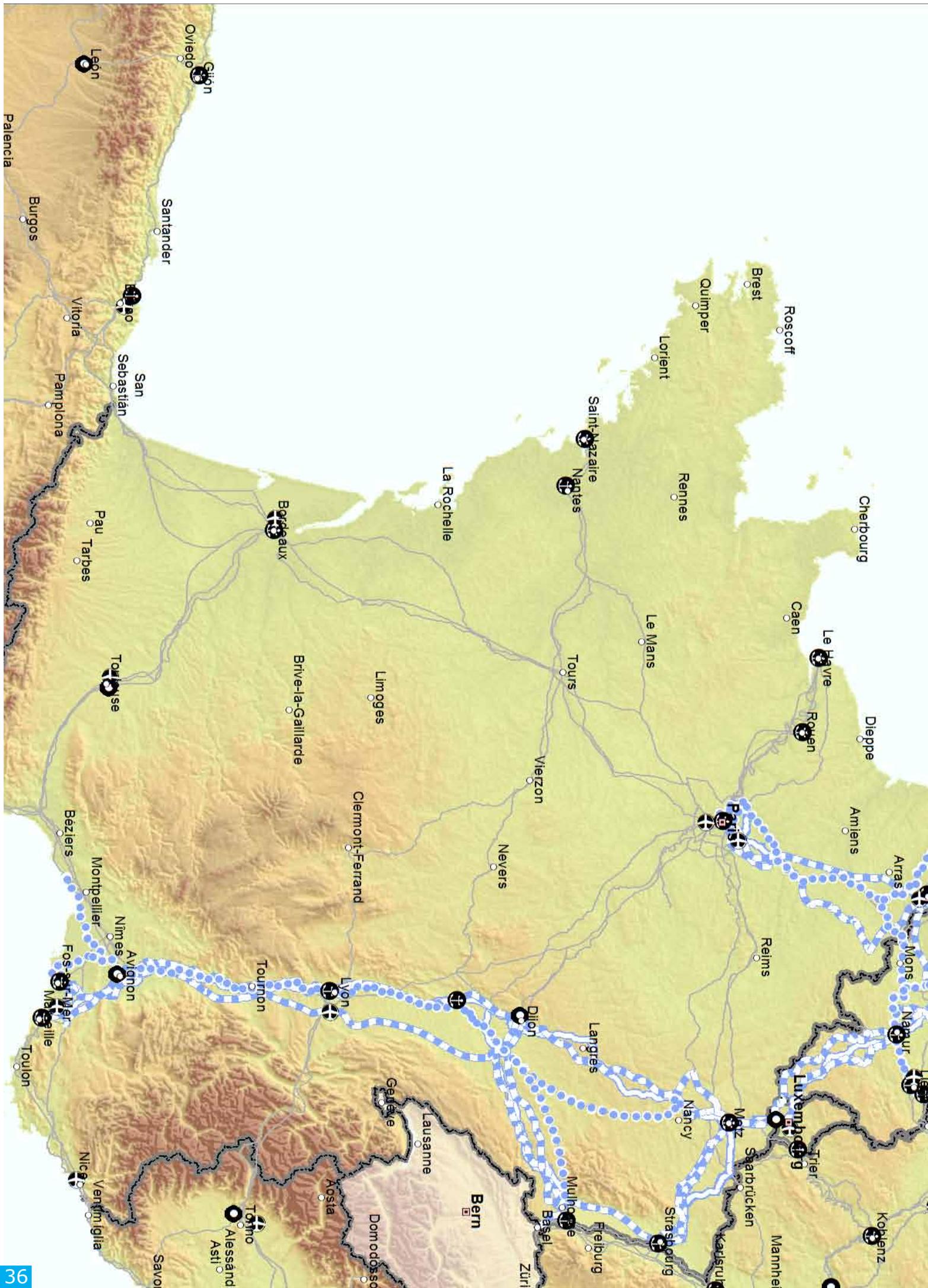


Aibre viaduct in France

## NORTH SEA-MEDITERRANEAN CORRIDOR

## CEF: Pre-identified projects

Cork - Dublin - Belfast	Rail	Studies and works; Dublin Interconnector (DART);
Belfast	Port, multimodal connections	upgrading
Glasgow - Edinburgh	Rail	Upgrading
Manchester - Liverpool	Rail	Upgrading and electrification, including Northern Hub
Birmingham - Reading - Southampton	Rail	Upgrading of the freight line
Dublin, Cork, Southampton	Ports, Rail	Studies and works on port capacity, MoS and interconnections
Dunkerque	Port	Further development of multimodal platforms and interconnections
Calais - Paris	Rail	preliminary studies
Bruxelles/Brussel	Rail	studies and works (North-South connection for conventional and high-speed)
Felixstowe - Midlands	Rail, port, multimodal platforms	rail upgrading, interconnections port and multimodal platforms
Maas, including Maaswerken	IWW	Upgrading
Albertkanaal/ Canal Bocholt-Herentals	IWW	Upgrading
Rhine-Scheldt corridor: Volkeraklock and Kreekaklock, Krammerlock and Lock Hansweert	IWW	locks: studies ongoing
Terneuzen	Maritime	locks: studies ongoing; works
Terneuzen - Gent	IWW	studies, upgrading
Zeebrugge	Port	locks: studies, interconnections (studies and works)
Antwerp	Maritime, port, rail	locks: studies ongoing; port: interconnections (including second rail access to the port of Antwerp)
Rotterdam - Antwerp	Rail	upgrading rail freight line
Canal Seine Nord; Seine - Escaut	IWW	studies and works; upgrading including cross-border and multimodal connections
