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ABSTRACT

This document describes the actual status of safety of intermodal transport systems in Romania and highlights the specific topics, challenges and progresses registered during the last years, which could be of interest to the world road community. After a short presentation of the transport systems in Romania this report, structured according PIARC Strategic Theme “B” in five chapters. Finally, conclusions and main directions for future development trends and strategic approaches.

1. INTRODUCTION – some theoretical developments regarding intermodal transport systems.

Transport

Bannister D. define the transport infrastructure as a part of the durable capital of the city or region in question and fixed in location. Transport infrastructure has the following characteristics: the parts make up networks; it forms an indispensable part of the total production costs of goods; it has substantial elements of natural monopoly; sunk/capital costs are high, but running costs are low. Infrastructure is traditionally a concern and responsibility of public sector, which can mean local, regional or state government.

According to Stock J. R., there can be significant differences between the transport infrastructures found in countries throughout the world. Variations in each of the transport modes will exist throughout the world and must be examined by logistics executives distributing products in those areas. Differences in taxes, transport subsidies, regulations, government ownership of carriers, geography, and other factors can significantly influence the modes and carriers selected for inbound and outbound freight movements.

Enarsson mentions that dependency on infrastructure is basic for all modes of transport and with an emphasis on the infrastructure the following aspects can be stated in an overall perspective:

- the infrastructure makes conditions and possibilities;
- there must be co-ordination between the different modes of transport;
- the infrastructure must be built on national perspective with international adaptation;
- the limited resources demand concentrated directives and hard priorities;
- the demand from the industry are of greater importance.

Transport Policy

According to Coyle J.J., the purpose of transport policy is to provide direction for determining the amount of resources that will be dedicated to transportation and for determining the quality of service that is essential for economic activities. Transport policy provides the framework for the resources allocation to the transport modes.

Transport policy is related to ensuring the safety of travelers, protecting the public from the abuse of monopoly power, promoting the competition, developing or continuing vital transport services, balancing environmental, energy, and social requirements in transportation, planning and decision making.

National transport policies are developed on various governmental levels and by different agencies. Government intervention is needed to design feasible routes, cover the expense of building public highways and rails, and develop harbors and waterways.

Intermodal Transport
Intermodal transport involves the use of two or more transport modes in moving a shipment from origin to destination, primarily through the use of the container. As several transport modes are used, each one of them can be used where it is most efficient in point of view of customer benefit, resource utilization or environmental effects. A number of advantages can be achieved through a combination of multimodal transport and the utilization of unit loads.

Woxenius J. state that there are different definitions of intermodal transport and the related concepts of combined transport and multimodal transport. The ECMT (European Conference of Ministers of Transport) and the European Committee for Standardization (CEN) use the following definition for intermodal transport: *The movement of goods in one and the same loading unit or vehicle which uses successively several modes of transport without handling of the goods themselves in changing modes.*

2. EUROPEANS POLICIES ON MULTIMODAL TRANSPORT SYSTEMS

Transport policy plays an important role for the transport infrastructure and logistics market development. In this perspective, this chapter discusses national transport polices of CEEC. As all of them are European countries, it starts from the EU perspective towards the CEEC's transport policies. Additionally, transport safety/security issues are covered and infrastructure standards for road and rail are provided. The chapter ends with extensive information about ongoing investment into transport infrastructure.

EU has great influence on transport policies of all CEE countries, especially on the NMs and candidates. Being the main trade partner, EU also participates actively in the transport infrastructure investments in the region, especially in funding the infrastructure through TEN-T systems. According to its estimations 20 000 km of roads and 30 000 km of rail should be built or improved in the new member states by 2015. The importance of infrastructure development is obvious taking into account EU enlargement and traffic flow growth.

