

## ABSTRACT

Radio Detection and Ranging (Radar) is a system that works by emitting electromagnetic waves and detect feedback signals from an object that is able to provide information in the form of distance, position and speed of an object. Based on the signal sent, the radar can be divided into two, namely Pulse Wave (Radar Pulsa) and Continuous Wave. One type of continuous-wave radar is the Frequency Modulated Continuous Wave (FMCW) radar. FMCW radar uses frequency modulation of the waveform to allow a range measurement. The range resolution depends on the bandwidth.

One of software that can develop radar technology is Software Defined Radio (SDR). Implementation of GNU radio-based software defined radio (SDR) for designing a FMCW to detect vibrating targets. The use of SDR system in which its components are implemented by uses software as a substitute for hardware that is used as a mixer, filter, modulator / demodulator and so on to reduce cost and complexity in the design and implementation.

The FMCW radar system design is made with a bandwidth of 10 MHz and works with a modulation frequency of 1 kHz. In this test, using delay as vibration engineering. The simulation results obtained from the FMCW radar system for detecting vibrations can be proven by the phase shift and beat frequency. The phase shift can be seen, where the small vibration shifts as much as 0.001 seconds and the large vibration is 0.004 seconds. Whereas in the measurement using beat frequency, for small vibrations the peak reached 24 rad/s and large vibrations 25 rad /s.

**Keywords :** *Radar, FMCW, SDR, GNU Radio, Vibration*