Dunkerque - Lille	IWW	studies ongoing
Antwerpen, Bruxelles/Brussels, Charleroi	IWW	upgrading
Waterways upgrade in Wallonia	IWW	studies, upgrading, intermodal connections
Brussel/Bruxelles - Luxembourg - Strasbourg	Rail	works ongoing
Antwerp - Namur - LUX border - FR border	Rail	upgrading of rail freight line
Strasbourg - Mulhouse - Basel	Rail	upgrading
Rail Connections Luxembourg - Dijon - Lyon (TGV Rhin - Rhône)	Rail	studies and works
Lyon	Rail	eastern bypass: studies and works
Canal Saône - Moselle/Rhin	IWW	preliminary studies ongoing
Rhône	IWW	upgrading
Port of Marseille-Fos	Port	interconnections and multimodal terminals
Lyon - Avignon - Port de Marseille - Fos	Rail	upgrading





## RHINE-DANUBE CORRIDOR

*Strasbourg – Stuttgart – München – Wels/Linz  
 Strasbourg – Mannheim – Frankfurt – Würzburg – Nürnberg – Regensburg – Passau – Wels/Linz  
 München/Nürnberg – Praha – Ostrava/Přerov – Žilina – Košice – UA border  
 Wels/Linz – Wien – Bratislava – Budapest – Vukovar  
 Wien/Bratislava – Budapest – Arad – Braşov/Craiova – Bucureşti – Constanta – Sulina*

### Description

This corridor will provide the main east–west link between continental European countries, connecting France and Germany, Austria, the Czech Republic, Slovakia, Hungary, Romania and Bulgaria all along the Main and Danube rivers to the Black Sea by improving (high speed) rail and inland waterway interconnections. It includes sections of Priority Projects 7, 17, 18 and 22. The parts in the Czech Republic and Slovakia are also covered by Rail Freight Corridor 9.

