EXECUTIVE SUMMARY

This report looks forward to examining selected representative cases of initiatives already implemented in Europe or proposed for the short term, that seek to improve interconnectivity among transport networks and making access for passengers easier. The goal is to identify existing good practice and potential solutions, analyse these solutions and establish their likely contribution to improved interconnectivity in European transport networks, and also to identify existing problems still to be solved.

The topic of intermodality, co-modality and interconnectivity has been an important topic of discussion over the years in Europe. The case studies developed in this report provide new evidence based on real situations, highlighting solutions already found and applied successfully, and exploring problems encountered in the developing of plans and implementation of projects by regional authorities.

INTERCONNECT deals with the role of local and regional interconnections in the context of longer distance journeys. It starts from the premise that, with the continuing increase in trip length in inter-regional travel, effective interconnection between trip legs will become a necessary feature of a growing proportion of passenger journeys, particularly of those which contribute most to the regional and national economies.

The topic has particular relevance at the European level because the European Transport Networks' role as an integrated international network is compromised by poor interconnectivity, and also because the next generation of European transport policies (for the Transport White Book 2010-2020 revision and TEN-T update) will have to be sensitive to the differences between short, medium and long-term transport markets and the market advantages of each transport mode. In this context, a realistic assessment of intermodal opportunities is a key component of future policy development.

In order to further investigate these questions there is an obvious need to follow a case-study approach. A total of 12 cases have been selected in four groups, namely airports, train connections, ferry terminals and other case studies where several modes carry similar weights. In respect to origin and destination of a trip, switching from individual transport to regional or high speed trains as well as from public transport to air transport has been covered.

The ***Frankfurt airport interconnections*** case study analyses the state of land interconnections at Frankfurt airport, how the airport is interconnected with urban, regional and long distance rail services and with the road network. It especially deals with the fact that besides the rich interconnection with the highway network, the incorporation of the airport into the high speed railway system has been a big step forward to increase the intermodality at the airport, together with the co-operation between air and rail operators for through ticketing, thus constituting an element of good practice. This case study argues that the improvement of the rail-airport interconnection and operator co-operation has resulted in substantial rail demand in the airport, allowing liberation of slots from no longer necessary feeder flights to be used for other long-haul flights, therefore improving transport co-modality. This case study will be used in T4.3 as an in depth 'test-bed' analysis to check for transferability of findings from Frankfurt to the Stuttgart airport.

The ***Catalan airport system interconnections: Barcelona, Girona, Reus and Lleida*** case study discusses the interconnections of Reus, Barcelona, Girona and Lleida airports with regional transport networks and also with their corresponding city centres. All airports are located within 200 km of each other, and the new HSR line will pass within reach of all of them. The interconnection of airports to the HSR is intended to create a network of specialised airports, with small airports being able to provide the capacity that Barcelona will lack sooner or later. But the interest and feasibility of these rail connections have always been under debate and now they are just partially achieved. This case study concludes that it is difficult to plan optimal solutions in a multiple stakeholder framework and a highly populated territory. It has also pointed to the fact that designing optimal interconnections requires ad-hoc solutions for choosing best transport modes in each case. Territorial impacts beyond optimisation of travel times and travel costs are to be taken into account in long-term impact appraisal. This case study will be the object of two different 'test beds' in T4.3.

The ***Milanese airport system interconnections: Malpensa, Linate and Orio al Serio*** case study looks at the condition of interconnectivity in the airports of Malpensa, Linate and the low-cost airport of Orio al Serio. All are located around Milan within a radius of 60 km, at the core of the densely populated Lombardy region. Following the trends all around Europe, the passenger traffic of these airports has been growing during the last years, especially in Orio al Serio which has become the main Ryanair hub in Italy and has climbed to the fourth position of Italy's busiest airports in 2009. The case study analyses the typology of air traffic in the airports, their connection with Milan and the rest of the region, their connection airport to airport, and their link with the long distance national network. The case study concludes that the lack of adequate planning has resulted in poor interconnections in the Milan area, with long-distance rail network connection missing in Malpensa, an absence of reserved road infrastructure for public transport even when accesses to airports in Milan is congested, or missing passenger facilities at terminals that would increase interconnection quality. Most worryingly, the completion of planned infrastructures is affected by great uncertainty.