The Acquis Communautaire (acquis)
The EU transport policy towards the CEEC defers according to the following groups of countries:

- *New EU members* (Latvia, Lithuania, Estonia, Czech Republic, Slovakia, Slovenia, Poland, Hungary);
- *Acceding countries***,** which are new EU members from 2007 (Romania, Bulgaria);
- *Candidate countries* (Turkey, Croatia, FYR Macedonia);
- *Potential candidate countries* (Albania, Bosnia and Herzegovina, Serbia). The progress of being recognized as candidates for these countries depends on their engagement in the Stabilisation and Association Process (SAP).

In order to join EU all the countries should implement in time all the requirements of acquis as well as change the national laws, which are often connected with changes in the administrative bodies. From the first day of membership in EU, countries should apply the common EU legal framework, which includes chapters concerning customs, administration, transport policy, standards and technical requirements, IT policy, etc.

The acquis have been divided into 31 different chapters for the enlargement negotiations with acceding countries. Each chapter should be closed by the candidates in order to join the EU. The transport issues are covered by Chapter 9 ("Transport Policy") of the acquis

communautaire. This chapter is very complex and forms about 10% of the European acquis.

The transport chapter was opened with all the countries and was closed with: Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovakia and Czech Republic. The transport chapter was closed with: Romania and Bulgaria in December 2004.

For Romania, Acquis Requirements of Chapter 9 ("Transport policy") ask to develop the follow documents:

- Development strategy of the railway system 2002-2010*, Ministry of Public Works, Transport and Housing.*
- Development Strategy of the national program for motorways. *2001, Romanian Parliament.*
- Rehabilitation strategy of the national roads. *Ministry of Public Works, Transport and Housing.*
- Development natonal strategy for road transport.

The rapid development and growth of Central and Eastern European countries (CEEC) have accelerated the geographic transformation within the EU. Central and Eastern Europe (CEE) has become one of the most important emerging markets by attracting high level of investments from global companies. The region offers various opportunities of sourcing and manufacturing to investors.

3. THE ROMANIAN PUBLIC ROAD NETWORK. THE ROAD TRANSPORT SYSTEM

The Romanian transportation infrastructure consisting mainly of highways and railways, has a general orientation influenced by the Carpathian Mountains which are nevertheless crossed by ten railways and over twenty motorways, and by the southern location of Romania's capital city Bucharest, to which all the main traffic lines are converging. The modal distribution of the transport of freight and passenger travel in this country is shown in table below:

Modal distribution of transport of goods and passengers in Romania

Transportation mode	Freight transport (%)	Passenger transport (%)
Road transport	87.3	65.5
Railroad transport	9.8	34.1
Sea transport	1.2	0.1
River transport	0.5	0.1
Air transport	0.1	0.2
Pipe transport	1.1	-

Romania is a major crossroad for international economic exchange in Europe. Due to insufficient investment, maintenance and repair, the transport infrastructure doesn't meet current needs of a market economy and lags behind Western Europe. These conditions are being improved through institutional strengthening, and further development of the transport infrastructure and its proper maintenance and rehabilitation.

The transport infrastructure, according to the Romanian Constitution, is public property of the state. Therefore, these assets are being administered by national or lower government entities, or companies, or corporations, under the jurisdiction of the Ministry of Transports, or the Ministry of Administration and Interior who may award these assets for concession, in accordance with the provisions of the Romanian laws.

The Ministry through general directorates is in charge of setting up the general transport strategy and policy, defining the needs in terms of networks development, dealing with international organizations and organizing the transport operation through licensing of operators and setting up rules and regulations for the transport sector.

Roads and road transport.
Romania's total road network totals about 78,000 km. Public roads in Romania (excluding street networks) are classified in a three-tier system: national (main) roads (14,500 km), district roads (app. 36,000 km), and communal roads (app. 28 000 km). In addition there are approximately 30,000 km village roads serving the rural villages' needs, and farming related activities. The national roads are administered and managed by the National Company for Motorways and National Roads (RNCMNR) - an entity under the Ministry of Transports. The district (county) roads are administered by the County Council and managed by the County's technical department. The communal roads are administered and managed by the village councils aided by the County council's technical office.