### Missing links

The main missing links are the cross-border rail network interconnections between Germany and its neighbours, France, Austria and the Czech Republic with the view to develop a cross-border network. Bottlenecks between Austria and Slovakia, in Slovakia, Hungary, Romania and Bulgaria also need to be removed. While the navigation on the Rhine River as well on the connection Rhine-Main-Danube Canal is not hampered by the presence of major bottlenecks for a thorough inland waterway transport, the navigability of the Danube River must be improved in order to offer a real modal choice for freight transport. In addition, the Western Balkans section of the Danube plays an important part in the functioning of this corridor.

### Major issues

#### Development of (high-speed) rail

During the last decade several rail sections have been upgraded or build, especially in Austria and France:

- > In France, the TGV-Est service started in 2007 between Paris and Strasbourg, gaining 100 minutes of travelling time between Paris and Strasbourg (from 4 hours down to 2 hours 20 minutes).
- > The Kehl Bridge crossing the Rhine was opened in December 2010 increasing the efficiency, capacity and speed on this section (from 50 km/h to 160 km/h).
- > The rail connection Vienna – Budapest was upgraded to 140 km/h in Austria and up to 160 km/h of Hungarian sections, already in the 1990ies.
- > The railway line Budapest – Lököshaza (border between Hungary and Romania) has already been upgraded, upgrading on the Romanian side via Arad – Brasov – Bucuresti is on-going (with a few subsections completed), the Bucuresti – Constanta section has greatly been upgraded already.

#### Inland waterways transport

The main inland connection between Rhine, Main and the Danube represents the backbone of the inland navigation between north-western European basins and the south-eastern Black Sea.

On the Danube, the refurbishment of navigability in the section east of Vienna till the border with Slovakia is being successfully dealt with through a best practice that is being tested via a pilot project inside the natural protected area. The old bridge in Bratislava is being lifted up in order to allow the transit of vessels at category VI. In Hungary a study has been performed to evaluate the necessary intervention in thirty-one sites. Works have not yet started as the study is still been kept on hold for environmental reasons.

Studies have also been undertaken in the section that forms the border between Bulgaria **and** Romania. An inter-ministerial committee has been set up in order to coordinate the efforts and to develop a strategy for a territorial development of the region along the Danube.

In Romania, at Calarasi-Braila, an experimental monitoring programme, supported by the ICPDR, has been set up to evaluate the impact on the flora and fauna during and after the construction of the infrastructures meant to redirect part of the flow from the Bala branch to the main branch of the river.

## RHINE-DANUBE CORRIDOR

## CEF: Pre-identified projects

Rail connection Strasbourg - Kehl Appenweier	Rail	works interconnection Appenweier
Karlsruhe - Stuttgart - München	Rail	studies and works ongoing
Ostrava/Prerov – Žilina – Košice – UA border	Rail	upgrading, multimodal platforms
Zlín – Žilina	Road	cross-border road section
München – Praha	Rail	studies and works
Nürnberg – Praha	Rail	studies and works
München - Mühldorf - Freilassing - Salzburg	Rail	studies and works ongoing
Salzburg - Wels	Rail	studies
Nürnberg - Regensburg - Passau - Wels	Rail	Studies and works
Rail connection Wels - Wien	Rail	completion expected by 2017
Wien – Bratislava / Wien – Budapest / Bratislava – Budapest	Rail	studies high speed rail (including the alignment of the connections between the three cities)
Budapest - Arad	Rail	studies for high speed network between Budapest and Arad
Komárom – Komárno	IWW	Studies and works for cross-border bridge
Arad - Braşov - Bucureşti - Constanta	Rail	upgrading of specific sections; studies high-speed
Main – Main-Donau-Canal	IWW	studies and works on several sections and bottlenecks; inland waterway ports:multimodal interconnections with rail
Slavonski Brod	Port	Studies and works
Giurgiu, Galaţi	Port	Further development of multimodal platforms and connections with the hinterland: studies and works
Danube (Kehlheim - Constanţa/ Midia/Sulina)	IWW	studies and works on several sections and bottlenecks; inland waterway ports:multimodal interconnections
Sava	IWW	Studies and works on several sections and bottlenecks (including cross-border bridge)
Bucharest – Danube Canal	IWW	Studies & works
Constanta	Port, MoS	port interconnections, MoS (including icebreaking services)
Craiova – Bucharest	Rail	Studies and works



