

Methods and Accuracy: From Large Satellite to Small Cellular Cells

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Abstract

Localization and positioning are terms used to denote the physical position or logical location of a mobile device or node with respect to some coordinate system (absolute or relative) or symbolic location. Various localization technologies and techniques (LDT) for outdoors (satellite cell) and indoors (small cell) exist but can be categorized mainly as satellite-based, network-based and hybrid approach. The LDTs use Global Positioning System (GPS), Assisted Global Positioning System (AGPS), Cell-Identity (Cell ID), Angle of Arrival (AOA), Time of Arrival (TOA), Extended Observed Time Difference (EOTD), Observe Time Difference of Arrival (OTDOA) and others to estimate user location. The hybrid approach uses more than one localization methods using signal hearability to fulfil service and E911 requirements. The LDT accuracy has become an increasingly important to public safety concern, because peoples have become more dependent on their mobile wireless devices. In the next generation Fifth Generation (5G), the deployment of small cells with different classes of base stations; macro-, pico-, and femto known as heterogeneous network (HetNets) over multiple Radio Access Technologies (multi-RATs) optimistically make indoor localization extremely more precise.