



Intelligent Urban Transport Systems

## How digitalisation is driving public transport progress for visually impaired passengers

### New app and on-board technology are a boon for bus travel

In Switzerland, the Disability Equality Act requires barrier-free conversion of railway stations. In Germany, the Passenger Transport Act demanded accessibility in public transport by 2022. And in Austria, the law on the equality of people with disabilities required compliance by 2015 with transition periods. However, transition periods of around ten years are a big ask when it comes to remodelling stops, replacing buses and making underground stations more accessible. What is often overlooked is the fact that such accessibility does not end with raised kerbs at stops, lifts in stations and orientation strips, but extends to the entire transport experience - from route planning to orientation at major stops and real-time information in passenger vehicles.

In collaboration with the Swiss Association for the Blind and Visually Impaired (SBV), Trapeze, a company that provides software solutions for public transport, has developed the INTROS system. It provides virtual assistance for passengers with visual impairments, helping them get from A to B, and will be presented in more detail at IT-TRANS from 14 to 16 May in Karlsruhe.

By definition, public transport is as much a fundamental part of daily life as, say, education, energy supply and healthcare. For passengers with disabilities, however, the ability to use transport safely, stress-free and, above all, independently is key to an enhanced quality of life. While access for people with walking difficulties in particular has been improved in recent years, blind and visually impaired passengers face more specific challenges.

### Learning from users

So what problems does a person with a visual impairment encounter when travelling by bus? The variety of stops, routes and destinations, for a start, all of which are particularly common at transport hubs and can be a challenge even

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for sighted passengers. Which bus is currently pulling into the stop? Where are the entrances to the vehicle? When do I have to get off and where is the stop button? At best, there is an audible on-board announcement of upcoming stops; at worst, there is just a visual display - and these may not necessarily be correct due to last-minute diversions and timetable changes. Everything that many passengers take for granted when travelling by bus can be problematic for blind and visually impaired people.

The INTROS development team worked closely with the SBV to identify the specific needs of blind people on public transport, and the most pressing issues. Michael Lingk, Product Manager at Trapeze, says: "As the representative of visually impaired and blind passengers, the SBV approached Trapeze Switzerland in 2018 to assist with the development of a regionally scalable solution. Pupils from the Zugerland School for the Blind were involved in the first pilot project to ensure feasibility of the solution, along with computer scientists from the SBV's Technology and Innovation department. In short, the app was developed by those affected for those affected."

### **Real-time communication and networked systems**

The system is based on an on-board module connected to the vehicle's computer via an interface, alongside a smartphone app that can communicate with the on-board module using Bluetooth Low Energy. The focus is always on enabling passengers to plan and start their journey as independently as possible, and without the need for third-party assistance.

Before travelling, passengers can use the app to access timetables and plan their route, with the system automatically identifying the stop closest to their current location. If the passenger is already at the stop, the system recognises this and displays the local timetable. When the desired vehicle arrives, the app informs the user and guides them to the correct boarding point.

An important component of INTROS is real-time communication with the vehicle's on-board computer and, therefore, direct interaction. For example, through the app, users can tell the driver that they need more time to get on or off the vehicle, and at which stop they wish to alight. Acoustic signals on board and a hands-free system help further simplify the process.

### **After successful trial run, Saarbahn equips entire bus fleet**

Saarbahn is currently equipping its entire bus fleet with the barrier-free INTROS information and orientation system. In doing so, the Saarbrücken-based



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transport company aims to make it easier for blind and visually impaired passengers, in particular, to use public transport, thus supporting their need for independence.

The lighthouse project is funded by the state of Saarland, and was preceded by another Saarbahn initiative in 2020 and 2021, which was supported by the Saarland Association for the Blind and Visually Impaired, the full-time Commissioner for the Disabled and the Saarbrücken Advisory Council for the Disabled.

The "barrier-free information and orientation system" was tested in cooperation with blind and visually impaired passengers. "The focus was on the special requirements of the target groups and the user-friendliness of the system," explains Katharina Meßner-Schalk, Head of Strategic Projects at Saarbahn. After several months of testing, the technology was described by test users as suitable for offering everyday assistance to blind and visually impaired people. Other user groups could also benefit from the service, for example senior citizens and those unable to use conventional passenger information due to a literacy issues or learning difficulties.

Saarbahn is implementing the project, which is based on successful cooperation between all parties involved, across its entire bus fleet. With 28 trains and 138 buses, the company transports around 40 million people a year in the state capital of Saarbrücken and the surrounding region.

Says IT-TRANS Senior Product Manager Markus Kocea: "At Messe Karlsruhe, we engage in intensive dialogue on the topic of accessibility, especially through our in-house trade fair REHAB. What we have learned time and time again is that appropriate offers are well received when they enable people to cope with everyday life largely independently. This also includes travelling safely from A to B without having to rely on the help of others, thanks to reliable and well thought-out technology. We are delighted that Trapeze will be presenting the innovative INTROS system at the upcoming IT-TRANS from 14 to 16 May 2024."