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GRAPHIC REPRESENTATIONS IN TRAFFIC SURVEYS

***Abstract*:** *The paper presents the implementation necessity of certain modern traffic management systems, the manner in which graphic representations obtained subsequent to data processing simplify traffic administration. Two computer software programs are presented, already implemented by the Cluj-Napoca City Hall by which traffic lights control and coordination is secured and a traffic management system by which the received traffic data are sent to the control center, processed and graphically represented, offering information in real time with reference to traffic conditions bringing thus a contribution to decision making related to traffic optimizing.*
Key words: *computer software, graphic representations, road traffic.*

1. INTRODUCTION

Most of the displacements are done on the road network which offers greater freedom for organizing the trip or the transport but with negative consequences in what concerns traffic safety and comfort. To solve such problems traffic surveys are necessary, a better handling of the road traffic and an adequate management based on new technologies for the collection, organization and transmission of information related to the infrastructure and traffic status.

The complexity of the issues which need to be approached by such traffic surveys and the great number of factors that influence traffic require the collection and the processing of a huge volume of data and the performance of multiple calculations to determine optimal solutions. All these are carried out with the aid of computer software and of certain advanced traffic management systems.

2. APPLICATION OF COMPUTER SOFWARE AND ROAD TRAFFIC MANAGEMENT SYSTEMS

The economic and demographic development of the Cluj-Napoca city led to traffic development within the city, a thing that stressed the inadequacy of the present traffic networks, fact that manifests itself by the conglomeration of the streets. To secure the access and mobility possibilities, to satisfy the present and foreseeable displacements needs there is a need to propose new manners for the fluidization of the road traffic within the city with the observance of the urban area utilization requirements and of the environment conditions.

Thus, the City Hall included in the medium term Street Modernization Program 2005-2014, the traffic fluidization in intersections by the performance of an integrated, modern and intelligent traffic flow guidance systems.

According to the public funds available, during a first stage automatic traffic lights were mounted thus carrying out the coordination of traffic lighting and the development of green wave systems. As of 1999 automatic traffic lights were mounted in 7 important intersections in the city, functioning on the basis of the MON_GSTN and CC computers software.

The use of a computerized traffic lights system in the city has as its aim the traffic optimizing by the traffic lights adjustment taking into consideration the traffic status in real time and of the effective treatment of the incidents. By the traffic lights coordination a fluid traffic is performed, offering to drivers the “green wave”. Data related to speed, flow, runways occupation, obtained in intersections are sent to the traffic management center.

2.1 MON_GSTN and CC computer software description

The MON_GSTN Program – Tele-monitoring, remote control and alarm reception program for the CC automatic devices through the public telephone lines, is a software product used in supervising the functioning of the CC automatic devices due to the implementation of the tele-monitoring, remote control and reception of alarms sent by traffic lights devices [1].

The operation mode is through the public telephone lines as the program requires the presence of an external type of modem such as Aprotek. This may be connected to the computer on any of its communication serial ports: COM1,…,COM4. Tele-alarms printing may be carried out in real time on any matrix printer connected to the computer by the LPT1 parallel communication port.

The main menus of the program are:

- file: secures the printer selection and the application quit option;
- modem: allows modem programming, of the communication port and of the telephone agenda;
- general: general settings for communication.

The main functions of the program are:

- tele-monitoring; this function allows the control center to call a communication terminal located in an intersection, to follow and control in real time the functioning of the traffic lights installation (fig. 1).

At the level of the area, there is a way to visualize synoptically, with the aid of a legend, the status of the CC automatic traffic lights devices from the point of view of functioning and of communication relationships with the communication terminals. It can be obtain the

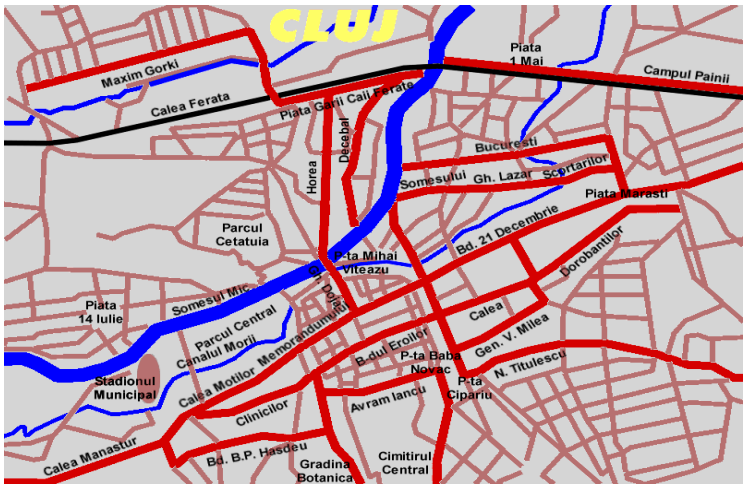

Fig.1 The area of city where traffic lights were mounted.

