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Potential for ITS/ICT solutions in urban freight management

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Abstract

The article presents a study on applying ITS solutions in planning and management of urban freight transport in Gdynia. The traffic management system Tristar which is under implementation and its related systems show a potential to assist in development of freight transport measures. Recommendations for urban freight policy development supplementing Gdynia's Sustainable Urban Mobility Plan were used as a basis for identification where ITS/ITC could be implemented. The first stage may involve modelling and analysis of freight vehicle traffic with new multilevel transport model for Gdynia. Other possible measures include, among others provision of dynamic information for vehicle routing and priorities for trucks on selected sections of road network. However, problems with access to reliable data describing delivery vehicle traffic were identified in this early stage as no practical rules for their collection had been developed. Additional problems appear in acquiring urban supply chain characteristics that require collaboration with the private sector. Such studies have not as yet been conducted in Poland. The identified factors indicate the need to precisely specify expected results and the areas of ITS application in Gdynia to prepare for their. Dynamic routing and scheduling with real time information appeared to be the most promising solution applying ITS, with temporary priorities for HGV providing services to the sea port in Gdynia in peak traffic and directing lorries implementation to free parking slots. Experience gained in these applications will be useful in developing other, complex solutions, e.g. in organising distribution in the city centre.

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1. Introduction

Current trends in urban freight indicate potential for the introduction of advanced transport technologies as the way for more sustainable goods transport. Such solutions may include, among others, traffic management systems (in-vehicle and area related), access rights for different vehicle classes and traffic conditions, provision of open traffic information for accurate vehicle routing, and loading areas surveillance or vehicle monitoring (i.e. carrying dangerous goods or being overloaded). Proper implementation of modern transport technologies may result in a win-win situation, in which both the city authorities and freight operators equally reach their objectives improving the overall quality of services and transport system general efficiency.

However, the implementation of ITS/ICT (Intelligent Transport systems/Information and Communication Technology) solutions in urban freight transport necessarily require mature planning environment, clear objectives and eager involvement of various stakeholders from both the public and the private sector. Yet some of these requirements extend far beyond the city authorities competence and address the policy making on the national level. The above mentioned measures should be enforced as a part of a complex concept with a well designed system of supporting actions outstretching previously implemented solutions. Technology used should be proven and based on sound business cases engaging reliable private actors.

Although a traffic management system is currently under implementation in Gdynia urban freight still remains on a sidetrack. Thus, an urgent need has arisen to find out how these two domains may work together creating synergy effects for the city and actors involved. The city was selected as an example of ITS implementation because for several reason. The obvious one is the availability of first-hand experience from implementation of one of the most complex traffic management systems in Poland, covering not only single city, but the whole metropolitan area of Gdańsk, Gdynia and Sopot. The second reason is a possibility to evaluate how other measures, based on the traffic management system are implemented, supplementing its capabilities. This refers to the CIVITAS "Dynamo" project where, among other measures, a multilevel transport model is under development.

The main objective of this paper is to identify opportunities for ICT/ITS implementation in urban freight transport in the city of Gdynia. The research is based on the city's current experience in this field and the new developments stemming from an ongoing CIVITAS "Dynamo" project.

Section 1 of this paper gives an introduction to the problem and presents the research approach. In section 2 characteristics of ITS measures relevant for urban freight management are identified, as well as the requirements for data when freight modelling is considered. An example from the city of Gdansk is provided to illustrate typical problems in data acquisition, such as irregularity of road surveys and inadequate structure of available information. This problems occur also in Gdynia, which forms the TriCity agglomeration together with Gdansk and Sopot. This is the starting point for indicating ITS significance in the urban freight management process and its integrating and informative role. Section 3 links identified ITS measures with urban freight stakeholders concerns, giving an opportunity to introduce recommendations for Gdynia's Sustainable Urban Mobility Plan referring to freight transport.

In section 4 actual implementation of ITS solutions in Gdynia is presented, focusing on the Tristar traffic management system and multilevel transport model, which is under final stage of implementation as a comprehensive system supporting planning and decision making. These two system were analysed in terms of their feasibility to facilitate urban freight measure. Section 5 summaries the paper with conclusions.

2. ITS in urban freight transport

2.1. Characteristic ITS/ICT solutions as instruments for managing freight transport

ITS and ICT are a broad category of terms and measures which are structured in many ways according to available sources. As this paper is not intended as a literature review on this issue, only selected definitions are mentioned with emphasis on the planning process and local authorities perspective involved in freight issues. European Commission defines ITS as advanced applications providing innovative services related to the different modes of transport and traffic management. This capacious definition may be structured into more the following detailed traffic areas/cells and mobility management systems, user information systems, transport management

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