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COMPUTERIZED SYSTEM FOR A MORE FLUID CROSS-BORDER RAILROAD TRAFFIC

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***SUMMARY**: The paper introduces a computerized system of global communication and railroad traffic coordination, created by the authors for the area Curtici (Romania) – Bekescsaba (Hungary), which is on course of implementation and that can further be extended to other cross-border areas.*

***KEY WORDS**: railroad transport, making fluid, cross-border*

1. INTRODUCTION

Railroad transportation shows, in general, several advantages with respect to other types of transportation, but it can face competition only by a continuous update and adaptation to the market requirements. Due to the major dangers which travelers could be exposed to and to the important damage in case of technical fails, the railroad authorities imposed highly exigent internal technical norms, both with respect to equipment safety in exploitation and in the compartment of coordination and management of train circulation.

Both the technical level of such equipment and the internal regulations differ quite a lot from one county to another, according to their general level of development, traditions, military strategies, network density, etc. This aspect generates important problems in border areas, where national networks come into junction, which leads to the necessity of having a permanent communication between the authorities of the two countries, and where there is need for correlation of traffic parameters, safety measures, etc. All these suppose special efforts and responsibilities (with an international character), which are boosted by traffic growth and the increase in quality requirements. Linguistic difficulties are not to be neglected when it comes to operative communications between parties, one misinterpreted message being likely to cause bad accidents.

At present, considering European integration and the increase in commercial and personal exchanges, all the problems mentioned above have grown keener and can be solved by means of information technology.

The paper introduces a system of global communication and train coordination created by the authors for the area Curtici (Romania) – Bekescsaba (Hungary), which is on course of implementation and that can further be extended to other cross-border areas.

2. SYSTEM DESCRIPTION

The block diagram of the system of information management and transfer between CFR – MÁV in the area mentioned above is given in fig.1.

