FUJITSU THE POSSIBILITIES ARE INFINITE

High-Precision Radio Positioning Technology

May, 2008

Abstract

Recently, GPS has been installed on various devices such as mobile phones, and various types of services using location information have been made possible. GPS, however, is still difficult to use in indoor environments. To expand implementation of these services, there is high demand for a precise means of measuring positions of people and objects both indoors and outdoors. Against this backdrop, we are developing a high-precision radio positioning system using ultra wideband (UWB) radio technology. UWB is a radio communication technology that uses a very wide frequency band. Using impulse radio, kind of UWB, high-precision positioning is made possible by precisely measuring radio wave propagation delay time.

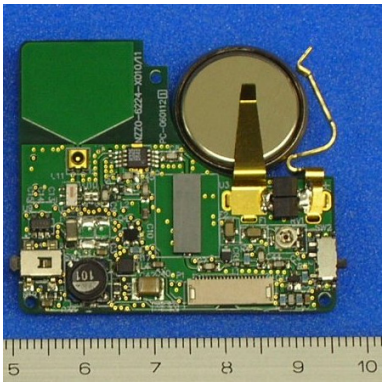
Technology

- **Compact UWB active tag**
  We are developing a compact and low power consumption active tag. The tag has only a transmission capability and drives required circuits intermittently, which enables its downsizing and low power consumption. By installing a sensor on the tag, it is possible to transmit an ID or a state of a person or an object.
- **High-precision time measurement base station**
  We are developing a UWB base station that can measure propagation time of a radio wave from a UWB tag in a high resolution of 1 nanosecond or higher.
- **Positioning system**
  We are developing a system for calculating the location of a tag on the basis of differences of propagation time measured at two or more base stations. In an experimental environment with the same conditions as a standard indoor office, the world's most high-precision measurement of a tag location, with an average error of 17cm, has been verified.

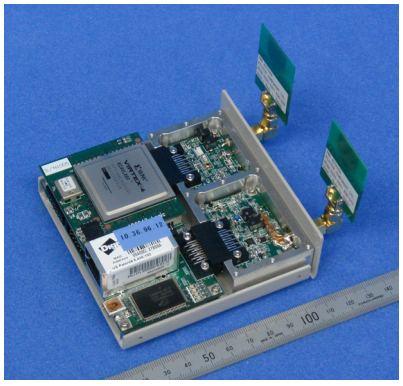
Application Examples

By attaching a tag on a person or an object, precise measurement of a state and location of the person or the object is made possible.

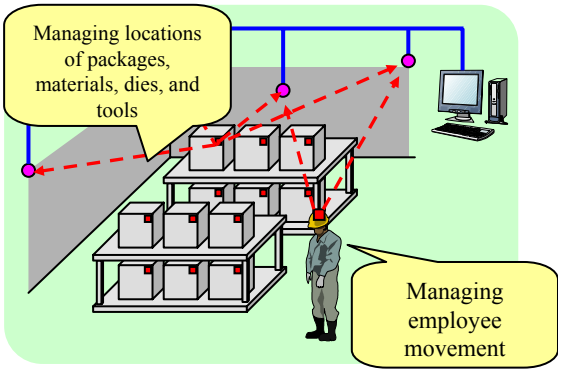
- Precisely managing locations of items in warehouses and stores
- Managing locations and use history of office devices such as notebook PCs.
- Managing entry, exit, and in/out status of office employees
- Collecting data of customer movement in a store by measuring cart positions in real-time
- Managing employee movement and locations of tools and parts in a plant



UWB active tag



UWB base station



Application image