

# **Implementation of the Pan-European Corridors Concept: The Case of Corridor X**

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## **Abstract**

In this paper, the Corridor X as good example of implementation of the Pan-European Corridors concept is presented. More specifically, the Technical Secretariat of the Steering Committee for Pan-European Corridor X presents scientific, technical and procedural activities, which contributed to the embedding of a Pan-European multimodal transport Corridor and feed its development perspective in Southeast Europe, a definitely sensitive region – if not instable, but also necessary for the European integration.

Furthermore, the presentation of the T.S. experience is followed by a brief description of the existing and future situation of the Corridor, being results of the systematic following of all the activities concerning the development of Corridor X since the establishment of the structures of Corridor X, according to a relevant Memorandum of Understanding.

## **1. The Corridors concept**

The Prague Declaration on all-European Transport Policy of the First Pan-European Transport Conference in 1991 for the development of an efficient all-European Transport System foresaw the indication of the most important transport routes linking the European countries and regions to be considered for improvement and modernization.

More decisively, the Second Pan-European Transport Conference in Crete in 1994 declared that a starting point for future work on coherent infrastructure development at Pan-European level was the report on a set of indicative guidelines, which covered the main infrastructure corridors for the various transport modes. Nine Corridors were defined, to which a tenth was added during the third Pan-European Transport Conference in Helsinki in 1997 to include the former Yugoslavian countries, and more especially the today's Serbian Republic.

The overall objective of the Helsinki Declaration was to promote sustainable, efficient transport systems (taking into account technical and interoperability aspects in order to facilitate movements at border crossings), which meet the economic, social, environmental and safety needs of European citizens, help to reduce regional disparities and enable European business to be competitive in the world markets. Among other sub-objectives, one is to promote rehabilitation or reconstruction of problematic links, giving at the same time priority to measures, which are able to better exploit the existing infrastructures.

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The means for the achievement of the objectives set, had been – among others – the arrangements for “Europe Wide Transport Network Partnership”, that should be initiated to bring together all the parties concerned with transport infrastructure in order to coordinate investment schemes.

## 2. Corridor X’s definition

Pan-European Corridor X, as the principals of the Corridors definition order, is a pre-existing and traditional route linking South-Eastern Europe with Central Europe, which had served transportation in the area for many decades. Before the 1990’s this Corridor was fully operational and more or less developed in terms of road and rail infrastructure. The unfortunate events in former Yugoslavia have caused a significant drop in traffic along the Corridor and have also influenced the status of infrastructures and facilities, adding at the same time new international borders along the Corridor, between the four former Yugoslavian countries.

The multimodal Pan-European Transport Corridor X (Main Axis and four branches), as defined by the Helsinki declaration, connects Salzburg, Ljubljana, Zagreb, Belgrade, Nis, Skopje, Veles and Thessaloniki; Graz with Maribor and Zagreb (Branch A); Budapest with Novi Sad and Belgrade (Branch B); Nis with Sofia [to Istanbul via Corridor IV (Branch C)]; and Veles with Bitola and Florina [and via Egnatia with Igoumenitsa port (Branch D)]. The alignment of the Corridor is described in more detail in **Table 1** and represented in **Maps 1** and **2** for roads and railways respectively.

More specifically, Corridor X refers not only to the road and rail infrastructure, but also to interconnection points for inland waterways, air, maritime, intermodal and in particular combined transport infrastructure, including ancillary installations such as signalling, the installations necessary for traffic management, access links, border crossing stations, service stations, freight and passenger terminals and warehouses along the route of the Corridor.