Inauguration of the Kehl Bridge



Inland waterways play a key role in the global reduction of the environmental footprint of transport

# RHINE-DANUBE CORRIDOR





# TEN-T CORE NETWORK CORRIDORS

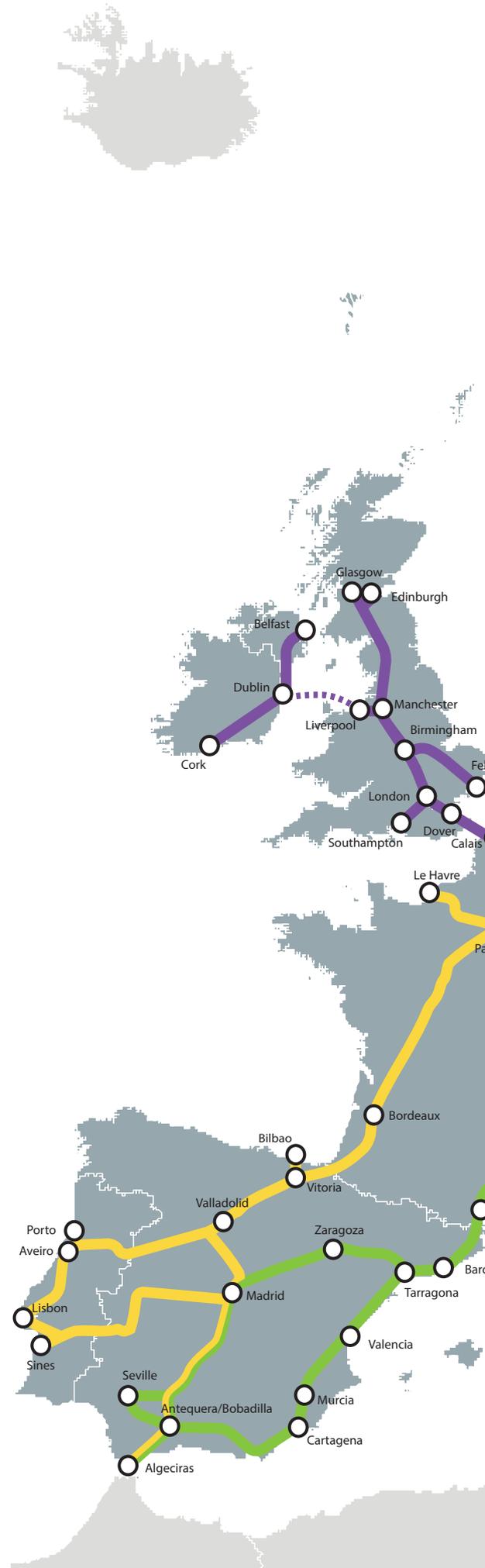
