

ABSTRACT

Based on the observation of the Aircraft Accident Investigation Commission for last ten years, the number of aviation accidents in Indonesia is five times more than the accidents in the U.S ^[6]. Seeing the number of aircraft accidents that occurred in this country makes questions about the system of the Air Traffic Control (ATC).

In this Final Task, it will determines the working principles of radar systems and simulate it for the application of air traffic monitoring system using the Doppler method. Where in the simulation plane is the object of a moving object with a certain speed, then when the radar signal on the object, it bounces the signal back to the radar system. Then radar systems process the information signal reflections to get the position, distance, speed, and the type of object object. Detection is obtained by comparing the amplitude of the signal with an amplitude threshold of radar. Then, if that signals has entered into a radar system, the distance, position and angle, can be measured by analyzing the time delay during signal transmitted through the signal back to the radar system, taking into account parameters of the radial velocity, PRI, PW, Stagger, sampling frequency, and digitizer noise. After the time and positions are known, the Doppler method can easily be used to determine speed and direction of different moves.

From the simulation results, the best detection system in radar system is to use the CFAR threshold mode, where the threshold is relative, it can be changed according to the object being detected. As for ranging or distance measuring, timing control of PW, PRI, stagger, and sampling frequency should be set up in accordance with the existing formula, as an example in this simulation, in order to detect the optimal system, the PRI is set 0.8 msec, PW is set in maximum 3% of PRI, and stagger required if the value of PRI is less than 0.8, and sampling frequency of 50 KHz. So by getting the appropriate variable timing control, the radar system will also be more accurate for detection.

Key words: Radar, Air traffic Control, Doppler.