Passive coherent location (PCL) systems use signals of opportunity to perform traditional radar detection, targeting, and tracking functions. Traditionally these signals include FM radio, digital TV, GSM, and GPS because of their availability in most urban environments. A benefit of having an abundance of signals is the ability to choose which of those best meet the desired system intentions. For example, one may want to choose a digital TV signal over an FM radio signal due to its range resolution characteristics. This work presents a novel algorithm for characterizing commercial signals for use in a PCL systems. By analyzing each signal’s ambiguity function in terms of amplitude, transmitter geometry, range and Doppler resolution, and sidelobe levels, a comparative evaluation can be made to decide which signals are best suited for an intended radar function. In addition, this research shows that multiple signals can be combined in the detection process to increase the probability of detection over that of a single signal. Finally, this research investigates the geometric considerations for PCL systems in terms of bistatic radar geometry. The results show zones of linear and non-linear relationships between time delay, range, and Doppler frequency.

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The public is welcome to attend.