National Roads Network

Road financing was arranged through a Road Fund, which received 45 % of the fuel excise tax and a vignette. This fuel excise tax income was shared between national (65 %) and county roads (35 %). The road fund income covered administrative expenses, routine maintenance, loan service payments, and limited rehabilitation costs of the national roads. It covered also, as main source of financing, parts of the costs of county roads' rehabilitation and maintenance, even though insufficient. Recently, the Government has issued a Policy Letter for the road sector. It includes, inter alia, a study to modernize Romanian road fund and road financing.

Over the past decade NAR has secured grants (EU-ISPA) and several loans from International Financial Institutions (the World Bank, EIB, EBRD) guaranteed by the state, to upgrade its main road corridors. The Government is actively pursuing new external IFI financing or Public-Private Partnerships to further upgrade the main roads and improve RNCMNR institutional capacity. RNCMNR's multi-year Highway Development Program and a multi-year Highway Rehabilitation Program are both primarily funded through loans

and grants. The communal road network has recently begun receiving support from EU's SAPARD program and the World Bank's Rural Development Project.

Road transport is privatized and performed by numerous buses and trucks operated either by their owners or bus and trucking companies.

The issue of road safety has been moving inexorably up the policy agenda in Romania. As in the rest of the world, road accidents are responsible for many deaths and serious injuries each year. In an effort to curb this trend in Central and Eastern Europe, a strategic alliance has recently been formed between the Dutch programme Partners for Roads and the World Bank to jointly contribute to further the development and incorporation of safe road design and to facilitate the transfer of knowledge in Romania as well as in a number of other countries.

Rail transport

The railway network in Romania comprised in 2004 22,298 km of track, of which 36% electrified and 27% double track. In 2003, the railways carried 8.1 billion passenger-km in addition to 17.3 billion ton-km of freight, and the combined total transportation by rail constituted around 45% of all passenger and freight movement in the country. In terms of size and scale of operations, railways are comparable with larger EU railways. However, as in other centrally planned economies, Romanian railways had very short lengths of haul, averaging only 250 km. Consequently, the railways experienced a dramatic fall in freight and passenger volumes from the peak volumes recorded in 1989 mainly due to the decline in GDP and competition from road transport. The rail share fell significantly from 80% for freight and 70% for passenger traffic in 1960, to less than 40% for freight, and to about 50% for passenger travel by 2001. Road transport competes aggressively with rail and has continued to gain in the share of the combined freight market (in terms of tonnage), and of the intercity passenger transport market (in terms of number of passengers). International trade is still important for the Romanian railways with imports accounting for 11% of the traffic, exports about 6%, and transit about 1%.

The three railway companies, CFR, Calatori and Marfa, own several subsidiaries which sell services for them and other purchasers. In the last years the MTCT has licensed a few private rail freight operators which share the use of the rail tracks and pay the TAC to CFR. The private operators now have 10-15% of the rail freight market. (See map of railway network)

