

# Workgroup B

## **Green and Integrated Transport on the Danube River**

### **Extending and Enhancing the Existing Motorail (Car Trains) System in the Danube River Basin (Drb)**

#### ABSTRACT

The aim of the project is the enhancement of a greener, innovative and sustainable mobility through the extension of the existing railway system with as little changes as possible and the development of new modes of transport, providing a fast and seamless combination of rail and water transport, followed by short distance travel to the final destination by motorized vehicles or bicycles. This would be achieved through the extension in the Danube River Basin of the motorail system which allows the transport of cars, motorbikes and small trailers, creating an efficient, seamless and low-carbon transport network, thus contributing to the sustainable development of economic competitiveness and growth, of an integrated European single market and of an open and inclusive society, of tourist accessibility to new countries.

#### KEYWORDS

sustainable mobility  
modes of transport  
seamless combination  
rail and water transport  
motorail

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## INTRODUCTION

The Danube Region is a functional area defined by its river basin. Geographically it concerns primarily but not exclusively: Germany (Baden-Württemberg and Bavaria), Austria, the Slovak Republic, the Czech Republic, Hungary, Slovenia, Romania and Bulgaria within the EU, and Croatia, Serbia, Bosnia and Herzegovina, Montenegro, the Republic of Moldova and Ukraine (the regions along the Danube) outside. Since the Danube flows into the Black Sea, it should be coherent with Black Sea perspectives. With over 100 million people, and a fifth of EU surface, the area is vital for Europe.

Sustainable mobility can only be achieved through a radical change in the transport system, inspired by breakthroughs in transport research, far-reaching innovation, and a coherent, Europe-wide implementation of greener, safer and smarter transport solutions. This can be achieved by extending the existing railway system with as little changes as possible and developing new modes for seamless transportation. Transport is a major driver of Europe's economic competitiveness and growth. It ensures the mobility of people and goods necessary for an integrated European single market and an open and inclusive society. The existing railway and water system have little contribution for the access of citizens from Eastern Europe to the common labour market. The currently preferred air transport can be challenged only by providing a fast (TGV) and seamless (well-coordinated) combination of rail and water transport, followed by short distance travel to the final destination by motorized vehicles or bicycles.

Transport industry and transport equipment manufacturing together represent 6.3 % of the Union's GDP. Transport is 96 % dependent on fossil fuels. The urban context poses specific challenges to the sustainability of transport.

Accelerating the development and deployment of new technologies and innovative solutions for vehicles, infrastructures and transport management are proposed in the map of the extended network and in the work packages in this project proposal. Union level funding of transport research and innovation will help to focus on activities with a clear European added-value which include lower emissions, ease of connecting remote areas, providing employment opportunities, improving revenues from tourism. Europe-wide, interoperable transport solutions need to be pursued which is why extending and enhancing the existing motorail system is an important matter.

In order to achieve sustainable mobility within the Danube river basin, the upgraded motorail system should fulfil the following:

- Resource efficient transport that respects the environment which could be achieved by switching from fossil fuels to bio fuels, and in general, renewable sources of energy and in that way decrease the amount of CO<sub>2</sub> emissions by using electrically powered rail system which provide a greener way of transport. Also, improving the efficiency of transport by providing more work for the Railway System and Danube River Navigation companies while in the same time relieving the car and motorcycle traffic should be included. This kind of action also lowers the risk of congestions and accidents on the roads. Optimization of the use of infrastructures, by means of intelligent transport systems and smart equipment and increasing the use of demand management and public and non-motorized transport, particularly in urban areas could be achieved by online coordination of a coherent railway-river transport system.
- Better mobility, less congestion, more safety and security which should include innovative solutions for seamless, inclusive, safe, secure and robust transport systems through investments in research, involving new materials and new sources of energy. Also, providing input from research centres, universities and sector-specific organizations could be very useful. Enhancement of inter-modality and the deployment of smart planning and management solutions requires development and implementation of a smart planning systems similar to the ones used for coordination of flights.
- Socio-economic research and forward looking activities for policy making – the main task would be to raise awareness of people through education and marketing (advertisement, series of actions involving lower cost of transportation – government actions). The aim is to support improved policy making which is necessary to promote innovation and meet the challenges raised by transport and the societal needs related to it. The focus of activities shall be to improve the understanding of transport related socioeconomic trends and prospects (which includes training of interested parties and target groups and providing employment opportunities to underdeveloped economic regions) and provide policy makers with evidence-based data and analyses (assured by inclusion of policy (and decision) makers as partners in the project and creating the sense of ownership for the process implementation, thus assuring better chances for success).