**Table 1: Corridor X main characteristics and alignment**

Concerned countries: <b>Austria, Bulgaria, Croatia, F.Y.R. of Macedonia, Greece, Hungary, Slovenia, Serbia/ Montenegro</b>		
Transport modes:	<b>Railways</b>	<b>2,528 km</b>
	<b>Roads</b>	<b>2,300 km</b>
	<b>Inland waterways</b>	<b>n.a.</b>
	<b>Airports</b>	<b>12</b>
	<b>Sea- &amp; River- ports</b>	<b>4</b>
Alignment		
<u>Main Axis: Salzburg - Ljubljana - Zagreb - Beograd - Nis - Skopje - Veles - Thessaloniki</u>		
<b>Railway</b>	<b>Salzburg - Villach - Jesenice - Ljubljana - Zidani Most - Dobova - Zagreb - Novska - Vinkovci - Beograd - Nis - Skopje - Veles - Thessaloniki</b>	
<b>Road</b>	<b>Salzburg - Villach - Karawanken - Ljubljana - Bic - Kraska Vas - Obrezje - Zagreb - Beograd - Nis - Skopje - Gradsko - Thessaloniki</b>	
<u>Branch from Graz (Branch A)</u>		
<b>Railway</b>	<b>Graz - Sentilj - Maribor - Zidani Most</b>	
<b>Road</b>	<b>Graz - Sentilj - Ptuj - Gruskovje - Zagreb</b>	
<u>Branch from Budapest (Branch B)</u>		
<b>Railway</b>	<b>Budapest - Kunszentmiklos - Tass - Kelebia - Novi Sad - Beograd</b>	
<b>Road</b>	<b>Budapest - Szeged - Roszke - Subotica - Novi Sad - Beograd</b>	
<u>Branch to Sofija (to Istanbul) (Branch C)</u>		
<b>Railway</b>	<b>Nis - Dimitrovgrad - Kalotina - Sofija</b>	
<b>Road</b>	<b>Nis - Dimtrovgrad - Sofija</b>	
<u>Branch to Florina (Via Egnatia to Igoumenitsa port) (Branch D)</u>		
<b>Railway</b>	<b>Veles - Bitola - Florina</b>	
<b>Road</b>	<b>Veles - Prilep - Bitola - Florina</b>	

**Map 1: Road Corridor X alignment**



**Map 2: Rail Corridor X alignment**



### **3. Structures for the development of Corridor X**

In line with the Declarations of Crete and Helsinki, and recognizing the economic, commercial and geopolitical importance of the Corridor for the stability, cooperation and the development in the Balkans, several meetings had been organized, with all parties involved and sharing the same interest for the revitalization of Corridor X and for the integration of the Trans-European and the Pan-European Transport Networks, in view of preparing and signing of a Memorandum of Understanding (**MoU**) by the Ministers of Transport of the Corridor's countries. After two constructive preparative meetings of delegations of the countries concerned and representatives of the European Commission and other international organizations in Thessaloniki in November 1998 and in November 1999, the Ministers of Transport of the participating countries signed the MoU on the 15<sup>th</sup> of March 2001 in Thessaloniki, before the 3<sup>rd</sup> meeting of the Steering Committee.

The MoU of the Pan-European Corridor X aims at the cooperation for the development of main and ancillary infrastructure on the multimodal Corridor X, which should include maintenance, reconstruction, rehabilitation, upgrading and new construction of infrastructure as well as its operation and use with a view to fostering the most efficient and environmentally friendly transport modes. Furthermore, the cooperation aims at perceiving and defining prerequisites and conditions for the most efficient use of funds and know-how provided by public and private sources.

The MoU includes the general rules on studies to be carried out according to best practices and to the requirements of the private sector and the international financial institutions, which should be involved during the different stages of planning, implementation, operation and use of infrastructure. It also foresees the exchange of information concerning the development, use and operation of the Corridor, such as physical aspects, traffic flows, delays at cross borders etc.

Furthermore, the MoU foresees to the agreement upon a common set of technical standards necessary to secure optimal interoperability of all the sections of the Corridor, including the interoperability between transport modes. The border crossings and customs cooperation included in the MoU aims at the minimization of waiting times and the improvement of long-distance transport conditions.

The framework for private participation in the development, use and operation of the Corridor is intended for optimum private sector involvement through a dialogue with the private sector and the International Financial Institutions during the planning and realisation of projects, and the ensuring of the necessary legal and financial conditions.

The framework for the implementation of the MoU is the definition of priorities, budgets and time-plans for specific measures necessary for the development of the Corridor, based on the coordination work of the Steering Committee of the Corridor.

The Steering Committee, which is consisted of representatives of the eight participating countries and the European Commission, meets regularly once a year and it is permanently supported by a Technical Secretariat (**T.S.**), which has been assigned by the Greek Chair of the Steering Committee to the Department of Transportation and Hydraulic Engineering of the Faculty of Rural and Surveying Engineering of Aristotle

University of Thessaloniki to support the Committee from January 2000 until March 2007 (end of the Greek Chairmanship).