The ***Scottish airport system interconnections: Edinburgh, Glasgow and Prestwick*** case study analyses the issues concerning the competition between the three Scottish airports, and more crucially, the connections between them, their connections with the conurbations of the so called "Central Belt" around Glasgow and Edinburgh where the majority of Scotland's 5 million inhabitants live, and the large but sparsely populated 'rest of Scotland'. Although Scotland comprises a land area of nearly 80,000 km^2, Glasgow and Edinburgh airports are only 67 km apart from each other, and Prestwick, a third major airport, is just 41 km to the south-west of Glasgow. Glasgow and Edinburgh cater for all types of flight operators, while Prestwick focuses on low-cost airlines and holiday tour operators. Out of these three airports only Prestwick has a direct rail connection, and the three are only interconnected by very busy motorways. The case study concludes that even if infrastructure costs are not likely to be recovered rail services serving airports may be profitable, while bus services can attract large patronage. It will also note that intermodal ticketing strategies help attract users to public transport in airport to city trips. Following this case study, a specific 'test-bed' analysis will deal with the key question of how far an efficient high-speed land connection between these airports could reduce the total number of take-offs and landings there by bundling connections from in-coming long and mid-distance flights and flights from the many small airports scattered around Scotland for which there is little chance to replace them by efficient over-land services.

The ***Leeds railway station*** case study deals with the interconnectivity of rail in one of Britain's most significant railway stations, which in the past decade has seen a number of enhancements designed to, or having the effect of, enhancing interconnectivity via the improvement of access and egress. The rail reforms of the past 15 years have, throughout Europe, dismantled barriers to new entry of operators into local, regional and national rail markets in order to promote competition and a more vibrant rail industry. In most cases there are now more – sometimes considerably more - actors involved in the planning, development and operation of rail services than ever before. Through the analysis of the case of Leeds, this case study will focus on the interface between national, regional and local rail networks within this framework of increased competition and fragmentation of the industry, a process which has brought new opportunities in terms of competitiveness and innovation, and challenges particularly in relation to the maintenance of an interconnected network of rail services for passengers. The case study concludes that while passenger figures grew at Leeds rail station over the last 10 years, there is a lack of evidence that the observed growth is related to the enhancements undertaken at the station, while it is not clear whether or not competition promotes interconnectivity or detracts from it.

The ***Milan railways node*** case study analyses the current level of interconnectivity of rail networks in Milan and the existing plans concerning future connections with the new high speed rail services, providing useful elements concerning good and bad practice from several points of views, in particular with the issues regarding interconnection at stations, accessibility of stations, services for the airports and integration of fares***.*** Milan is a key node of the rail network in northern Italy, linking long distance routes to the regional network (operated by two separate companies on two independent infrastructures), to the local transit system of the main business metropolitan area in Italy and, in principle, also to the Milan airports. Continuous efforts have been made for improving the interconnections with local public transport as well as with the underground network, so that the main rail stations are currently reachable by at least one metro line and by bus or tramway. On the other hand, the lack of harmonisation between the services of the multiple providers, a minimum-stage ticketing integration and the lack of user information and scarcity of facilities to reduce transfer times at

interchange points leaves room for improvement in the future. The issues discussed in this case study will be further developed in a specific 'test bed' in task T4.3.

The ***dual-mode railway system: the Karlsruhe model*** case study analyses the solutions of interconnectivity established in Karlsruhe concerning the urban tram system and its integration on the suburban railway network, constituting a case of good practice in interconnectivity. Karlsruhe trams run on the urban light rail system and on the heavy rail tracks of the German Railways, allowing for tramway and suburban rail networks to operate together with relatively moderate investment requirements. In addition to the technical aspects concerning the tracks and the vehicles, this case study analyses the advantages, limitations and shortages of the model, concluding that it fits mostly in medium-sized urban areas with non-centrally located rail stations, resulting in important growths of passenger figures - including substantial catchment from private modes- and providing excellent cost-benefit ratios and helping relieve deficits of public transport.

The ***train-taxi and feeder bus services*** case study focuses on different concepts developed in the attempt to encourage travellers to take the train instead of the car in long distance and inter-regional journeys, by providing information and services that would help these travellers to overcome a key barrier, the "final few miles" corresponding to access and egress to and from train stations. The UK train-taxi (T-T) service provides online information about taxi services serving the UK's rail, tram and underground stations, while the Dutch T-T version provides discounts on the costs of taxi travel if journeys are shared both to and from the train station. More recently, Plusbus in the UK offers an optional ticketing add-on when purchasing a train ticket, which allows a train traveller unlimited travel on the buses serving both the origin and destination urban area on the day of travel. This case study concludes that while relatively inexpensive services to operate such as UK's T-T and Plusbus have been successful in the past, high costs have made Dutch T-T system difficult to sustain, resulting in a 65% offer reduction in the last 15 years. Large scale network coverage is usually beneficial for these schemes to be functional and attractive to customers.

