

# WLAN leads the way

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Wireless radio networks not only provide convenient access to the Internet; they also help pedestrians to reliably navigate through narrow city streets or buildings. Fraunhofer researchers and partners are currently demonstrating how this works in Nuremberg, where the first WLAN localization test environment was launched in January. The system will also be presented at CeBIT in Hanover on March 4 through 9.

Finding your way around a new city can often be a problem. Where's the nearest Thai restaurant? Is there a pharmacy nearby? How can I call a taxi if I'm not sure which street I'm in? A new system provides support in the form of autonomous WLAN localization via PDA or smartphone. Additional services can then supply further information, for example on restaurants and pharmacies in the vicinity, or you can order a taxi to pick you up from your current location.

Car drivers can usually rely on GPS to guide them to their destinations. However, when it comes to steering pedestrians through narrow city centers, buildings or subway areas, the satellite-based system is not sufficiently accurate. Researchers at the Fraunhofer Institute for Integrated Circuits IIS therefore use wireless local area networks (WLANs) to determine the user's position.

“We are taking advantage of the fact that most cities are very well equipped with WLAN networks, and that an increasing number of cell phones are capable of using them,” explains Jürgen Hupp, head of the Communication Networks Department at the IIS. Nuremberg is the

perfect example: Its city center has an average of 2000 WLAN transmitters per square kilometer. “This enables an average positioning accuracy of three meters inside buildings and ten meters outside,” explains Hupp.

Any spot within a city or a building can be clearly identified on the basis of received signal strengths from several WLAN base stations. The first task is therefore to take measurements at various different reference points. This information is stored on a central server and can be downloaded onto a mobile terminal together with a map of the city or a particular public facility. In order to continuously locate their position, users need to install special software on their PDA or smartphone.

This localization algorithm autonomously calculates the user’s current position. “Due to the system’s autonomous approach, positioning information is only available on the terminal. This means that the user can’t be located from outside,” stresses Hupp. The system takes both commercial hot spots and private WLAN transmitters into account. However, it does not require logging into or accessing the data network. Users can decide for themselves whether to apply the localization function for their own orientation purposes only, or whether to use additional service offers such as the taxi call option or the pharmacy finder.

In order to allow companies to enhance their location based services by including WLAN-localization, the IIS has made the technology available in Nuremberg within an area of 25 square kilometers. New location-based services are currently being tested under realistic conditions. Since January the open testbed consortium has been implementing recent applications such as the smart taxi call function. Initial partners include Müller Medien and its subsidiaries IT2media, Map and Route, as well as T-Systems, Gaschba, cruso AG and VAG Nuremberg. “The results of this large-scale test will serve as a basis for the planned standardization

of interfaces for the WLAN positioning system and for local services,” says Hupp, stating one of the project’s objectives.

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