The new alternative way of transportation in the Danube river basin shall be a competitor to the currently existing railway and waterway systems, thus fostering a continual strive for improvement.

The experts needed for project realization include civil engineers, ecologists, architects and designers, economists, software developers and marketing managers from all countries participating in the Danube river basin motorail system.

## **PROBLEM BACKGROUND**

Several proposed Commission funding resources will be used to support a new transport system in Europe:

- Horizon 2020, the next framework programme for research and innovation, has a proposed budget of €6.8 billion euros for research and innovation on “smart, green and integrated transport”.
- The Connecting Europe Facility (CEF) has a proposed budget of €31.7 billion to modernise Europe’s transport infrastructure, build missing links and remove bottlenecks. This includes €10 billion ring-fenced in the Cohesion Fund for transport projects in cohesion countries, with the remaining €21.7 billion available for all Member States.
- The programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) will, among others, help small and medium-sized enterprises to access finance and new markets. Its proposed budget is €2.5 billion.

The initiative launched the European Commission, in the form of a Communication, lists ten different fields of interest for which roadmaps towards deployment will be developed:

- 1) Clean, efficient, safe, quiet and smart road vehicles
- 2) Clean, efficient, safe, quiet and smart aircraft
- 3) Clean, efficient, safe, quiet and smart vessels
- 4) Clean, efficient, safe, quiet and smart rail vehicles
- 5) Smart, green, low-maintenance and climate-resilient infrastructure
- 6) Europe-wide alternative fuel distribution infrastructures
- 7) **Efficient modal traffic management systems (including capacity and demand management)**
- 8) **Integrated cross-modal information and management services**
- 9) Seamless logistics
- 10) Integrated and innovative urban mobility and transport

As outlined (in bold text font) this project aims to improve the current state of fields of interest 7 and 8. Industry, the public sector and other stakeholders involved in bringing innovative transport technologies and services to the market are invited to participate in further developing and implementing this strategy, for example by agreeing common targets, coordinating development and deployment agenda's, considering the needs for standards and identifying funding implications.

## **METHODOLOGY**

The methodology will include identification of availability of existing railway system, opinion poll among the drivers, and comparison of energy used by trains, impact of activities in environment, biodiversity, measurement and comparison of efficiencies with other transport system.

Organizing of pilot projects to test the speed of trains, improve the train efficiency, finding of alternate routes, solving problems of bottle neck section as part of a railway.

## **IDEA FORMULATION**

Motorails (car trains) are used successfully in the USA between Washington D.C. and Florida, and also in Europe. One can take a ferry or Eurotunnel shuttle across the Channel, as motorail trains cannot use the Channel Tunnel, they start at either Düsseldorf (Germany) or Hertogenbosch (Netherlands) or Paris, but no longer (as of 2010) from Calais.

The specific objective is to achieve a European transport system that is resource efficient, environmentally-friendly, safe and seamless for the benefit of citizens, the economy and society.

### **WHAT IS MOTORAIL?**

Normal passenger trains don't carry cars or motorbikes, just passengers and sometimes bicycles. However, there are special Motorail trains which carry

cars & motorbikes using car transporters attached to the train. They are usually summer-only and usually only once or twice a week. They are run by several operators. Motorail trains carry cars, motorbikes, small trailers & roof boxes, and on many routes you can now take some over-height 4x4 vehicles & people carriers. However, they can't carry big 4X4s, vans, caravans or campers, as these are too high. There are no motorail trains within the UK, these ceased in 1995. Also there are no motorail in the DRB.

## WHY USE MOTORAIL?

First, there's the relaxed holiday atmosphere of the motorail experience, avoiding the stress & hassle of airports & flights. Second, it offers door-to-door convenience, taking your own car to the given destination carrying as much luggage as you like. No baggage fees or weight limits, no crowded airports, no expensive airport parking, etc. The journey is part of the holiday. It needn't take much longer than flying, because motorail trains run overnight, it may save a hotel bill or two as well.

The Motorail model is very simple. Ride a train to a given destination is very general and operates well for a long time. Those passengers who want to use the motorail services just simply purchase a motorail ticket, drive their car onto the car carrier and then go to their seat on the train. At the end of the journey they simply drive right off just like it is usual on a river ferry.