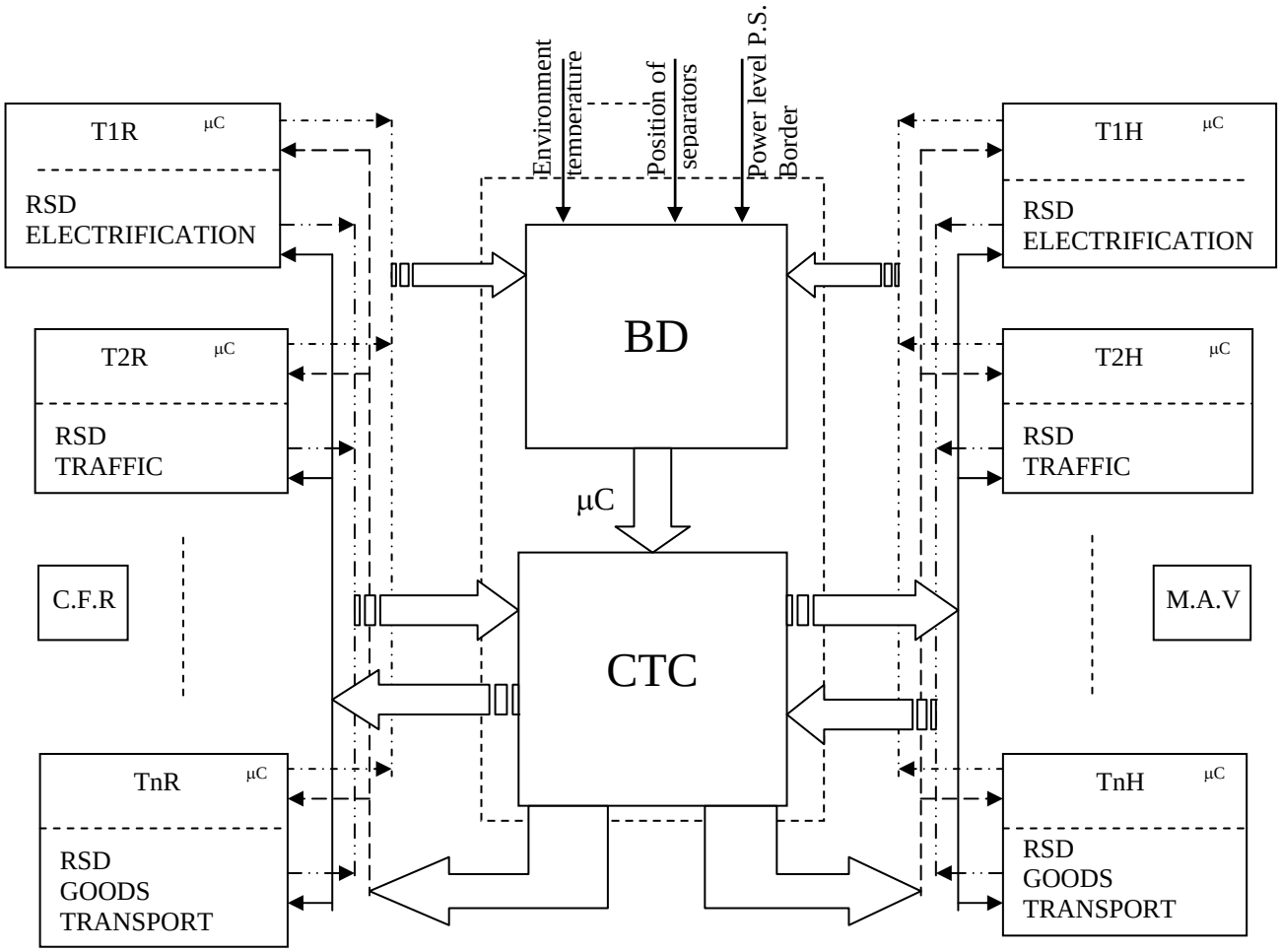

Fig.1

The basic targets are:

- the permanent bilateral access to a common database, permanently updated, allowing both parties to have a correct overview of the situation with respect to momentary traffic possibilities and restrictions on each side;

- the bilateral transfer of information by means of a software capable of translating messages (without any erroneous interpretations) and allowing the fluent and operative conversations between the partners. This procedure eliminates the actual negative situations such as: slow and imprecise correspondence or dealings; mutual requests, impossible to meet, but made out of lack of knowledge with respect to the actual state of the partner; uncertainties and mistiming in solving special cases or failures, etc.

The significations of notations in fig.1 are:

TkR - **T**erminal no. **k** **R**omania
TkH - **T**erminal no. **k** **H**ungariy
DRS - **D**estination **R**ailroad **S**pecific **Department**
DB - **D**ata**b**ase
CTC - **C**ommunication **T**ranslator **C**entral

- information input line (text , image) from the terminals to the DB
- information input line form the DB
- message broadcast line
- message reception line
- DB information input line (using the interface of parameter measurement, state detection, etc.)
- information transfer line from the DB to the CTC allowing communication adequate to the solicitant.

The database (DB) contains partitions for each compartment of railroad activity, and they can be accessed according to the respective compartment, by the specific terminals in view of updating or consulting. The DB also receives state information about certain equipment or on the magnitude of some parameters, by means of the data acquisition interface, directly connected to the railroad apparatuses in the area.

The Communication Translation Central (CTC) translates the text messages stored in the DB and offers them on request in case of real time conversation between partners, in each situation the information being communicated in the language of the recipient.

Each TkR sau TkH terminal is capable of communicating with:

- DB in order to input text or image information corresponding to the compartment of railroad activity to which it is destined (electrification, traffic, etc.);
- DB through the CTC in order to collect information exclusively from the compartment of railroad traffic it is destined to ;
- terminal k (pre-assigned correspondent) from the other railroad administration for the transfer of messages (broadcast, reception).

Terminals (TkR TkH) can be interconnected only according to the assignment (k) of railroad compartment, i.e. they can access for modification or collection of data only the DB partition assigned to them. The possibility of sending over data directly to the partner, i.e. through the DB, has been created in order to maintain a clear and actual situation of the configuration in the area for each compartment, without bothering the partner with information that is not absolutely necessary. For the information that is needed immediately, for emergency situations or for special clarifications we created the possibility of direct communication through real time appeals and messages.

From the physical point of view, the terminals are μC running software that is adequate to the application in the railroad compartment to which it is destined, and the DB, CTC and the interface for external signals are hardware-software components of a μC that manages communications.

In fig.2 we presented an aspect from the hall where the respective application has been implemented, application that is specific to the railroad energetic dispatcher.

Fig.2

3. CONCLUSIONS

The paper introduces a complex system meant to ease railroad traffic in the cross-border area in the area Curtici (Romania) – Bekescsaba (Hungary), which can also be used in other border points. This system ensures optimal performances with respect to traffic safety and an increased operational character in the activity of traffic coordination.

The system has been created by the authors and represents a fruitful collaboration between the experts of several fields of activity from Romania and Hungary. At present, the stage of implementation is as follows :

- The project under question is in an advanced stage, two of its applications being already functional: the former, for the electrification compartment, where the solutions have been tested and which constituted the application prototype, respectively, the latter, for the traffic compartment, based on the former, with the corresponding modifications;
- at present, it is also in an advanced stage the procedure of interconnection to the equipment of telemechanics and remote railroad energetic signaling for the border PS;
- we envisage to create a procedure of data transmission for energetic remote management;
- during the period of using the equipment already set into function, we brought a series of improvements, among which the possibility of μC registering and the off-line analysis of conversations.

4. BIBLIOGRAPHY

1. The CFR and MÁV internal norms