Abstract: The implementation of the principles of the e-governance for development of innovative electronic services and implementation of integrated software applications in railway transport is a prerequisite for ensuring efficiency and safety of the transport process, ensuring a high level of service to citizens and businesses.

Keywords: Railway transport, information technology, electronic governance, safety in railway transport, entities in charge of maintenance, safety of railway transport, National Vehicle Register (NVR), European Centralized Virtual Vehicle Register (ECVVR).

1. Introduction

The development of optimal and adequate to the public needs transport infrastructure is a priority of the state. Its condition determines the level of potential transport services and the opportunities for interaction of the systems characterizing the Unified Transport System (UTS).

UTS is a set of transport routes and technical resources (of all transport modes) combined in a system of legal standards, as well as of information, technological and economic relations, ensuring efficiency of the transport process while simultaneously ensuring protection of the interests of the state. In this respect, the role of the European Union and of the responsible management and supervisory bodies of the Republic of Bulgaria is related to regulation of transport activity in order to preserve the national and common interests of the Member States - economic, environmental, military, etc.

2. Reality in Railways

Railway transport is an essential section of UTS. It represents a complex of multiple transport and railway technical facilities owned by different entities and persons whose activities are implemented through a complex system of organizational control constructed in accordance with the requirements of a large number of legal documents and agreements. This is one reason why railways are adapting too slowly to the new economic models. The fact is that they have a small market share of freight carriages, whose growth in recent years is steadily increasing. For example, in 2005, it was 10% and if we take into account only land transport it is 16.5%, which has been the lowest level since 1945.

Analyzing these negative phenomena, the European Commission adopted a series of measures to revitalize the railway sector by removing obstacles to the movement of trains throughout the European railway network. The Commission launched this initiative for the following reasons:

- To facilitate the free movement of trains within the EU through a transparent and efficient procedure for placing into service of vehicles;
- To simplify the regulatory environment for achieving interoperability of railway transport.

By amending Directive 2004/49/EO on safety on the Community’s railways, the committee had as its objective:

- Introduction of the principle of mutual recognition of authorizations for operation, which the Member State had already issued. According to this principle, it is not necessary for rolling stock that has already been issued authorization for placing into service in one Member State to pass an additional certification in another Member State with respect to the additional national requirements arising from the characteristics of the local railway network;
- Identification of the different national procedures and technical rules that must be checked only once, either because it concerns internationally accepted rules or because the requirements may be considered equivalent;
- Clarification of the relationship between the railway undertaking and the entity in charge of maintenance.

Directive 2008/110/EU harmonizes the criteria for safety throughout the European Union. With its transposition into the Bulgarian legislation in Ordinance № 59 and with the adoption of the prepared draft for amendment and supplement of the Railway Transport Act (RTA), the safety of railway vehicles will be ensured in a new way, which is different from the previous one.

This will be done through a system of certification of entities in charge of maintenance of vehicles (ECM). Such may be the railway carrier itself, the infrastructure manager (NRC) or a third party - external railway factories, workshops or other entities which meet the criteria. All of them will be certified by the Executive Agency "Railway Administration" (RAEA) that they can support the respective type of rolling stock and to ensure its safe operation of the national railway infrastructure. Thus, safety will be ensured on a daily basis. No document (safety certificate) will be issued to an individual vehicle but to the structure that is responsible for its safe mechanical condition.

It is mandatory for any vehicle that its owner (keeper) shall specify the structure responsible for its maintenance (ECM) i.e. without appointing such structure the vehicle will not be authorized for placing into service. This fact will be recorded in the National Vehicle Register kept by RAEA and only then will be allowed to operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM. The moment when it is observed that ECM not operate. The Agency will carry out continuous monitoring on the activity of the ECM.
### 3. Pragmatism in Railways

The Ministry of Transport, Information Technologies and Communications (MTITC) in collaboration with the Executive Agency "Railway Administration" transforms the European legislation, creates a legal framework, defines strategic objectives and implements the policy in the field of railways. For their practical implementation, the transport technologies and processes will have to adapt. At expert level, RAEA has a key role for the European Centralized Virtual Vehicle Register (ECVVR). In implementation of Decision № 2007/756 of the European Commission, the Railway Transport Act and Ordinance № 57 on the essential requirements for railway infrastructure and vehicles to achieve the interoperability of the national railway system with the railway system within the European Union, a national register of railway vehicles has been built at Executive Agency "Railway Administration".

