

ABSTRACT

Visible Light Communication (VLC) is a communication technology that utilizes visible light as transmitter, air as a transmission medium, and photodiode as receiver. The Global Positioning System (GPS) working system can only be used to determine the position of objects that are outside the room / building this is because a weak GPS signal cannot penetrate the walls of the building, so VLC positioning technology is needed which can applied to determine the position of the object in the room.

In this Final Project analyze the positioning error value and accuracy using root mean square error (RMSE). Simulations in this research used the assumption of a room measuring $5 \times 5 \times 3 \text{ m}^3$. This research used 2 scenarios. Scenario 1 tests the location of receiver coordinates (2,2.5,0),(2.5,2,0), and (3,3,0). Scenario 2 tests the location of receiver coordinates (1.5,3.5,0), (2.5,1.5,0), and (3.5,3.5,0). There are 3 variations of the coordinates of 3 transmitters used to test the accuracy of VLC system by using TDOA method in detecting the location of receiver coordinates.

Simulation and analysis results in this Final Project showed that the location of transmitter position coordinates that have coordinates (0.5,4.5,3),(2.5,0.5,3), and (4.5,4.5,3) having the highest level of accuracy in scenario 1 has a value of RMSE 0.1569 and a positioning error of 0.5814 meters and scenario 2 has a value of RMSE 0.1247 and a positioning error of 1.0776 meters. The smaller the RMSE value and positioning error, the higher the accuracy of the estimated coordinates.

Key Word : Visible Light Communication, Time Difference of Arrival, Root Mean Square Error, Positioning Error, Accuracy