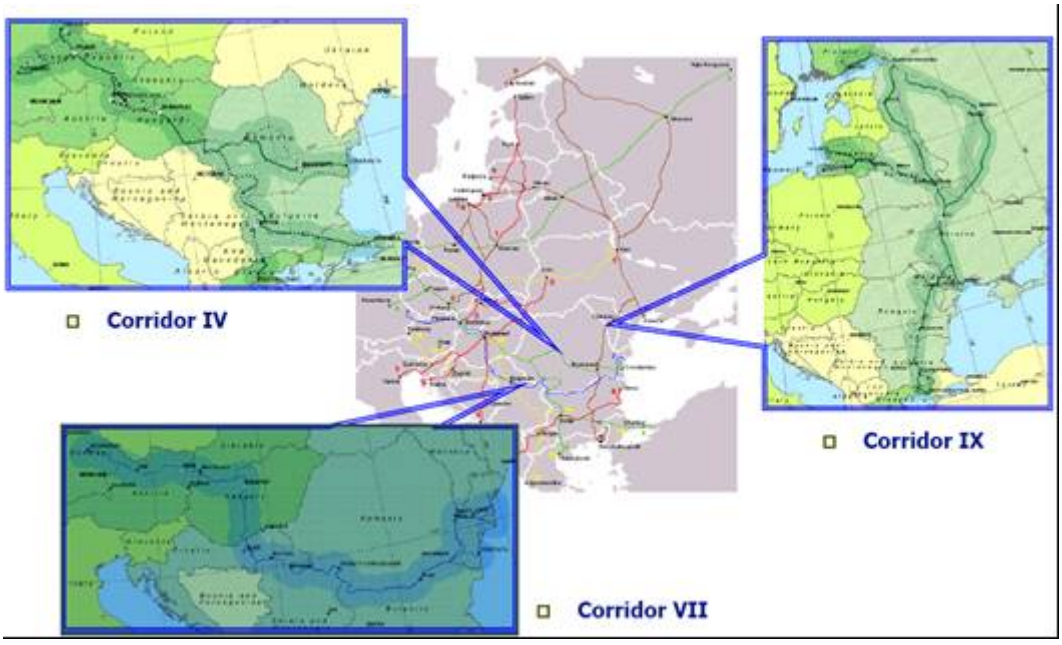
Railway Network

Maritime transport.
In the maritime and inland waterways transport sector, similar principles have been adopted where State owned bodies or entities are in charge of the port infrastructure (quays, breakwaters, landfill, etc.) and award concessions to private bodies for port operations. The ports and navigation infrastructure are administered by the APM-SA Constanta National Company, CAN-SA Constanta National Company, APDF-SA Giurgiu National Company, APDM-SA Galati National Company, and AFDJ-SA Galati Autonomous Regie.

Air Transport.
The national airline, TAROM, is fully state owned and there are no current prospects for its privatization. Air transport infrastructure (airports) is managed by "National Company" type entities for international airports, with the Ministry of Transports, Constructions and Tourism as the owner and the administrator. The other airports (serving only national air traffic) are organized as "Autonomous Regie", which are local public companies.

Pan-European Transport Corridors
According to the map of the Pan-European Transport Corridors Network, Romania is an important knot of this network, being located at the crossroad of two from the longest Pan-European Corridors, to wit:

- **Corridor 4**, on the west-east direction:
  Berlin/Nuremberg–Prague–Budapest–Bucharest–Constanta–Instanbul/Thessaloniki, penetrates in Bucharest on the section Pitesti-Bucharest (A1);
- **Corridor 9**, on the north-south direction:
  Helsinki–St. Petersburg–Kiev/Moscow–Chisinau/Odessa – Bucharest–Dimitrovgrad–Alexandropolis and is totally superposed in the area of the Municipality of Bucharest;
- **Corridor 7**
  The Danube, is at about 65 km distance from Bucharest, including, also, the Danube–Black Sea Channel.

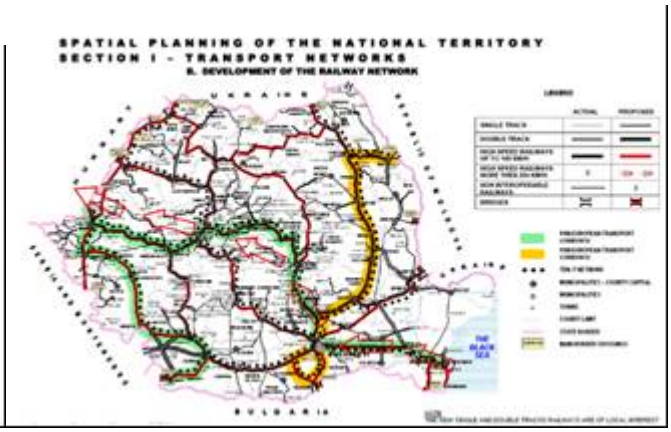


Pan-European Transport Corridors

Trans-European Network - Transport (Ten-T)