The National Vehicle Register (NVR) is implemented as a decentralized decision of the European Centralized Virtual Vehicle Register (ECVVR). The aim is to implement a search engine for distributed data (Figure 1), using a common software application to enable users to retrieve data from all local registers (LR) in the Member States. The NVR data of the Republic of Bulgaria are stored at national level and are accessed by using the program of web address https://nvr.iaja.government.bg/. In the scheme, this functionality is provided as Level 1. The phase, in which ECVVR is scheduled to undergo in 2012, is linked to its regular operation. It is represented as Level 2.

![Figure 1](image)

#### Level 1
- **National Safety Authority (NSA)**
- **Registering Entity (RE)**
- **Infrastructure Manager (IM)**
- **Owner of the vehicle**
- **Keeper of the vehicle**
- **Train operator**

#### Level 2
- **European Railway Agency**
- **Control and audit bodies, notified by the Member-States**
- **Infrastructure Managers**
- **All consumers recognized by the NSA or ERA**

NVR is part of the architecture of the VVR. Through the interaction of both subsystems, a search engine for locally stored data in all Member States, in consequence of which:

- Computerized records open to cross-examination are created at the national level;
- Paper records are replaced with computerized records to enable the Member States to manage and share information with other Member States;
- An opportunity is created for relations between the NVRs and the VVR, which use common standards and terminology.

The NVR should be used for the following purposes:

- **Registration of the authorizations for placing into service of rolling stock**
- **Registration of the European vehicle number (EVN)**
- **Registration of technical parameters**
- **Registration of repairs done**
- **Registration of the mode of exchange**
- **Registration of a user identification code (Vehicle Keeper Marking - VKM)**
- **Using VVR for finding information on vehicles owned by the Member States**
- **Extraction of information about vehicles, related to their safety and maintenance**
- **Providing information to the user**
- **Providing information about the technical condition of the particular vehicle**

The National Vehicle Register (NVR) can be considered as a database (DB) of the system for identification and maintenance of vehicles. This database reflects a combination of technical, administrative and managerial actions during the lifetime of the vehicle, including ECM activities that restore or upgrade a vehicle or a component to a condition, in which it can perform the required function, by ensuring continuing integrity of safety systems and compliance with the applicable standards for maintenance and modernization. In the application of the Railway Transport Act, RAEA is responsible for the current state of information and functionality of the National Vehicle Register.

### 4. Perspective

The responsibilities of participants in the railway system are referred to in the Safety Directive in Articles 4, 14a and 16 (for NSA). The introduction of the new system for ECM will change the criteria regarding the volume of repairs that have to be carried out, the run of the vehicle between the repairs or other similar conditions that directly impact the operational performance of railway vehicles. The Safety Management Systems of the infrastructure managers and carriers, as well as of the entities carrying out activities such as design, construction, maintenance, repair and operation of rolling stock shall meet the performance requirements for safety, including the requirements of Regulation № 445/2011 establishing a system for certification of Entities in charge of maintenance of wagons (ECM). Article 5 (2) of Ordinance № 59 for safety management in railway transport states:

*The safe operation of the railway system, the control of risks associated with it, and the measures for controlling risk are implemented by the railway infrastructure managers and railway undertakings through their safety management systems.*

The above-mentioned regulations are the basis for implementation of systems for continuous monitoring of interoperability, the technical and operational fitness of the vehicles. In this connection, for automation of processes for real-time performance of monitoring on the information-management systems of the participants in the railway transport it is necessary to build an Information System "National Safety Rules" (NSR).

Assuming that an activity can be expressed as follows

![Diagram](image)

then Fig. 2 most generally presents the NSR and their interaction with the control systems and the systems related to safety in railway transport. An element and an essential condition for the implementation of the Information System "National Safety Rules" is the adaptation of the
National Vehicle Register. Re-engineering the NVR is needed to ensure the functionality of the elements of the "Maintenance System" of ECM, such as:

- Management Function
- Function on development of support
- Maintenance File

5. Conclusion

The implementation of the principles of e-governance for development of innovative electronic services and the implementation of integrated software applications are a prerequisite for the multiple use of the information contained in the database of the National Vehicle Register. Making real-time connection between NVR, ECVVR and the database for daily movement of vehicles on the national railway network is the basis for automating the activities and functions related to monitoring the technical fitness of vehicles allowed to operate a national railway network.

Building up the Information System "National Safety Rules" and Re-engineering the NVR is associated with achieving effective management and control of SMS/QMS, while simultaneously it is a factor to achieve interoperability of the subjects in the railways. In terms of IT, interoperability is the ability of information systems and processes they support to exchange data and to integrate information and knowledge that ensure synergy of technical equipment.

The implementation of the system is a way to provide modern services to citizens and businesses, including to certified structures responsible for the maintenance of vehicles (ECM). This, as well as the strategic geographical location of Bulgaria, is a prerequisite for attracting foreign financial investment and for the development of the national economy.

6. Literature