

Transmitter Localization Without Clock Synchronization

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BACKGROUND

Determining the location of a transmitting party in a communication network normally requires a number of identifying factors. The transmitting party can be located through triangulating their signal, using the signal's arrival at several receivers to determine the transmission's origin. One can also determine the location of a receiver by comparing the receipt of multiple transmitter signals; however, in both scenarios the transmitter and receiver must employ clock synchronization and signal time-of-travel information to accurately compute relative localization between the two. The Global Positioning System is a well-known example of this process, leveraging known time (and synchronizing to that time) and position of each GPS satellite to deduce the location of a receiver.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a novel signal encoding scheme that allows the localization between a transmitter and receiver without the need for clock synchronization. The proposed distance estimator can be implemented using several devices that are commonly used in communications, such as oscillators, modulators, phase detectors, and filters. Implementation can be done with analog circuits or, depending on the target frequency range, using entirely digital algorithms

APPLICATIONS

The disclosed technology can enable GPS like localization in environments currently not serviced or suitable for GPS, such as underwater, in space or indoors.

ADVANTAGES

The disclosed technology can be realized in a number of hardware configurations at various price points and can leverage differing wave energies (depending upon the transmission media) to include radio waves and pressure waves.

STATE OF DEVELOPMENT

A working prototype of the invention has been built and demonstrated

INTELLECTUAL PROPERTY INFO

The invention is patent pending and available for licensing.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

GPS, localization, navigation

CATEGORIZED AS

- **Communications**
 - Wireless
- **Sensors & Instrumentation**
 - Position sensors
- **Transportation**
 - Automotive

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