

PRESS RELEASE

INNOVATION IN ELECTRONIC TICKETING **Automatic presence detection using the be-in/be-out principle**

The vehicle automatically detects the presence of a passenger with an e-ticket, without the passenger having to take any action. Recording is based on the be-in/be-out principle (BIBO). All the passenger needs is the user medium, in the form of a card or cell phone. He can then get on and go – the rest is automatic.

The principle

To save the life of the battery in the user medium (cell phone or card), it is in an energy-saving idle status. It is only “awoken” when the passenger boards the vehicle after which it is assigned to the activating vehicle with an electronic “stamp”. As long as the vehicle remains at the stop, the system does not record the user medium. This means that the user is free to get off the vehicle again, without charge, before it departs. A few seconds after departure, all tickets on the activated user media are “collected” and recorded in the vehicle. In accordance with the selected method of payment, the corresponding charges are billed (similar to a phone bill) or the customer pays in advance and with that credits his electronic travel pass.

The user media

The passenger has a choice of different media. There is the credit-card type card, currently around 3mm thick or there is also the cell-phone option with special electronics for presence detection. The card has a two-line display and two keys, which allow the passenger to view and change the current trip information and parameters. The cell phone works in a similar way to the card. The phone display is used to represent the information.

The advantages

With the introduction of the e-ticket the transport authority reduces its operating costs. Furthermore, automatic presence detection offers a flexible, market-based means of structuring fares. As a welcome side effect, electronic ticketing systems deliver a whole range of data, which would otherwise necessitate extensive customer surveys. For example, the system automatically establishes passenger counts with source-destination data. This means that the transport authority knows how many people boarded and alighted at each of the stops. This represents a simple way of creating data for effective Customer Relationship Management (CRM). The system also fully complies with data protection regulations.

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The components

The vehicle equipment consists of the onboard computer, BIBO-reader, wake-up antenna (one per door) and a presence detection antenna.

The BIBO reader is responsible for controlling the attached antennae. The **onboard computer** evaluates the vehicle data, is responsible for communication with the background system as well as vehicle location. With the aid of the satellite positioning system, GPS, the onboard computer determines whether the vehicle is near a stop, creates the "stop" or "traveling" information and with that controls the antennae. Communication is currently achieved via GSM/GPRS, but can be conducted transparently via other interfaces such as, for example, UMTS or WLAN. A further central task of the onboard computer is the control of the recording components – BIBO reader, wake-up antennae and presence detection antennae. The onboard computer is also responsible for implementing the necessary safety procedures. The **wake-up antennae** are installed in the door areas. When the passenger gets on, the user medium is effectively "awoken". This guarantees that large numbers of passengers can board simultaneously and all user media are awoken. The **presence detection antennae** are responsible for the actual recording of the user media, which involves a complex protocol with various safety mechanisms (challenge-response, interior and exterior protection with MAC). The current working status of the German "VDV Core Application" standard is a defining factor. A recording transaction is generated in every section of the journey in a multi-stage telegram exchange, which has been "signed" by the card or cell phone.

Press and public relations work

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