

ABSTRACT

A car must know the distance and speed of the surrounding vehicle to overtake other vehicles and avoid collisions. If the distance and speed of the target are not monitored properly, it will have bad consequences which can lead to accidents. Therefore, a radar system is needed to monitor the distance and speed of the vehicle.

In this final project, research on the working principle of the 77GHz frequency radar system and simulates it to monitor the situation around the vehicle. In this case, simulations for vehicle distance and speed detection use FMCW (Frequency Modulated Continuous Wave) radar. FMCW radar has been widely used in measuring distance and speed due to simple signal generation. However, in FMCW radar detection there is a false-alarm interference which can cause the radar system performance to decrease. The use of the six-port method can suppress the false-alarm thanks to phasing difference measurements. From the measurement of the phase difference, it can be calculated distance that is not detected by FMCW radar.

Simulation results obtained from the FMCW radar system show a distance detection error of 3.4 %, while the FMCW radar system using the six-port method is 3.38 %. And speed detection shows good accuracy. It can be concluded that the performance using the FMCW radar system with the six-port method is better.

Keywords: *Radar, FMCW Radar, Six-port Radar*