The ***Amsterdam ferry services*** case study focuses on the efforts that are being made in the Netherlands to increase the interoperability of different transport services and to co-ordinate and synchronise tariff and ticket systems. The geographic location of Amsterdam has traditionally allowed the development of waterborne and land transport in parallel, creating a high level of accessibility, but resulting also in a significant number of different operators. A mobility card has been introduced allowing seamless transfer between modes to overcome barriers to interconnection, and provides at the same time new technological possibilities to assess and manage mobility. The top-down approach in the process of transport integration, which has been driven from a national perspective so as to integrate all public transport within the Netherlands, has resulted in the need for a synchronisation between large numbers of parties, but there seems to be a high notion of co-operation between these parties towards a single goal. This case study concludes that ticketing in Amsterdam is moving from a modal or operator led approach towards a "mobility" approach, but it also will question who is the overall beneficiary of the new system, even when integration and interconnection between operators bears the potential to increase services and to expand the reach of the transport network, pointing out that emphasis should be placed on the analysis of user benefits of current developments.

The ***Lisbon ferry services*** case study aims at exploring the driving forces that have maintained the ferry services in the Tagus river, even after the construction of bridges which brought significant competition from road and rail traffic. Lisbon has an intensive network of ferry services across the river, despite the imposing Ponte 25 de Abril bridge which links the two sides of the city and carries both rail and road traffic. Even a car ferry service has survived the arrival of the bridge, unusual in such circumstances. The case study identifies diverse elements of good practice which can help explain the survival of ferries, among them the co-operation (and finally merging) of the two operating ferry companies, the improvement of terminals for easier interconnection to other means of transport, the investment in boat renewal which has resulted in decreased travel times, and the introduction of smart cards to overcome a complex fare system.

The ***ferry terminal of Helsingborg*** case study focuses on the strategies which have made the ferry services between Helsingborg and Elsinore a competitive means of transport, even after the construction of the Øresund bridge. With more than 11 million annual passengers, the port of Helsingborg is one of the busiest ferry ports in the world. In the 1980s a decision was made to create a central terminal for all modes of public transportation in Helsingborg, located right at the port,

facilitating direct and rapid interchange between the ferries and all modes of public transportation. The terminal incorporates two former train stations, the central bus station and the ferry terminal, and currently serves local, regional and national trains and buses to and from Helsingborg, and boat services to Elsinore. This case study concludes that the project was only possible due to intense institutional co-operation and understanding, and identifies additional elements of good practice such as the driving concept of terminals which has forced designs specifically targeted to easy interconnectivity, and the co-operation of ferry operators to take account of each other's timetables and increase service quality.

The ***ferry terminal of Rostock*** case study analyses the case of Rostock as an example of a harbour where interconnectivity of transport networks for non-motorised passengers has for a long time been disregarded as the majority of passengers travel by car or bus. This case study argues that the little investments made to improve conditions for the non-motorised segment in the terminal have led to decline and poor conditions of access to and egress from the terminal. The case study explores solutions that have been more recently implemented or which are being planned for the future to improve this situation. A shuttle bus link connecting the passenger terminal with the city centre and the rail station is planned, saving non-motorised passengers at least 20 minutes of travelling and waiting time. The shuttle will run during a trial period from May 2011 until December 2011. A joint ticketing scheme will be in place with one ticket valid for both the ferry and the buses on both shores.

The ***Tri-City: Gdansk / Sopot / Gdynia*** case study focuses on the discussion of the many interconnectivity challenges that the Tri-City region is facing in the next years, identifying potential solutions already envisaged. The analysis involves several transport networks in this dense Polish urban agglomeration. The Tri-City and its metropolitan area concentrate 55% of the region's population; two Pan-European transport corridors run through the region and although there are two major seaports in Gdansk and Gdynia, ferry links are not very well developed and many direct connections were abandoned during the economic transformation. Lech Walesa airport operates domestic connections to Warsaw and direct international links to European airports served by 13 airlines; a new terminal and airside constructions are underway and fixed rail link to the airport is planned. Urban public transport requires improvement to increase efficiency, as do the rail and the road networks. The case study shows that interconnectivity is a priority for local and central administrations, having a clear vision that there is a need to improve services to increase regional attractiveness, and will identify financial requirements as being the most important barrier to improvement, with rivalries between the two major cities of Gdansk and Gdynia also a barrier.

In the light of the case studies' major findings and other evidence supported by strategic studies conducted at national and European level, this report concludes with a proposed set of final hypotheses to be further validated. On *infrastructure planning*, the report claims that as interconnections typically involve significant resources, integrated planning and management of interconnections is a key element to properly achieve social and economic profitability of investments and positive network effects, especially in small and medium sized terminals. On *service management*, the report states the need to favour co-modality through serving interconnections with the most efficient travel modes in each case and thinking of specific solutions for different situations. On *organisational issues*, the report notes that institutional complexity and contradictory stakeholders' goals need often to be overcome in order to achieve good interconnections.

From the 12 selected and reported case studies a subset of five will be used as 'test beds' for simulations in order to investigate the applicability of solutions found in WP3 - either from the case studies or from theoretical considerations - in a new environment. This study will be performed in T4.3, and is therefore not included in D4.1.