



Highly-Precise Bus Positioning in Depots

The challenge

When public buses in large cities such as Hamburg and Düsseldorf are not on the road, they are normally parked at the depot. To make it easier to know exactly where the vehicles are located so that they can be fueled, maintained or cleaned, the public transit operators Düsseldorf Rheinbahn AG and Hamburger Hochbahn AG began searching for a cost-effective, simple solution capable of automatically locating buses in fleets as large as several hundred vehicles. Employees previously had to walk through the depot to locate the position of the buses.

The solution

The two companies are now using Symeo's wireless-based positioning technology to precisely detect and record the position of their entire bus fleets. Installed on each vehicle is a wireless receiver, the Symeo Positioning Unit (SPU), which independently determines the position of the bus without using a central server. The position and vehicle data is then transmitted over a proprietary frequency to a Symeo wireless data collection point, which in turn forwards the coordinates to the operator's depot management system. The Symeo LPR®-2D technology thus enables the automatic positioning of the vehicles, down to the exact parking space, without using or interfering with the depot's existing wireless network, which is utilized for transmitting enterprise data among other information.

The project's success

More than 1,200 buses in the Hamburger Hochbahn depots in Hummelsbüttel, Mesterkamp, Harburg and Wandsbek, in addition to the Düsseldorf Rheinbahn depots in Lierenfeld and Heerdt, have been equipped with the technology. Thanks to automatic positioning and reliable data transmission, both companies have optimized their depot operations and reduced workloads.

Time-consuming bus searches

Düsseldorfer Rheinbahn AG is the largest of the more than 20 public transit companies that make up the Rhein-Ruhr public transit network, Europe's biggest. Rheinbahn operates no less than 735 vehicles and 110 lines while serving more than 720,000 passengers in and around Düsseldorf, the capital of North Rhine-Westphalia, Germany's most populous state.

Hamburger Hochbahn AG is Germany's second largest public transit company and the largest member of the Hamburg public transit network. Hamburger Hochbahn AG serves more than 200 million passengers annually with hybrid fuel cell vehicles, double-articulated buses and hybrid diesels.

Whenever the buses are not in service, they are parked at the operator's depot, which simultaneously serves as the hub for all planning activity and the starting point for the drivers. Hamburger Hochbahn AG alone employs as many as 1,900 drivers for instance. Until now, the only way to locate the buses for refueling, maintenance or cleaning was to search for and manually record their position, a time-consuming task. The goal was to find a way to automatically locate vehicles parked inside the depot and on the outdoor grounds and thus streamline the operation. Another requirement was making sure the solution did not interfere with the depot's data network.

The solution: precise positioning with Symeo LPR®-2D technology

The Symeo positioning technology enables highly-precise, automatic

positioning of the depot vehicles using wireless communication and LPR®-2D receivers installed on the buses. For location reference, the system relies on transponders that can be mounted on walls, fences or columns without cabling them to one another.

"Before we installed the Symeo technology, someone had to search for and manually record the position of the buses. This effort has now been eliminated since the system automatically determines where the buses are parked. Our depot operations have been optimized as a result. The products were easy to install and function very reliably," says Dr. Heinrich Böse, area manager responsible for system planning and technology at the Hamburger Hochbahn AG.

The Symeo products feature a robust design that makes them ideal for use even in harsh industrial environments where dust, grime or vibrations are common.

Wireless data networks are left alone

The position and vehicle data is transmitted over the LPR® data channel to a Symeo wireless data collection point using a 5.8 GHz proprietary frequency, which then automatically forwards the coordinates to a depot management system installed by PSI Transcom GmbH.

"The wireless networks in our depots are fully occupied. We're therefore pleased to have this separate, self-sufficient data link, which provides easy and fast data transmission," says Thomas Klein, project manager at Düsseldorfer Rheinbahn AG.

Düsseldorfer Rheinbahn AG

Rheinbahn, founded in 1896 as the Rheinische Bahngesellschaft AG, is the public transit operator for the North Rhine-Westphalia capital city of Düsseldorf. Rheinbahn is the fifth largest public transit company in Germany and the largest of the more than 20-member strong Rhein-Ruhr Verkehrsverbund (VRR), Europe's largest public transit network. Rheinbahn employs more than 2,800 people from 31 nations. Operating 735 vehicles and 110 lines, each workday Rheinbahn serves around 720,000 passengers within a 570-square-meter metropolitan area that is home to more than 1 million people.
www.rheinbahn.de

Hamburger Hochbahn AG

Hamburger Hochbahn AG is owned by the Free Hanseatic City of Hamburg AG, but organized and managed on private enterprise principles. As the second largest public transport company in Germany, and the largest member of the Hamburger Verkehrsverbund (HVV), the Hamburger Hochbahn AG and its more than 4,800 employees serve around 1.2 million passengers each day within the Hamburg metropolitan area with four subway lines and more than 100 bus routes.
www.hochbahn.de

Symeo GmbH

Symeo GmbH develops and markets systems for precise and contact-free distance measurement, position detection and collision avoidance. Symeo products are suitable for cranes, industrial vehicles as well as for other transport methods. Furthermore, the company develops customer-specific telemetry and smart metering solutions, which fulfill relevant standards (e.g. EN 50463). Symeo products are robustly designed and well-suited for applications in harsh industrial environments indoors and outdoors.

Symeo's patented LPR® offers a wireless and real-time system for precise positioning and distance measurement that is ideally suited for industrial applications. Symeo also provides industrial GNSS (Global Navigation Satellite Systems GPS, Glonass and Galileo) receivers that can be combined with LPR® and other motion and inertial sensor systems, enabling highly available and precise positioning even under the most adverse conditions and in areas with limited satellite availability.

Symeo GmbH

Prof.-Messerschmitt-Str. 3
85579 Neubiberg
Germany

phone: +49 89 6607796-0
fax: +49 89 6607796-190

www.symeo.com
info@symeo.com

- Automatic, reliable and wireless indoor positioning of buses down to the exact parking space
- Easy to install
- Does not use or interfere with existing wireless data networks
- No cabling between transponders required
- Robust design
- Grime, dust and weather resistant
- Option to transmit data using mobile phone or WLAN technology
- On-the-road positioning via GNSS can also be activated as an option