The environmental costs of inefficient transportation are growing permanently all around the world. In the United States the transportation sector accounts for approximately one-third of total CO<sub>2</sub> emissions. Transportation is the fastest-growing source of greenhouse gases, accounting for nearly half of the net increase in total U.S. emissions since 1990. To maintain the current transportation structure is simply not sustainable. We need to find innovative ways to make auto travel more efficient, and at the same time, find ways to encourage other means of getting around besides the car<sup>3</sup>. Rail travel is a relatively green mode of transportation. Traveling by train produces three to 10 times less CO<sub>2</sub> compared to road or air transport, according to the UIC, an international railroad organization. The other point is the technology development: beside sustainability the modern railway systems could be much cheaper, more effective and more green than the 'traditional' modes of transportation. The advantages of rail travel are the next:

- Energy consumption
- Carbon emissions
- Efficiency (compared with the single cars)

- Cost (even lower external costs)
- Safety
- Community benefits

## EXTENDING THE EXISTING NETWORK TO A CIRCULAR RAILWAY SYSTEM

Thus improving tourist services and accessibility to new countries.

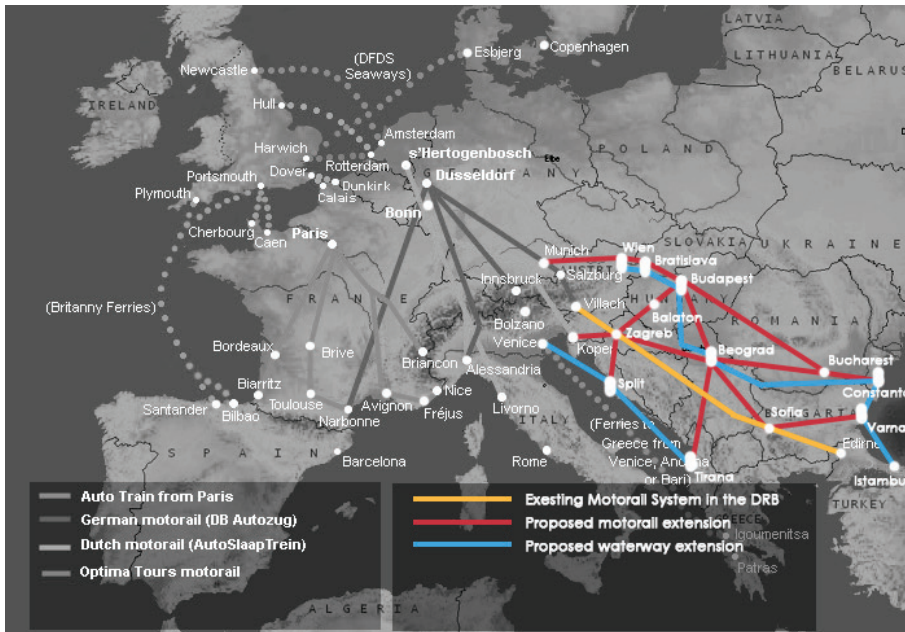


Fig.1 Existing network of railways

## TOURIST SERVICES

- Hop on/off
- Mixed service: bike between cities and pick up car in a different railway station (hub)

### Enhancing commuting between economic centres and rural areas

**Temporary employment:** unemployed people will be trained to help people with disabilities to reach their destination, and tourists with organising custom tours and interpreting.

## LINKS TO HORIZON2020

The specific objective (4.1) in the 4. chapter of Horizon 2020 (SMART, GREEN AND INTEGRATED TRANSPORT) is to achieve an European transport system that is resource efficient, environmentally-friendly, safe and seamless for the benefit of citizens, the economy and society, parallel with satisfying the growing mobility needs of its citizens with and the and climate resilient economy. *'Despite its growth, the transport sector must achieve a substantial reduction in greenhouse gases and other adverse environmental impacts, and must break its dependency on oil, while maintaining high levels of efficiency and mobility. Sustainable mobility can only be achieved through a radical change in the transport system inspired by breakthroughs in transport research, far-reaching innovation, and a coherent, Europe-wide implementation of greener, safer and smarter transport solutions.'* Extending the existing railway system with as little changes as possible and developing new modes for seamless transportation help to reach these aims. There are great differences within the European Union, but according to the Impact assessment support study on the revision of the institutional framework of the EU railway system<sup>5</sup>, in the next years the development of old rail infrastructure in certain parts of the EU is an important priority and policy supported from different funds of the European Union. It is clear that failing to improve the sustainability of transport will result in unacceptably high societal, ecological, and economic costs in the long term.