#### **4. The role of the Technical Secretariat**

The role of the T.S. had been to become active especially in the collection and evaluation of existing information and relevant studies with respect to Corridor X, such as the collection of the information concerning the state of infrastructure, traffic flows, waiting times at borders, specific maintenance, reconstruction, rehabilitation and upgrading investments, and the establishment of an information system to demonstrate in a systematic and comprehensive manner the state of the Corridor at its various stages of development.

The T.S. adopts, among other coordination and monitoring approaches, a methodology of an analytical and in depth data collection survey, which mainly includes: a) annual questionnaire-based surveys in all participating countries, b) extended on-site visits of expertise and meetings with members of the road and rail authorities and organizations in each country, c) collection of reports from various sources (e.g., international and national organizations etc.) about Corridor X, d) International cooperation, especially with other Corridors in the area, the European Commission – Directorate General Transport and Energy, United Nations Economic Commission for Europe – Transport Division and also the Infrastructure Steering Group of the Joint Office for South East Europe of the European Commission and the World Bank.

As a result of the data collection and analysis process, a Geographic Information System (**G.I.S.**) has been developed by the T.S., in order to present spatial information concerning the status and the various development stages of Corridor X to all concerned countries Corridor (maps included in this paper are G.I.S. products). Concerning the dissemination of the results, updated information about the status of the Corridor is available at the T.S. website at the following address: <http://edessa.topo.auth.gr/X/>.

Furthermore, the T.S. has to bring out conclusions of the inventory of existing studies and suggestions for the terms of references of new studies concerning Corridor X in line with the international experience in this field and to examine conditions providing interoperability and promoting intermodal transport (Efficient Integration of Cargo Transport **Modes & Nodes** in CADSES area – IMONODE project). The T.S. also assists the efforts of the concerned countries to attract assistance for the development of the Corridor X by International Financial Institutions and the private sector. In the framework of those efforts, the T.S. has elaborated a traffic flows forecasting study (for both freight and passenger sectors) for the documentation of needs for new studies and respective projects for the development of the Corridor.

The T.S. is also assigned to contribute to the optimization of the operations and procedures taking place at border crossings and the provision of improved conditions for access to the Corridor. That is the reason why the T.S. has elaborated a study dedicated for border crossings with a questionnaire-based survey followed by on-site visits of expertise. That study was the documentation basis for the Steering Committee to constitute a Working Group for the improvement of border crossings along the Corridor, which has already met twice and hopefully, will conclude to a Protocol signing in autumn 2005 for the facilitation of transport at frontiers. The T.S. is assigned with the technical support of the speaking Working Group.

Most of the activities mentioned above are horizontal for the Technical Secretariat (except from those that are self-dependent, i.e. the elaboration of the Terms of References for new studies, the traffic flows forecasting and the cross borders survey) and obviously in accordance to the MoU provisions. Finally, the Work Programme of the T.S. includes the exchange of information with the recently established South East Europe Transport Observatory (SEETO), which is the Technical Secretariat of the Steering Committee for the implementation of the South East Europe Core Network defined by the Regional Balkans Infrastructure Study (REBIS, 2003).

## 5. State of play of the Corridor

### 5.1 Roads

The total length of the road Corridor X is 2.299,6km and at present consists of multilane motorways at a percentage of 59% and highways and other main roads at 41%.

The general alignment of Road Corridor X and the road categories along the Corridor are presented in **Map 3**.

**Map 3: Road category of sections of Corridor X**



The main part of Road Corridor X linking Salzburg and Thessaloniki through the capitals of the former Yugoslav Republics is 1.451,4km long and consists of multilane motorways at a percentage of 80% of its length. The maximum permitted speed along the Main Axis is 120km/h at most of its sections, and generally the infrastructure is in good condition. The percentage of the multilane motorways will reach 90% of the Axis by 2008, where all the Slovenian and Croatia sections will be constructed in full motorway profile. The remaining sections of the Axis that need reconstruction are the Leskovac

(Serbia) – Kumanovo (F.Y.R. of Macedonia) section of 127km and Demir Kapija – Gevgelija section of 44,5km in F.Y.R. of Macedonia. Also, by 2010 the construction of the Belgrade bypass is foreseen. Bottlenecks identified at cross border stations of the Main Axis in Slovenia, Croatia and Serbia are being confronted through interventions of infrastructure nature (Obrezje, Bregana and Lipovac by the end of the current year) and remain to be confronted at Batrovci and Presevo in Serbia, where preparatory studies are on-going for the rehabilitation or reconstruction of the stations.