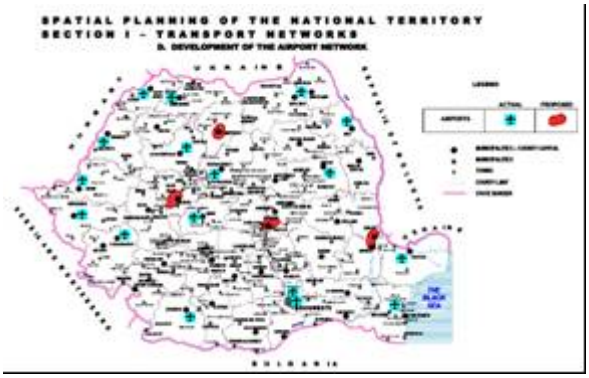
Major transport works required in the future in Romania

Road Network



Rail Network

Waterways



Airways

Combinated transport terminals

Romanian General Transport Master Plan

Romanian General Transport Master Plan is a project who starts in 2007 and was elaborated by Louis Berger SAS. It was copleded in 2009. He summarizes the main directions to develop projects in transportation industry. This is the first study based on a demand model to account for competition among transportation systems.

The document organizations:
Section 1: Macro-economic Overview
Section 2: Freight Transport Analysis
Section 3: Passenger Transport Analysis
Section 4: Transport Model Construction And Calibration
Section 5: Traffic Forecasts

The main considerations from the study can be summarizing as follow:

Fragmentation

For road transport

The axle load limit often varies from the road section to another which forces to use the less optimal, lowest axle load permitted vehicle;

The lack of the poor alignamet of by-pass roads around major cities increases the transit time;

The high accident rate caused by poor quality of infrastructure and signalling;

For rail transport

Lack of coordination among main and secondary railroad stations

Too many train reaarangements caused by an excessive number of marshalling yards

Missing connections between rail terminals and destination.

Average commercial speed

on roads average speed is about 37km/hr;

on rail average speed is about 25-30km/hr;

on waterways average speed is about 10-15km/hr.

Outdated and/or lack of technical equipment

Rail terminals have old and outdated handling equipment;

There is a lack of specialized rolling stock;

There is no sufficient storage capacity at rail terminals and inland ports;

Local railroad connections with major logistic facilities are missing.

Princing policy

Most rail companies do not guarantee transparency of all costs, some such as handling, demurrage, documents, etc. are not made known to the shippers in advance;
The cost of transport on secondary rail lines is very high (approx 3-5Euro/ton) for very short distances (3-10 km)
There are no payment facilities for domestic railroad transport.

4. TRANSPORT SYSTEM IN TOWNS – Delivering integrated transport modes and services to customers

Bucharest City - case study

The city of Bucharest holds a triple statute:

The biggest Urban Agglomeration of the country

holds structural relations with its surroundings;
first rank in the national network of cities;
10% of the country population within the heart of the agglomeration.

European Metropolis

over 2 millions inhabitants in the city;
good geographic positioning, at the intersection of the main Pan-European transportation corridors.

European Capital-City:

Capital of Romania– political and administrative centre;
Important role in the Central Est European Region.

Bucharest boasts the largest transport network in Romania, and one of the largest in Europe. The Bucharest transport network is made up of a metro network and a surface transport network. Although there are multiple connection points, the two systems operate independently of each other, are run by different organizations (the metro is run by Metrorex and the surface transport network by RATB) and use separate ticketing systems.

Bucharest Metro

Bucharest has a fairly extensive subway system consisting of four lines. In total, the network is 67.3 km long and has 48 stations, with 1.4 km average distance between stops. It is one of the fastest ways to get around the city.

Surface transport

Surface transport in Bucharest is run by Regia Autonoma de Transport Bucuresti (RATB) and consists of an extensive network of:

- buses,
- trolleybuses,
- trams,
- light rail

The RATB network is one of the most dense in Europe, and the fourth largest on the continent, carrying about 1.7 million passengers daily on 121 bus lines, 30 tram lines, 3 light rail lines and 20 trolleybus lines. At times, however, it does suffer from severe crowding.

