ABSTRACT

Many studies have been developing RADAR for small displacement detection including Synthetic Aperture RADAR (SAR) to detect the landslide, where a wide bandwidth is commonly used. This thesis propose a small displacement detection by using Continuous Wave (CW) RADAR. CW RADAR with its narrow bandwidth feature, make system realization become more simple compared to the system using a wide bandwidth.

CW RADAR can only detect the velocity of a dynamic target. Then, it underlie this thesis to modify the CW RADAR system by using dual frequency. This dual frequency, helps the system to recognize the displacement of a static target by processing its phase component on the echo signal.

This thesis performs a computer simulation by MATLAB and an experiment by HB100 motion sensor. The computer simulation result shows that the proposed RADAR is capable to detect a small displacement in milimeter scale. It simulated -3.5625 mm until 3.5625 mm of displacement with three value of bandwidth. The narrowest bandwidth that can be simulated is 0.3 MHz. In the experiment result, the bandwidth is set to 0.87 MHz. Then, it needs some improvement in order to make the result better.

Keywords: *continuous wave (CW) RADAR*, *small displacement*, *phase shift*.