



## *The challenge*

Current technologies for tracking the position of vehicles and pedestrians often involve use of 3 separate receivers to measure the time difference between sending a signal and receiving a response and/or rely on GPS or visual-range sensors. These approaches require customized firmware on the receivers and an application to be run on a device. Moreover, the time synchronization between these separate receivers creates challenges.

## *The solution*

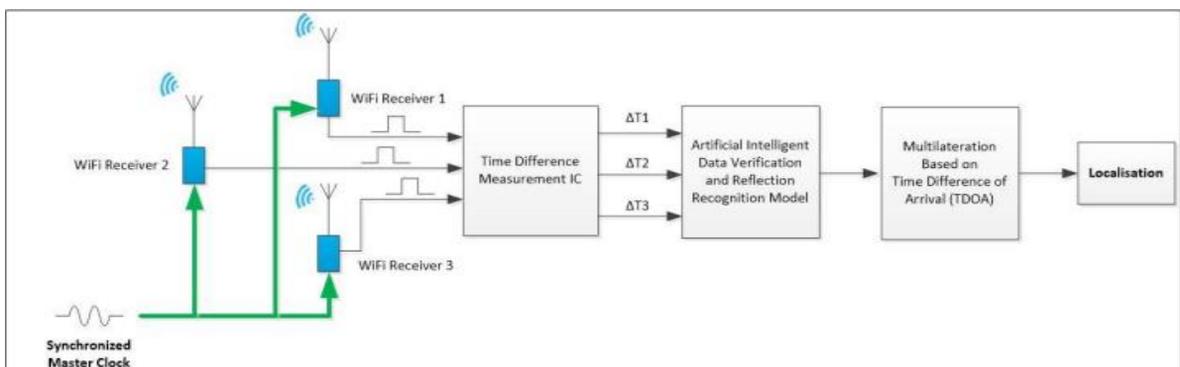
An integrated sensor arrangement system which accurately localizes smart devices (e.g., phones, tablets, watches, connected vehicle beacons) in traffic scenes without the use of visual-range sensors or GPS signals. Wireless sensors are methodically placed to detect Wi-Fi and/or Bluetooth signals emitted by these smart devices.

## *Key Benefits*

- ✓ Wireless sensors do not suffer from the same limitations of visual-range sensors such as cameras and LIDAR.
- ✓ The hardware configurations are far less expensive than competing technologies (e.g., radar, video cameras, and LIDAR).
- ✓ Sensor will utilize Bluetooth or wireless pings which represent a much lower battery drain

## *Development Stage*

Concept validation complete.



**Figure 1: System Block Diagram**



## **Details**

The proposed road safety wireless sensor:

- Makes use of high-precision measurement of Time Difference of Arrival (TDOA) technology to determine the location of the signal source.
- Observes road user positions in a traffic stream providing valuable information to transportation and automotive engineers. As a result, they can better predict delays, optimize signal timing, and estimate queue lengths.
- Improves traffic safety based on the awareness of road user proximity.

## **Research Team**

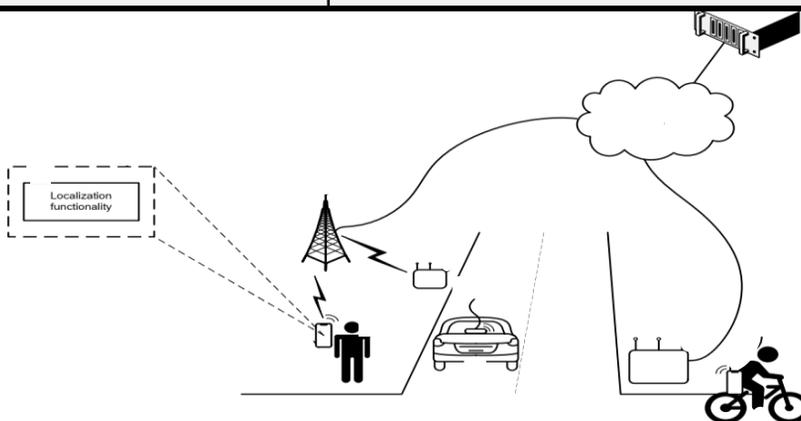
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## **Patents**

International Patent Application PCT/CA202/051465 filed Oct. 30, 2020

## **Publications**

S. Mohammadi, A. Ghods, and K. Ismail (2020), "Development of a Positioning Technique for Traffic Data Collection Using Wireless Signal Scanners," Transportation Research Record, vol. 2674(5), no. 3, pp.637–648.



**Figure 2: User detection using RF signals with number of locating devices having RF receivers and antennas. Each device can locate the source of signals Time Difference of Arrival (TDA) and trilateration. Each locating device may be at fixed known locations, or may be mounted on a vehicle**

***For more information about licensing and development opportunities, contact***

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