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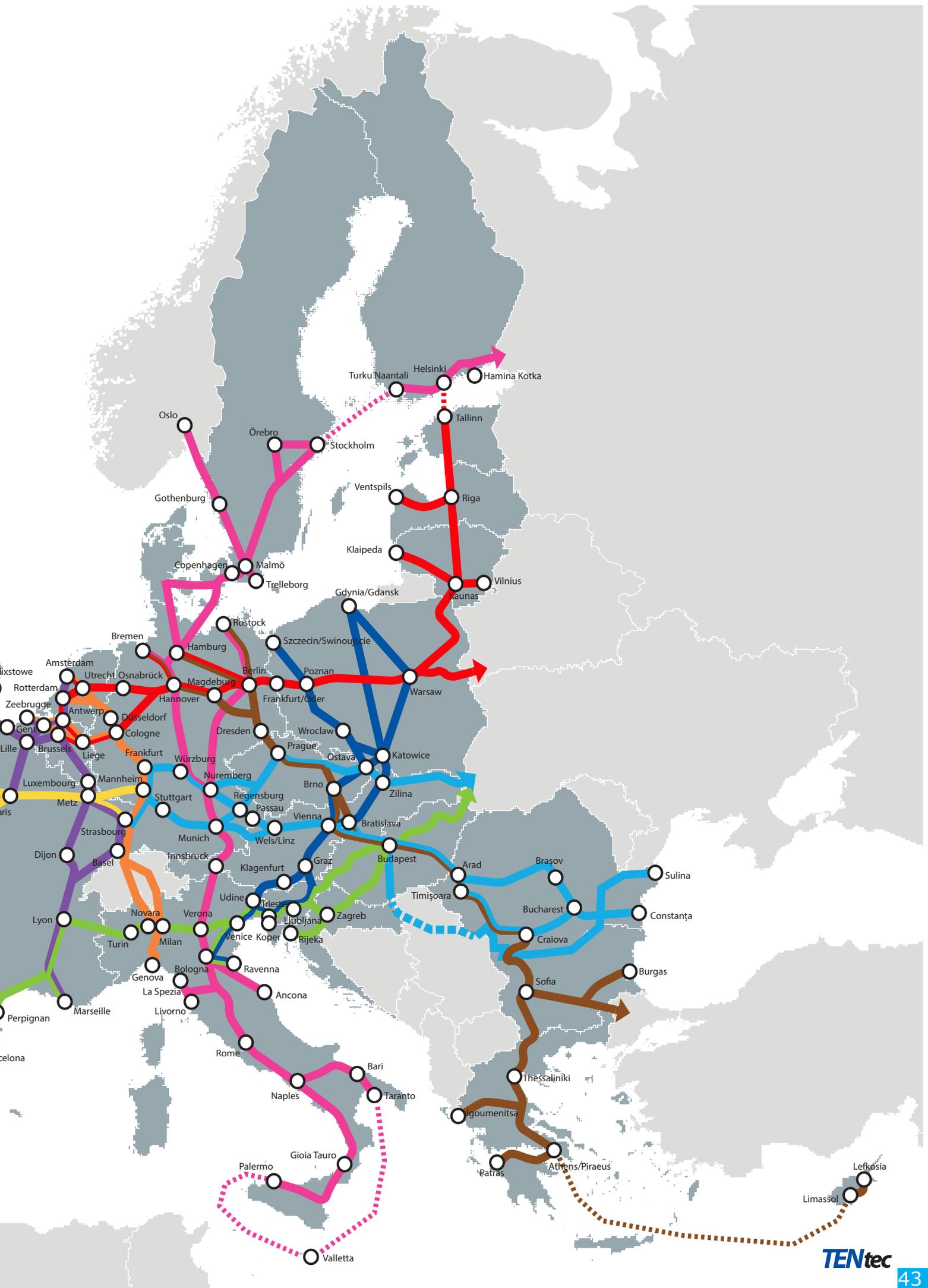
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- NORTH SEA - BALTIC
- MEDITERRANEAN
- ORIENT / EAST-MED
- SCANDINAVIAN - MEDITERRANEAN
- RHINE - ALPINE
- ATLANTIC
- NORTH SEA - MEDITERRANEAN
- RHINE - DANUBE