RATB is a reasonably efficient and a very frequently-used way of getting around Bucharest. As with the Metro, the system is going under a period of renewal. Highlights of the renewal include the introduction of a new light rail service, aside from trams, as well as wheelchair-accessible buses and trolleybuses.

- ***Buses***

The RATB bus network is the most dense out of all the transport types in Bucharest. In fact, RATB's advertisements state that one can never be more than five minutes walking

distance from a bus stop. There are 121 bus lines, most of which operate in the Municipality of Bucharest. However, there are also a few bus lines which provide services to the towns and villages which border Bucharest, in Ilfov County, and whose populations usually commute to Bucharest for work.
RATB's bus fleet is made up of more than 1450 vehicles, of which around 68% are wheelchair-accessible „low floor" and around 34% are air-conditioned.

- ***Trolleybuses***

Trolleybuses supplement buses on the RATB network, which operates 19 trolleybus lines, mainly on high-usage routes.

- ***Trams and light rail***

RATB operates a complex system of trams and light rail (called "metrou uşor" which translates as light metro) in the Municipality of Bucharest. Beside tens of tram lines, there are currently three light rail lines which run in the western part of Bucharest. Light rail use more modern rolling stock than trams and also run on separate designated corridors for faster travel times. The light rail service is expected to be expanded by upgrading existing tram lines to light rail status.

- ***Minibuses***

In Romania, they are called "maxi-taxi", minibuses supplied the need of affordable public transportation at a time when some local administrations dismantled the community-owned systems of buses and or trolley cars. Only 11 maxi-taxi lines are allowed to both start and terminate within Bucharest's city limits.

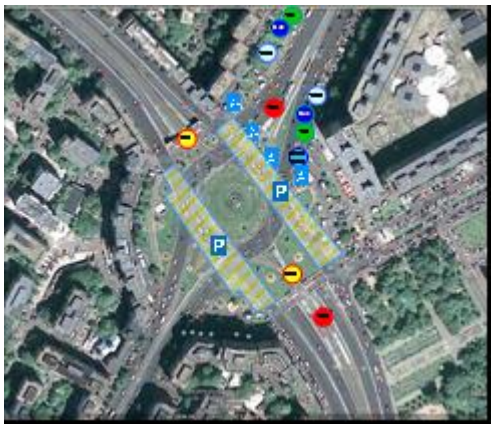
- ***Private cars***

At the end of 2008, in Bucharest there were 1.24 million vehicles, among which 985.000 cars. In 2007 there were 150.000 less vehicles, which mean the number of vehicles increased with 13.76% in one year.
With so many cars and a very high population density (50% bigger than Tokyo and 4 times bigger than Rome for example), parking is a real problem in Bucharest.

Examples of multimodal transport terminals in Bucharest City:

1. Bucur Obor:

Transport modes: buses, trolleybuses, trams, metrou, maxi-taxi, periurban transport, taxi. Underground parcking services 900 places
Advantegies: schort distances transfer, reduces transfer time, reduced risck for accidents, Park&Ride facilities, fluid traffic flow.



2. Ghencea Terminal

Transport modes: buses, trams, maxi-taxi, periurban transport, taxi.

Advantegies: schort distances transfer, reduces transfer time, reduced risck for accidents, fluid traffic flow, easy acces to the Steaua Stadion.