Branch A, from Graz to Zagreb via Maribor, is 163,4km long and consists of multilane motorways at 55% of its length. This Branch is foreseen to be fully constructed in motorway profile by 2012. Bottlenecks encountered at Macelj cross border station in Croatia will be confronted through the reconstruction of the station by 2007.

On Branch B, the 28% of the 352,9km are parts of the M5 motorway in Hungary. The construction of motorways on the rest of the Branch is foreseen by 2009. A new cross border station is foreseen to be constructed at Roszke in Hungary by 2007, whilst reconstruction of Horgos station in Serbia is on-going.

Branch C (191,8km) is consisted by highways at 71% and two-lane main roads at the rest of its length. According to national plans, 74% of this Branch will be motorways by 2008, whilst for the rest sections in Bulgaria the construction of a motorway is also planned with no fixed horizon of implementation. However, works of reconstruction of the Bulgarian section from the borders to Sofia ring-road are on-going and would be completed by the end of 2005. Finally, preparatory studies are on-going for the rehabilitation or reconstruction of the Gradina cross border station in Serbia.

Finally, Branch D is 140,1km long and consists of highways and other two-lane main roads. Rehabilitation plan exists for the Greek part of the Branch by 2007 and also on F.Y.R. of Macedonian sections, with no fixed horizon of implementation though.

Concerning all the Corridor, Main Axis and Branches, since 2001 132,63km of motorways have been constructed, out of sections of total length of 332,23km. The length of constructed sections corresponds to 40% and by the end of the year 2005 will reach 55,7% of planned transformation of highways to motorways (**Table 2**).

**Table 2: Progress of motorways' construction along Corridor X since 2001**

Part of Corridor X	Country	Section	Total length (km)	Constructed length (km)	Length of sections planned to be constructed in 2005 (km)		
Main Axis	Slovenia	Bic – Obrezje	75,5	46,7	-		
	Slovenia	Vrba – Naklo	20,9	4,3	-		
	Croatia	Velika Kopanica – Zupanja	24,13	24,13	-		
	Croatia	Zagreb – Bregana	13,0	13,0	-		
	Serbia	Belgrade bypass	35,5	16,8	-		
	F.Y.R. Macedonia	Gradsko – Demir Kapija	31,5	25,3	6,2		
Branch A	Slovenia	Maribor – Gruskovje	38,8	2,4	-		
Branch B	Hungary	Kiskunfelegyhaza – Szeged	46,2	-	46,2		
<b>Total</b>			<b>332,23</b>	<b>132,63</b>	<b>A= 40%</b>	<b>52,4</b>	<b>B= 15,7%</b>
<b>Grand Total</b>			<b>A + B = 185,03km (55,7%)</b>				

Summing up the perspectives previously described per Corridor's part, is concluded that by 2012 Road Corridor X will be constructed and operate in motorway profile at a great extend and if this will be accompanied with realization of the plans of the improvement of infrastructure and facilitation at border crossings, Road Corridor X would be fully operational.

## 5.2 Railways

The total length of the Rail Corridor X is 2.528,21km and at present consists of single lines at a percentage of 64% and double lines at 36%. The 92% of the network is electrified.

The general alignment of Rail Corridor X and the percentage of double tracks per section of the Corridor are presented in **Map 4**.

**Map 4: Percentage of double tracks per section of Rail Corridor X**



The main part of Rail Corridor X, in accordance to the Road one, connects Salzburg and Thessaloniki and has a total length of 1.742,3km. It consists of single tracks at 55% of its length and it is fully electrified. By 2006 the full doubling of tracks along the Austrian section is foreseen, whilst in Slovenia, Croatia and Serbia doubling of tracks is planned for the next decade. The percentage of double tracks after the implementation of the projects sometime after 2010 will reach 64% of the Main Axis. Also, concerning border crossings, by the end of 2005 the completion of on-going construction works of a Border

Inspection Post at Dobova and of the on-going improvement works at Tabanovce in F.Y.R. of Macedonia are foreseen.

Branch A is 154,3km long and consists of 100% electrified lines and double tracks at a percentage of 70%. By 2015, doubling of the branch's lines is planned.

