Application of Closed Circuit Television for Highway Telematics

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Abstract. The article presents questions connected with the transport telematic systems. Both analogue (CCTV) and TCP/IP controlled (CCTV IP) visual monitoring system are presented. New concepts of technical and functional solutions are also discussed, aimed to improve the operational effectiveness of integrated control and surveillance centres managing the transport telematic systems.

Keywords: visual monitoring system, transport telematics, security system.

1 Introduction

The transport telematics is a field of knowledge integrating IT and telecommunications, intended for purposes of organising, managing, routing and controlling traffic flows, which stimulates technical and organisational activities enabling higher efficiency and safety of those systems [18, 19]. Transport telematic solutions are used for a broadly defined transport safety at multiple systems and transport facilities [16].

This issue becomes ever-important in the transport perceived as a wide-area system. This applies not only to facilities with high number of staff using different transport solutions, but also to monitoring of passenger compartments (passenger safety during transport), load safety, monitoring of routes and key transportation structures (bridges, tunnels, overpasses etc.) since they are easy targets for terrorist attacks, which if successful could disrupt transport networks, hence the entire economy over substantial area.

Telematics-based security systems could be used as part of transport telematic systems. In that arrangement they assure safety during travel, which among other is the service provided by transport telematic systems. This functionality is delivered by systems installed at permanent structures of airports, railway stations [11], logistic bases, handling terminals as well as by the systems installed in moving objects (e.g. vehicles). Consequently, the security level of both the travellers and cargo increases.
In terms of reliability analysis of those systems there are already numerous publications (concerning both the entire system [2, 8, 9, 10, 12], as well as its components e.g. power supply [14] and transmission media [13]), thus they will not be discussed.

The highway telematics entails using various IT systems along highways in order to considerably increase safety during travel and commercial transport. A range of other positive effects are generated, i.e. a lower environmental impact, a higher efficiency of transport processes through traffic solutions, a better use of road infrastructure, a stronger economic validity of highway operator business [20, 21].

Highway telematics' elements include centres controlling transport, passengers, vehicles (cars, coaches etc.), drivers and cargos. Intelligent Transport Systems, subsystems managing roads, vehicles, drivers and transport services based on real-time telecommunications create a logical sequence capable of managing moving people, vehicles and cargos under changing environmental conditions. The visual monitoring is one of the subsystems. Among other is enables to assess highway conditions by locating the area where an accident has taken place and detecting its type. It can also determine the length of any consequent traffic jams (Fig. 1).

Currently there are many key solutions being implemented at visual monitoring systems concerning constructional design and organisation. Hence, the analysing of previous systems and suggesting viable changes increasing their functionality becomes of paramount importance. The article discusses issues related to telematic security systems. It particularly focuses on visual monitoring systems.