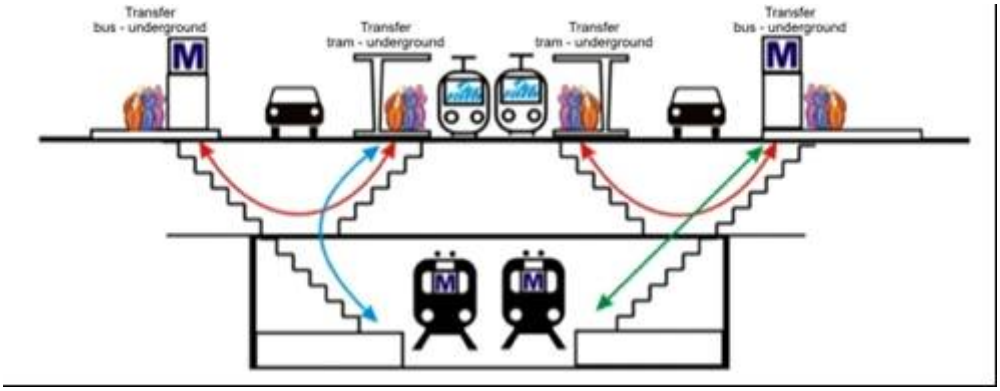
3. Piața Presei Libere

Transport modes: buses, maxi-taxi, periurban transport, taxi.

Advantegies: schort distances transfer, reduces transfer time, reduced risck for accidents, fluid traffic flow, easy acces to the line for Bucharest H Coanda airport

Piața Crângaşi

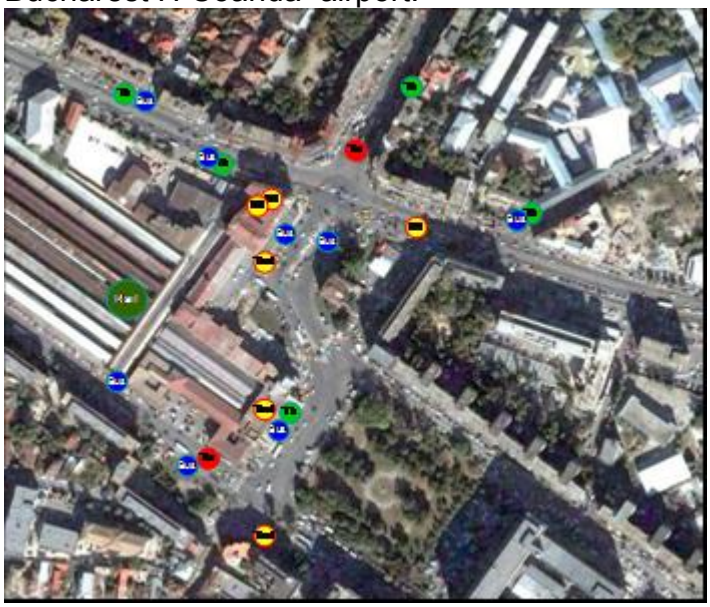
Transport modes: buses, maxi-taxi, periurban transport, taxi.



Gara de Nord

Transport modes: buses, maxi-taxi, periurban transport, taxi.

Advantegies: schort distances transfer, reduces transfer time, reduced risck for accidents, direct acces for pedestrians to the transport modes (same platform for differen transport modes), fluid traffic flow, easy acces to the line for Bucharest H Coanda airport.



On line information services for the customers

Integrated system on Gării de Nord terminal: train – metrou – surface public transport (CFR – Metrorex - RATB).

Integrated ticketing

„ACTIV” smart card can be used on RATB, and Metro network.


Devices for validation cards

5. CONCLUSIONS

In order to improve the transport services to the customer in Romania, it is necessary to establish compressive policies in transportation industries. In this respect is useful to mention some of the conclusions of Romanian Transport Master Plan:

- The lack of freeways (motorways) capable of sustaining high volumes and traffic safety, along with the paths of the existing national roads crossing linear villages (lack of beltways) and the high volumes of traffic generated by local economy, do not provide acceptable conditions for development of a competitive intermodal system;
- The lack of terminal technology to ensure both reasonable times for switching transportation means and cargo safety, the low speeds on the tracks are also barriers for the development of an efficient intermodal system;
- The Danube waterway, including the ports along the river, requires additional transport works before it can become a major transport corridor;
- It is difficult to talk about a real concept of intermodal transport before each transportation sector reaches a certain point of development;
- At this time, further development of the transport network is and will be, the first priority of the Romanian transport authorities.

Regarding urban transport services it is necessary to create the Metropolitan Authority in main towns of the country. These bodies will be competent to elaborate specific transports policies to extend and to administrate the problens of transportation in towns.

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