

ABSTRACT

RADAR (*Radio Detection and Ranging*) is an electromagnetic system for detecting & getting the information of the target. Short-Range RADAR systems are different in theory and significantly different in operation from conventional radar. Conventional radar uses signal pulse in the transmission. Short-Range radar system uses continuous wave where this short-range radar system simultaneously transmit and receive, resulting in unusual radar architectures.

Due to the short-range geometry of target scenes (50m-100m), short-range radar system require wide bandwidths to achieve useful range resolution. These target scenes are full of clutter that requires coherent processing and detection algorithm. Furthermore, short-range radar systems operate in the near field, requiring special treatment in beamforming and imaging.

There are two mode of transmitted signal in this short-range radar system. *Continuous wave (CW)* signal and *frequency modulated continuous wave (FMCW)* signal. Continuous wave signal is used to observe physical phenomena, such as the Doppler spectra of moving targets or observation of nature in general. Frequency modulated continuous wave signal is used to achieve target ranging by modulating the the ramp signal into CW oscillator and by multiplying this transmitted waveform by what is scattered off of the target, range-to-target distance can be determined.

The final result of this final task is a short range radar system that fairly shopisticated in measuring target velocity and target range. Signal processing of scattered signal and its sampling process is done in PC.

Keywords: Short-Range RADAR, CW, FMCW, Clutter Rejection