Branch B lines are fully electrified and consists of single tracks at most of its length (96% of 305,6km). Serbian parts are currently being rehabilitated and upgrade plans exist for the Hungarian part of the branch but with no secure financing and therefore no exact time horizon of completion set. Concerning border crossings, improvement works at Kelebia station in Hungary were completed in 2004.

The 161km of Rail Branch C is almost totally single (95%) and diesel (90%). For 2010 the upgrade of the line in Bulgaria for speeds of 120-160km/h is planned, whilst the rehabilitation of the Serbian part of the branch is planned for 2006. The operational level of the branch will be increased after the construction of a joint rail cross border station at Dimitrograd, which has been recently bilaterally agreed between Serbia and Bulgaria.

Branch D has a total length of 165km and fully consists of single diesel lines. Modernization works on the Greek part of the branch are on-going and would be completed within 2005 and rehabilitation of the F.Y.R. of Macedonian parts is planned by 2007. Although in present the branch is not operating for international transport, the works of renewal of Mesonission cross border station in Greece is foreseen for the current year.

Obviously, the progress presented on Corridor X mainly refers to the road sector, where the problematic parts will soon represent only 10% of the Corridor and border crossings will remain the main issue to be solved for the service of international traffic. On the contrary, and apart from the border crossings parameter, the railways, which are sufficiently developed only in Austria and Slovenia and in less extend in Croatia, should face the challenge to overcome the general crisis of the sector especially in the Western Balkans.

## **6. Effective and required investments on the Corridor**

In **Table 3**, the available information on effective investments on Corridor X per country during the last decade is presented. It should be noted that the total estimation of 1,92billions of euros is a number that corresponds to the available information; for various periods, for the seven out of the eight Corridor X's countries and for roads or railways or both sectors. Hence, this amount is definitely smaller than real investments.

Concerning the total investment requirements for the restoration of road Corridor X, exploiting various sources (studies and national reports), those are estimated at approximately 4billions of euros, whilst 1,674billions of euros (41,84%) are committed. Approximately 4billions of euros are also required for railway projects on Corridor X, of which only 1,8% are committed. Summing up for both the road and the rail Corridor X, the required investments for new projects (project not financially secured) are estimated at 6,15billions of euros.

**Table 3: Effective investments on Corridor X during the last decade (1994-2004)**

Country	Investments (millions of euros)	Period	Sector
<b>Austria</b>	499,5	1996-2002	Railways
<b>Slovenia</b>	819,7	1994-2004	Roads and railways (data for roads only for 2003-04)
<b>Croatia</b>	89,5	2003-2004	Roads and railways
<b>Hungary</b>	367,5	1994-2002	Roads and railways
<b>Serbia</b>	66,8	1994-2002	Railways
<b>Bulgaria</b>	No data	-	-
<b>F.Y.R. of Macedonia</b>	25,8	1994-2002	Railways
<b>Greece</b>	47,5	2003-2004	Railways
<b>Total</b>	<b>1,92billions of euros</b>		

## 7. Conclusions – Perspectives of the Corridor

The European Commission – Directorate General for Transport had already set the strategic Network of Southeast Europe back in 2001. After the elaboration of the Transport Infrastructure Regional Study (TIRS, 2002) and the Regional Balkans Infrastructure Study (REBIS, 2003), the Core Transport Network of the Western Balkans has been defined for priority implementation under a MoU signed in June 2004. Pan-European Corridor X sections in Croatia, Serbia and F.Y.R. of Macedonia consist the backbone of that network. Also, Corridor X remains a priority for the European Commission, as admitted by the High Level Group 2, chaired by former Commissioner Mrs. Loyola de Palacio in the framework of the revision of the priority Corridors for a Wider Europe.

What has been described in the above as structures and achievements of Corridor X could comprise a model for other, less developed, Corridors. It should be mentioned though that the projects implemented are not due such to the existence of composed trans-national structures, as to the will of Corridor X's countries, separately and their financial potential.

Therefore, the role of Corridor X's structures is to an extend encouraging to the efforts for development of Corridor X per country, but mainly is a mechanism able to present, with the appropriate technical tools for depiction (G.I.S.) and communication (Website), the real picture of the Corridor at every turn, and also the perspectives of the Corridor in function with fermentations, decisions, initiatives – often solitary, but also placed in the framework of a de facto overall unified plan. Hence, the Corridor X's structures on the one hand comprise an observatory of the progress of the implementation of the Corridor, and on the other a basis for documentation of the existing situation and the development planning.

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