

## ABSTRACT

Radar can track the position of an object very well, it has been widely applied in various fields, which is in defense systems that can detect missiles to predict the shape of their trajectory. Radar to detect an object works in a wide frequency range or Ultra-Wideband (UWB) so that it has high accuracy in detecting objects in the air. The Vivaldi antenna is used to get high-resolution results because it can work on UWB. To produce a high level of accuracy, this can be proven by the concept of Radar Cross Section (RCS) which observes the effect of reflectivity on each object orientation.

In this final project, an experiment was made to determine the effect of object orientation on missile trajectory with a radar system. The radar system was modeled using a Vector Network Analyzer (VNA) and simulation software. This experiment was carried out in several steps, namely making the experimental system design, collecting experimental data, processing the experimental data, and analyzing the experimental results. The types of orientation used in the experiment are  $0^\circ$ ,  $30^\circ$ ,  $60^\circ$ ,  $90^\circ$ ,  $120^\circ$ ,  $150^\circ$ , and  $180^\circ$ .

The experimental result of this Final Project is to produce an analysis of the effect of missile orientation on the prediction of its trajectory. Experiments using VNA resulted in an analysis of the effect of object orientation on missile detection. Result of experiments using simulation software and MATLAB2018 is proving the presence or absence of the effect of the object orientation on missile detection using a radar system.

**Keywords:** Missile, Orientation, Radar Cross Section.