

UWB Untracked Indoor Navigation



Where Am I in the Building?

How Do I Reach a Destination Inside the Mall?

We have all been there. We are in the shopping mall and want to quickly find a favorite store. Or we are at the airport, running late, and cannot locate the shortest path to the gate. Or maybe we simply can't find where we parked our car in a parking lot. In large buildings like shopping malls, airports, railway stations, and museums, users need help in navigating indoors to know their current location and to effortlessly reach their destination.

Precise indoor navigation also enables convenient services such as locating a tag-less gate in the subway station, an automatic check-in service or payment, quick navigation in an underground parking lot, supplementing guide dogs for visually impaired persons, a docent service in a museum or an art gallery, finding your children's location in a dense area, and other similar uses.



To make accurate indoor navigation a reality, FiRa™ Consortium is developing **UWB untracked navigation**, a powerful new technology that goes beyond the limitations of existing indoor navigation techniques in accuracy, scalability, and privacy.

Challenge: Indoor Navigation That Is Accurate, Scalable, and Private

Existing technology lacks the high accuracy, scalability and privacy needed for indoor navigation. In crowded situations (e.g., rush hour at a subway station or weekends at a shopping mall), people need a reliable and untracked indoor navigation service that scales to serve large numbers of user devices simultaneously.



Navigation technologies such as Bluetooth® High Accurate Distance Measurement (HADM), Wi-Fi Fine Timing Measurement (FTM), or UWB Two-Way Ranging (TWR) calculate the position of user devices by trilateration. The trilateration technique uses Time of Flight (ToF) measurements between user devices and a set of anchors to provide a stable, but minimally scalable, positioning service in a crowded area. In addition, when ToF is measured by anchors and the user's location is calculated on the server connected to the anchors, the user's location is inevitably exposed.



UWB untracked navigation is a competent technology for enabling precise indoor navigation, achieving centimeter-level accuracy, and supporting, in theory, unlimited users/devices. As a minimal fixed number of messages is enough to provide location estimation regardless of the number of user devices, the technology is scalable. To enable untracked navigation, UWB anchors simply need to be installed at planned locations. These UWB anchors don't need to be connected using a wired network, making the installation simple and cost effective.

In today's era, personal information, including a person's location, is considered more important than ever before. As the name suggests, with UWB untracked navigation, location of the user device is determined by the user device itself. This intrinsically protects the user's location information from being exposed or the user being tracked. This also prevents malicious usage from attackers and protects the user's privacy from being compromised.

UWB Untracked Navigation Opens Up a New Era of Location-Based Services

UWB untracked navigation enables centimeter-level positioning accuracy with very high scalability, while being deployed and managed in a cost-effective way when compared to other technologies. With this simple but powerful indoor navigation technique, indoor venues can greatly enhance location-based services offered to visitors and employees by simply relying on devices that users already have in their hands and by deploying a **UWB untracked navigation** infrastructure as defined by FiRa.

