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BOOK OF ABSTRACTS

Tuesday, Sept. 29, 13:00-14:30, Session: Automated Transport

Introducing Smart Yards: a New Concept in Smart Transport Logistics

Jelle van Heuveln

University of Twente, the Netherlands

jelle_vanheuveln@hotmail.com

Abstract. This presentation introduces a new concept in the field of smart transport logistics: smart yards. A smart yard is a buffer area to decouple long-haul operations from last-mile logistics and can be implemented at various logistics hubs, e.g., airports, seaports, or distribution centers. The presentation will briefly discuss the generic smart yard concept and conceptualizes this in a smart yard framework. We focused on complex mixed-traffic environments. Within these environments, roads are not private, but partly public, and traffic management is only partially controlled. This shift towards a more complex environment will have an impact on the development of connected and automated concepts, such as Automated Vehicles (AVs).

The smart yard concept can be divided into a physical smart yard and a digital smart yard. Both concepts will be briefly discussed in the presentation. Within the physical smart yard, a cargo decoupling point and AVs are implemented. In the digital smart yard, a seamlessly integrated network system is deployed, that utilizes technological applications such as IoT or 5G, to enable data sharing.

To get a grasp on the smart yard concept, a conceptual smart yard framework has been developed. In this framework, decisive factors are stated that are used as the input for a smart yard. A taxonomy, based on the decisive factors, characterizes a case. Based on these inputs, decisions on key elements (for example, the type of AV and control architecture) should be made. This framework provides directions for further research and addresses practical aspects.

To exemplify the smart yard concept, we present a use case, namely the Schiphol case. Based on the framework, we determine the taxonomy of the Schiphol use case and show the potential

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concept and the potential impacts that a smart yard can have. The usefulness of the smart yard is researched from a logistical point of view, to show the impact and effectiveness on KPIs such as throughput time, waiting time, and utilization. This is substantiated with a simulation model, which will be the main focus of the presentation. The approach, the simulation model itself, and the detailed results of this simulation study will be discussed. Furthermore, we will discuss the conclusions about smart yards and the potential areas for further research drawn from this study.

Keywords: Smart Yards, Freight transportation, Smart Logistics