*'The transport sector is a major contributor to greenhouse gases and generates up to a quarter of all emissions. The other important problem of the sector that transport is 96 % dependent on fossil fuels. The existing systems are not yet sufficiently smart; the alternatives for shifting between different modes of transport are not always attractive; road fatalities remain dramatically high at 34 000 per year in the Union; citizens and businesses expect a transport system that is safe and secure.'*

*'Within a few decades the expected growth rates of transport would drive European traffic into a gridlock and make its economic costs and societal impact unbearable. Passenger-kilometres are predicted to double over the next 40 years and grow twice as fast for air travel. CO2 emissions would grow 35 % by 2050. Congestion costs would increase by about 50 %, to nearly EUR 200 billion annually. The external costs of accidents would increase by about EUR 60 billion compared to 2005.'*



*'Research and innovation, driven by policy objectives and focused on the key challenges, shall contribute substantially to achieve the Union's targets of limiting global temperature increase to 2°C, cutting 60 % of CO2 emissions from transport, drastically reduce congestion and accident costs, and virtually eradicating road deaths by 2050'.*

*'The problems of pollution, congestion, safety and security are common throughout the Union and call for collaborative Europe-wide responses. Accelerating the development and deployment of new technologies and innovative solutions for vehicles infrastructures and transport management will be key to achieve a cleaner and more efficient transport system in the Union; to deliver the results necessary to mitigate climate change and improve resource efficiency; to maintain European leadership on the world markets for transport related products and services.'*

*'Additionally, the Union level funding of transport research and innovation will complement Member States' activities by focussing on activities with a clear European added-value Lower emissions; ease of connecting remote areas; providing employment opportunities; improving revenues from tourism.'*

Project proposal of enhancing and expanding the existing motorail system in the Danube River Basin match European policy objectives and priority areas although this aim covers just a part of the sustainable transportation system challenges of the European Union. This initiative could create a smarter and more integrated transport system will make an important contribution to the Europe 2020 goals of smart, sustainable and inclusive growth and the objectives of the Innovation Union flagship initiative, with connecting the countries, regions and people in Central-Eastern Europe and in the Danube River Basin.

The next SWOT analysis of the project proposal shows the identified internal strengths and weaknesses, and the external opportunities and threats.

## STRENGTHS

- Improving the efficiency of transport;
- Lowers the risk of congestions and accidents on the roads;
- Lower greenhouse gas emissions;
- Providing employment opportunities to underdeveloped economic regions;
- Lower highway traffic, improve accessibility;
- Easier mobility for elder generation;
- Easier accessibility of popular tourist destinations;
- More safety, comfort and security;
- Strong links to the different objectives of European development strategies.

## WEAKNESSES

- Low level of available resources, low level of available resources of funds;
- Low level of profit, negative effects of market competition;
- Low level of mobility of the target groups in the Danube River Basin;
- Not sufficient cooperation between stakeholders;
- Seasonality of needs;
- Great differences between the state of the railroads and infrastructure.

## OPPORTUNITIES

- Resource efficient motorail system that respects more the environment: reduce resource consumption and improve vehicle efficiency;
- Explore and exploit the potential of alternative fuels and innovative and more efficient propulsion systems, including fuel infrastructure;
- Develop smart online coordination of a coherent railway-river transport system.

## THREATS

- Lack of interest (stakeholders and potential target groups);
- Market competition of substitute products and services (higher prices, less effective marketing and PR activity, etc.);
- Unchanging customer behaviours and attitudes;
- Lack of European and local funds.

## **ADDITIONAL LINKS TO THE DANUBE STRATEGY**

According to the Danube Strategy the links between the project proposal and the Strategy are the next:

- There is a need to connect people, their ideas and needs;
- Transport interconnections must be modernised, and informatics access improved;
- Mobility challenges: There is particular need for greater multimodality, better interconnection with other river basins modernising and extending infrastructure in transport nodes such as inland ports;
- Environmental challenges: the environmental impact of transport links, tourist developments, or new energy-producing facilities must also be considered;
- Existing transport and trade links must be developed (Opportunities, 2.2.);
- Better connections among people are also needed, especially through culture and tourism. (Connecting the Danube Region, 3.1.).

In the first stage of implementation the project is focusing on expanding the existing Western-European motorail system seasonally (concentrating to the summer period) to connect the Romanian, Bulgarian and Adriatic Coast with the railway centres of Europe have play already important role in this type of combined transportation. Also, the implementation of vignette system (Danube vignette) into this motorail system would bring the connectivity among countries of the region onto an even higher level.