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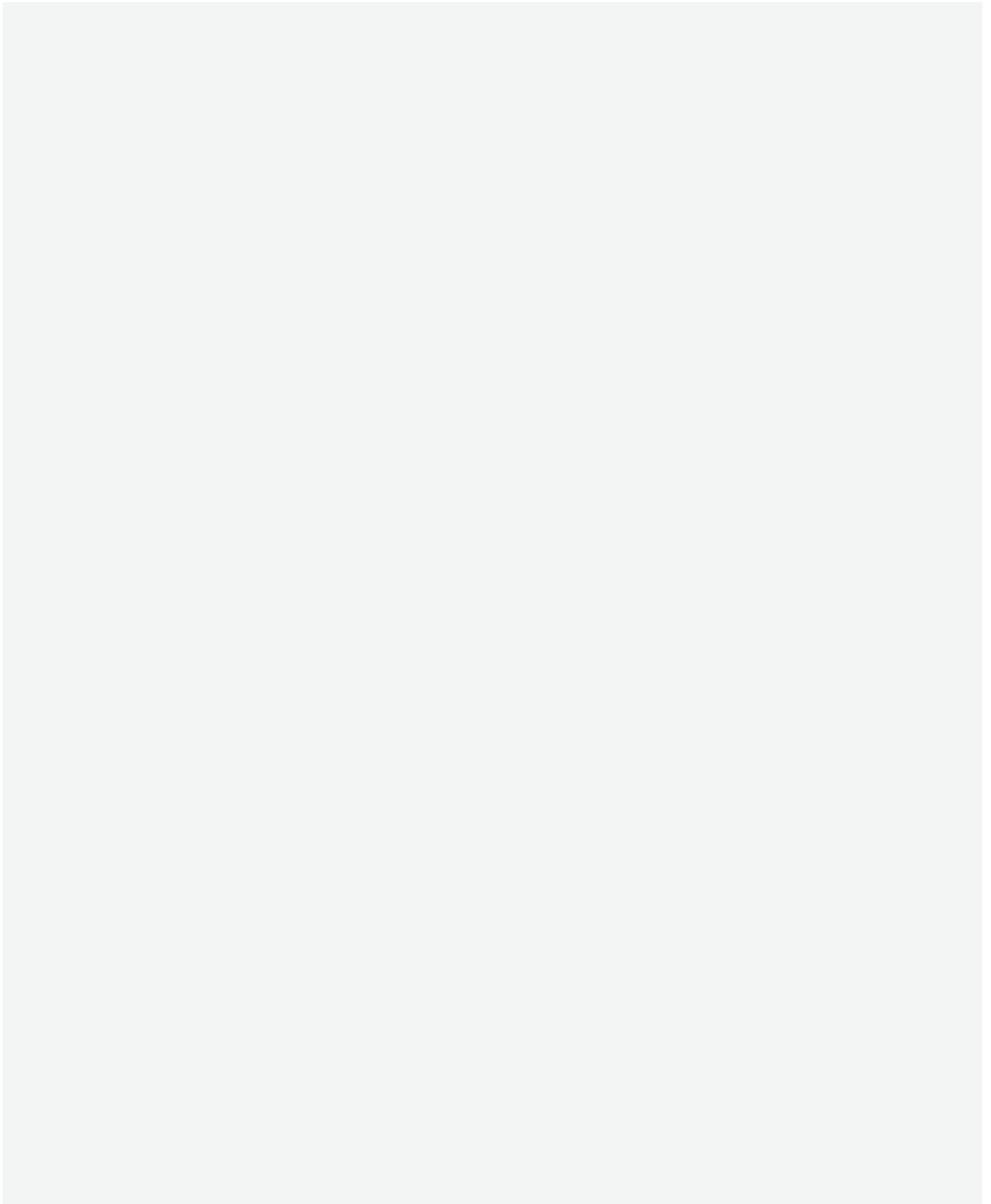
DG MOVE, TENtec Information System 2013

Based on the outcome of the informal trilogue on June 27th 2013





NOTES:







**Contact details:**

European Commission – Directorate General for Mobility and Transport  
Directorate B – European Mobility Network  
Unit B1 – Trans European Network  
[http://ec.europa.eu/transport/index\\_en.htm](http://ec.europa.eu/transport/index_en.htm)  
email: [move-info@ec.europa.eu](mailto:move-info@ec.europa.eu)

Offices:  
Rue Demot 28  
1049 Brussels Belgium