Fig.2 The visualize of the automatic traffic lights status Lucian Blaga Square

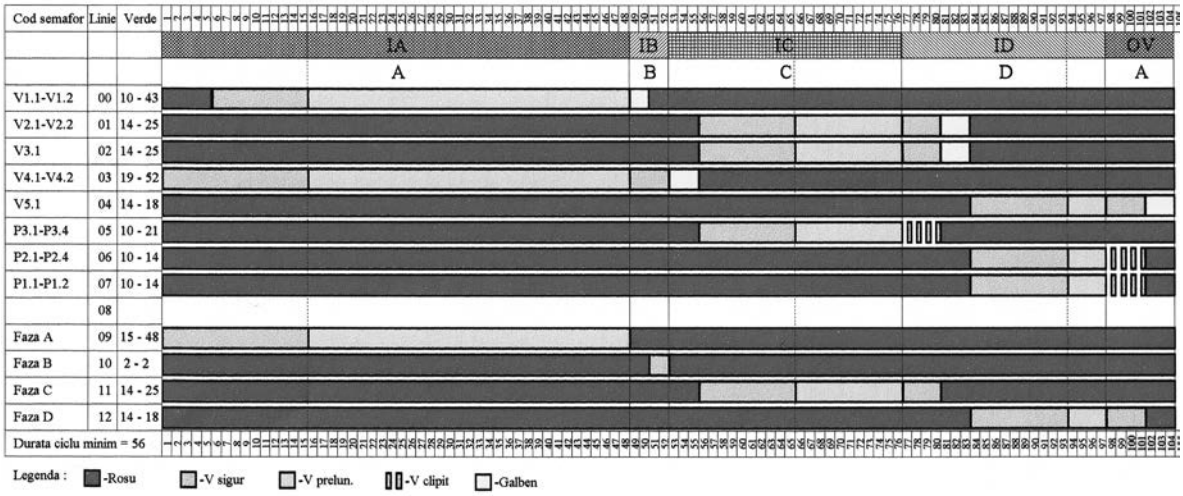

Fig.3 The traffic lights diagram in real time.

intersection plane image and visualizes in real time the status of traffic lights (fig.2) and the traffic lights diagram (fig.3);

- remote control – meaning that it is possible that the control center remotely controls the traffic lights device;
- alarm reception – the program will answer the telephone calls coming from a communication terminal any time it senses the appearance of a damage in the functioning of the traffic lights devices.

The CC Program – generation, modification and administration of the traffic lights programs for the CC automatic devices is a product indispensable to the development of traffic lights programs for CC8.000 and CC 10.000 automatic devices [1].

The CC Program has the following facilities:

- operated under Windows on any IBM compatible computer;
- provides for the document printing:

- the form corresponding to the E10/STS file (traffic lights program which is loaded unto the CC automatic device)/ (the E10 type of file having an extended header of information for a full identification);
- the traffic lights diagram corresponding to the E10 files (fig.3);
- antagonist green matrix;
- file directory of the TECO communication terminal;

- allows the handling of the E10/STS type of files;
- provides an editing environment for the E10/STS type of files easy to use;
- contains checking functions of the correctness of the edited traffic lights programs, signaling the errors appeared;
- secures the on screen visualizing of the traffic lights diagrams corresponding to the E10/STS type files.

2.2 Traffic management systems

Advanced Traffic Management System (ATMS) are based on a complex infrastructure, which contains sensors, video tracking cameras, data transmission network and exact position detection equipment (GPS-Global Positioning Systems). It is composed of multiple subsystems which are integrated into a system coordinated through the transport management centers [2].

To send the necessary services to users, ATMS uses a chain of information, which contains data acquisition from the transport system, data communication, data processing, information distribution to the system users and the use of information to back up decision and control.

Data processing, integration and results representation under a graphic form is done in the control centers of the ITS systems (Intelligent Transport Systems) offering information in real time on the current traffic conditions of a network.

ATMS has the role of securing the traffic control and monitoring as well as to provide information for the travelers, the aim being to decrease traffic congestions and agglomerations, of the time to travel and the time of intervention in case of accidents. For traffic safety and mobility information is handled with reference to transport manner, route and travel duration.

For the performance of the ATMS functions technologies belonging to electronics, IT and communication are used, as follow [3]:

- Sensors- these are the instruments wich collect traffic (fig. 4), weather (fig.5) and road information and send them to related control units in ITS applications.

Through the information received from sensors, warning and information messages are shown in ITS units such as VMS (Variable Traffic Signs), VTS (Variable Message Signs) (fig.6), etc.

- video cameras networks ;
- automatic vehicle location equipment based on global positioning systems (GPS);
- computerized traffic lights systems.

