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Mitsubishi Electric Develops Indoor Positioning System Using Wireless Communication and Acoustic Ranging

Enables low-cost positioning with better than one-meter accuracy

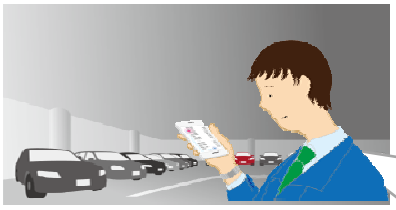
TOKYO, February 12, 2016 – Mitsubishi Electric Corporation (TOKYO: 6503) has developed an indoor positioning system utilizing wireless LAN communication and acoustic ranging to achieve accuracy within less than one meter. The system is expected to be used for applications such as walking navigation or warehouse management in underground locations where GPS signals are not reliably available. Commercial use is expected by April 2017.

The new system positions the target device based on the round trip times for sound waves traveling between the device and surrounding wireless WLAN APs equipped with positioning capability. The positioning trigger and other required data are exchanged via a WLAN. The system can be installed with as few as three, or more, positioning-capable WLAN APs. In structures that already have WLAN infrastructure, especially cost-effective installation is possible by simply appending the positioning of the existing WLAN APs. Mitsubishi Electric's new system also provides WLAN infrastructure, in addition to positioning.

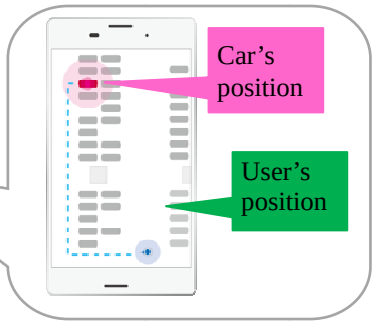
In the case of certain existing indoor-positioning methods, users must purchase positioning-specific hardware, such as RF tags. Mitsubishi Electric's system only requires WLAN communication and sound-wave transmission. Since smartphones are usually equipped for WLAN and sound, such as microphones and speakers, most users will simply need to install the positioning application in their smartphones.

As an example of using the system for walking navigation in an underground parking lot, the position of a car could be detected and stored when it is parked, and then the information could be used later to guide the user back to the car.

Before exiting car, detect and store parking position in a smartphone



Later, use current and stored positions to relocate car



There are many practical needs for accurate positioning inside buildings or underground facilities where GPS signals are not available, such as walking navigation, worker administration, warehouse logistics, asset management and more. So far, accurate, cost-effective positioning methods have not been possible due to issues described in the following chart:

Technology	Issues/Accuracy
WLAN signal strength	Low accuracy (approximately 10m) due to instability of signal strength
WLAN RSSI mapping	Requires technical knowledge and cost for installation Accuracy of meters
Time of arrival for WLAN packets	Requires specific, strictly synchronized WLAN APs Accuracy of around 1m
Acoustic/RF beacon	Requires high number of beacons for practical accuracy Accuracy from 1m to 10m
Acoustic signal	Transmitters and receivers must be synchronized Accuracy of less than 1m

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About Mitsubishi Electric Corporation

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,323.0 billion yen (US$ 36.0 billion*) in the fiscal year ended March 31, 2015. For more information visit:
http://www.MitsubishiElectric.com
*At an exchange rate of 120 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2015