Abstracts

Mobile ranging using low-accuracy clocks

D.D. McCrady, L. Doyle, H. Forstrom, T. Dempsey and M. Martorana. "Mobile ranging using low-accuracy clocks." 2000 Transactions on Microwave Theory and Techniques 48.6 (Jun. 2000 [T-MTT] (Mini-Special Issue on the 1999 IEEE Radio and Wireless Conference (RAWCON))): 951-958.

Our position-location technique provides location information within milliseconds and is integrated in a handheld direct-sequence spread-spectrum (DSSS) communications system. We use a standard DSSS waveform, with a state of-the-art chipping rate to provide a position location capability to an accuracy of less than 1 m in a severe multipath environment. We use a two-way time-of-arrival (TOA) measurement technique with 1-ppm clocks that eliminates the need to synchronize master and reference radio clocks. Several techniques improve TOA and, therefore, range accuracy. A loop back calibrates internal system delay. Frequency diversity orthogonalizes multipath with respect to direct path, and leading edge curve fitting of the direct path reduces the effect of multipath. Applications include location of urban war fighters, firefighters, police, and medical personnel and resources.

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