

## ABSTRACT

Radio Direction and Raging (RADAR) are electromagnetic waves that can be used to detect an object and measure distances. A radar system generally consists of a receiver, transmitter, antenna, signal processing and data processing. Based on the signal sent, radar is divided into two, namely pulsed and continuous wave radars. One type of continuous wave radar is the Stepped Frequency Continuous Wave (SFCW) radar. The SFCW radar is capable of producing a wider range and producing a larger range.

One of the software developed in radar technology is Software Defined Radio (SDR). SDR is a software-based radio communication system which is currently being implemented and shows great potential and is one of the applications for implementing radar communication systems. SDR is used for radio circuit design, flexibility in operation, simplifies design and low cost. GNU Radio software SDR implementation for designing SFCW radars for detecting vibrating objects. In the use of the SDR system, components are implemented through software as a substitute for the hardware used such as mixers, filters, modulator / demodulator and so on.

In this final project, the design and simulation of the SFCW radar system is made with a bandwidth of 10 MHz and a cut-off frequency of 800 kHz. This simulation performs distance engineering using a delay of 600 ns, 610 ns, and 620 ns. The results of the detection of small shifts to see the phase when the delay is changed which proves the existence of vibrations against the phase shift and beat frequency. The greater the delay, the smaller the wave amplitude, but the frequency FFT does not change.

**Keywords:** SFCW Radar, SDR, Vibration, GNU Radio.