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The Role of Cooperative Approach in Enhancing Energy Efficiency of Urban Traffic Systems

Abstract: The large number of personal vehicles, along with public transport and service vehicles, makes urban traffic systems complex and challenging to manage effectively. Urban traffic networks are typically characterized by increased travel times, congestion, and low travel speeds, all of which directly impact the energy efficiency of these systems. Intelligent transport systems (ITS) aim to address these issues using advanced information and communication technologies, offering an alternative to the physical expansion of traffic infrastructure. A further step in traffic management is the cooperative approach, which enables communication among key traffic actors: vehicles, infrastructure, and drivers. This presentation will explore cooperative concepts within the European ITS architecture framework, which is critical for understanding the challenges and opportunities of such systems. Various cooperative service scenarios (traffic management, traveler information, multimodal approaches, etc.) will be discussed, highlighting their potential to improve traffic and energy efficiency parameters, ultimately supporting the development of sustainable and efficient urban traffic networks and laying the groundwork for the smart city concept.

Keywords: intelligent transport systems, traffic management, sustainable mobility, European ITS architecture, smart city concept

Biography: Miroslav Vujić is an Assistant Professor, Head of Chair of Transport Telematics, and Head of the Intelligent Transport Systems Laboratory at the Faculty of Transport and Traffic Sciences at the University of Zagreb, Croatia. He received a Ph.D. in the Intelligent Transport Systems area with a dissertation “Dynamic Priority Systems for Public Transport in Urban Automatic Traffic Control. At the University of Zagreb, Croatia, Faculty of Transport and Traffic Sciences he teaches courses at undergraduate and graduate levels: Architecture of Intelligent Transport Systems, Basics of Traffic Engineering, Road Telematics, In-Vehicle Telematics. He was the team leader of the H2020 project Twinning Open Data Operational (GA No. 857592) and was a team member of several other EU-funded projects (FP7-317671 Intelligent Cooperative Sensing for Improved Traffic Efficiency – ICSI, FP7 CIVITAS ELAN Mobilising Citizens for Vital Cities - Public Transport Priority and Traveller Information, GA No. 218954), and various other national and regional projects. Area of expertise of asst. prof. Miroslav Vujić is in the field of development and application of Intelligent Transport Systems (ITS) concepts in traffic environments, traffic engineering, and cooperative systems, application and development of dynamic traffic management systems, development of adaptive traffic flow control models, data collection and processing for traffic and transport technology simulations, open data in traffic and transport.