We have defined the challenges and objectives of our project in the following logic framework matrix:

#### OVERALL OBJECTIVE

Efficient modal traffic management systems (including capacity and demand management)

#### PROJECT OBJECTIVE

Extending and enhancing the existing motorail (car trains) system in the Danube river basin (DRB)

#### INTERMEDIATE RESULTS

WP1 Organization and coordination of partner consortium

WP2 Establishing the current state

WP3 Product design

WP4 Product simulation and testing on a small scale

WP5 Full scale implementation of the product

WP6 Dissemination of the project results

#### OBJECTIVELY VERIFIABLE INDICATORS SOURCES OF VERIFICATION

#### ASSUMPTIONS & RISKS

EXTENDED MOTORAIL (CAR TRAINS) SYSTEM IN THE SOUTH-EASTERN SECTOR OF THE DANUBE RIVER BASIN (DRB) – STATISTICAL DATA FROM RAILWAY AND SHIPS OPERATORS

- On-Site Visits
- Feedback From Customers – Continuing Economic Crisis
- Insufficient Demand of Motivated Customers

WP1 budget; worksheets

WP2 analysis of the current state, permits for operation

WP3 map of planned extension of the existing network

WP4 Analysis of feedback (from customers, operators, operation)

WP5 Report on the implementation of the product

WP6 Publications

- Individual budgets of partners, justification documents; worksheets;
- Analysis/reports;
- Map;
- Publications.
- Exchange rate fluctuation;
- Acts of god.

## ACTIVITIES

WP1 Organization and coordination of partner consortium

- 1.1 Establishing a Technical Committee and Work Groups
- 1.2 Organize a kick-off meeting
- 1.3 Define and administrate project monitoring and reporting
- 1.4 Define communicational and promotional activities
- 1.5 Define a corporate image of the partnership

WP2 Establishing the current state

- 2.1 Surveying of stakeholders' and potential customers' opinions/motivation
- 2.2 Exchanging experience and good practices with Italian and German Motorail operators
- 2.3 Analysing the state of existing railway stations, trains and infrastructure
- 2.4 Financial analysis of necessary expenses and potential income and possibilities for fund raising

WP3 Product design

- 3.1 Analysis of existing motorail systems
- 3.2 Design of trains for transportation of people, cars, motorbikes and bicycles
- 3.3 Adaptation of the existing railway infrastructure, including railway tracks, stations, parking facilities, supporting software
- 3.4 Preliminary pricing and promotion
- 3.5 Developing training materials
- 3.6 Translation on the training and promotional activities in the languages of the target countries
- 3.7 Defining the scope for simulation and testing of the system

#### WP4 Product simulation and testing on a small scale

- 4.1 Operational planning of simulation and testing activities(S&T)
- 4.2 Implementation of S&T
- 4.3 Analysis of effectiveness and efficiency and providing feedback
- 4.4 Follow-up activities and cost analysis

#### WP5 Full scale implementation of the product

- 5.1 Final design of trains for transportation of people, cars, motorbikes and bicycles
- 5.2 Maintenance of the railway infrastructure, including railway tracks, stations, parking facilities, supporting software
- 5.3 Pricing and promotion
- 5.4 Training the staff involved

#### WP6 Dissemination of the project results

- 6.1 Organizing promotional activities (PA)
- 6.2 Carrying out PA
- 6.3 Feedback and dissemination to similar projects

According to the discussions with the other three working groups, we can we make a direct, primary contact with the group E. The possible cooperation is based on the common target of developing a certain types of touristic attractions. Our project can be determined as a mobile intermodal transporting system, which makes connections and shifts from train to car, motorcycle or bicycle. The group E proposed a touristic development of rural areas, but it has to be supported by other tools to make it more sustainable. Our project could help with the accessibility of these rural areas. Both projects can be successful only with well-functioning informational systems. This high-level information system could satisfy the needs of the tourists and could support the comfortable using of the offered services. In this way we can increase the number of available and accessible destinations of the existing motorail system. The other common point could be to install new intermodal stations at the borders of rural areas where cars could be changed for bicycles so rural areas could be reached without using cars: in this case there is no need for motorways.

With the other planned DIANET project proposals can we set up just secondary connections because it is likely that they are geographically wide from the train stations where the planned services offered. In case of realization it could be possible to link these projects with an information system but it would be necessary to know more details which are basically missing in this state of the projects.