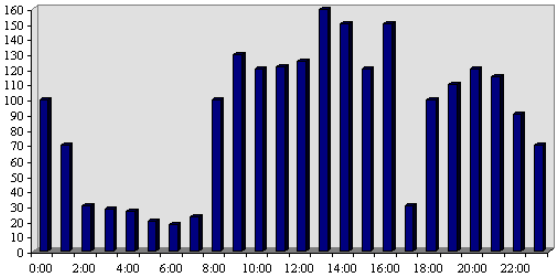

Fig.4 Traffic Measurement Systems(number of vehicles)

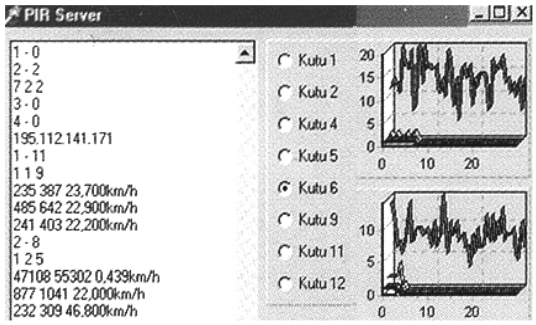

Fig. 5 Meteorological Systems.

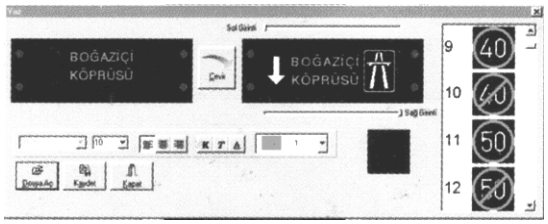

Fig. 6 Variable Message Sign.

Through these technologies the collected primary data are sent periodically to the traffic management center. Subsequent to processing, the data are graphically represented, interpreted and the decisions made at the center are sent to the variable signal panels under the form of graphic or text messages (fig.7)[3].

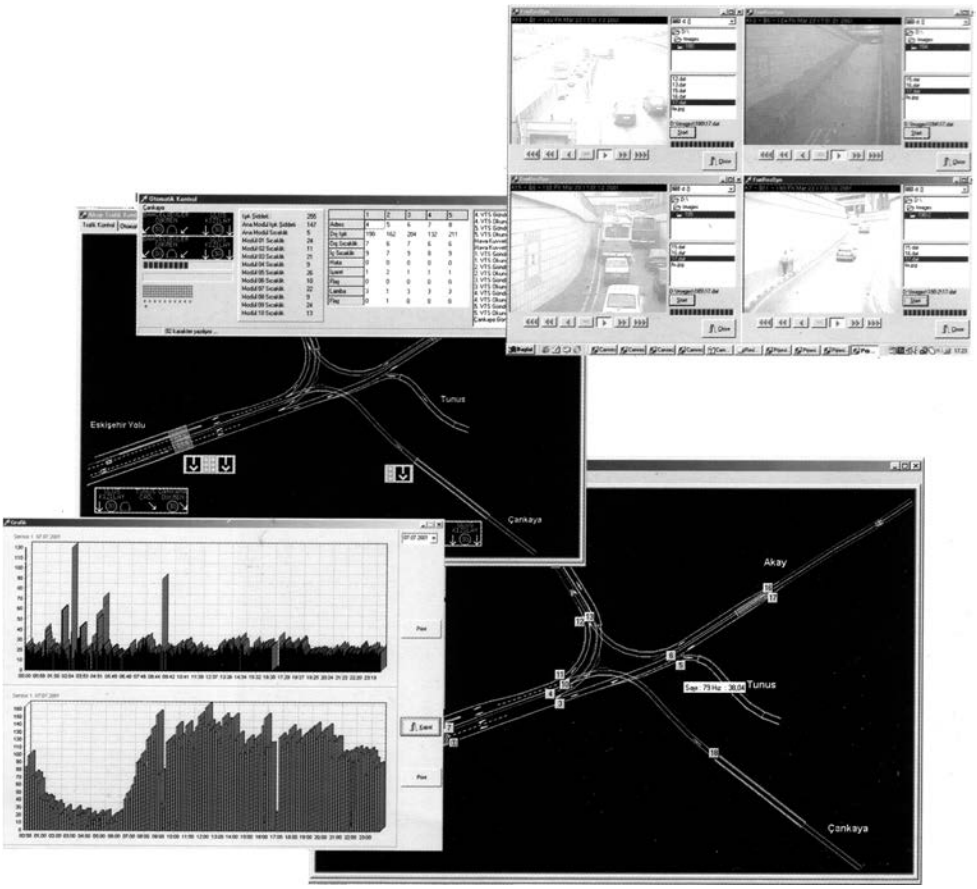

Fig. 7 Traffic Measurement, Traffic Information Systems VMS Control Software, Image Control Systems.

3. CONCLUSION

Graphic representations resulted subsequent to traffic data processing on the basis of computer software programs have a special importance by the information sent in real time related to traffic conditions and for the decisions related to traffic optimizing. Two computer software programs implemented by the Cluj-Napoca City Hall were presented, programs by which the control and coordination is secured to the traffic lights, the functioning principles, graphic representations and an advanced traffic management system, its functions, the technologies used, the manner in which the received traffic data are sent to the control center, processed and represented under a graphic form.

4. REFERENCES

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