

## ABSTRACT

Swarm drones are drones that communicate with each other, the more drones that communicate, the heavier the communication network, therefore the aim of this research is to be able to make light communication between two drones using the Message Queuing Telemetry Transport (MQTT) data protocol. The reason this undergraduate thesis proposes MQTT is because the characteristic of the swarm (many) that is more suitable for using the MQTT publisher-subscriber scenario.

This thesis uses NodeMCU tools. NodeMCU is an IoT platform that uses the Arduino IDE programming language in this thesis. The protocol used is Message Queuing Telemetry Transport (MQTT) in the use of communication between drones. Because of the shortcomings of the HTTP protocol, the MQTT server protocol must be implemented to support the development of the IoT platform. MQTT is a lightweight and simple communication protocol. The MQTT protocol is also designed for devices with limited capabilities, low bandwidth, high latency and less reliable networks. To transfer data communications, this thesis employs hardware in the form of a NodeMCU Micro-controller Unit and a mobile hotspot from a cell phone supported by the LTE network. The service set identifier (SSID) and password for the modem router are replaced with the SSID, password, and NodeMCU, which originate from the Node MCU code itself. It was made with MQTT in this thesis, and the system works with MQTT for mosquitoes from two drones.

The plan outcome is that two drones will be able to communicate reliably utilizing the MQTT data protocol and a mosquito shaped MQTT broker. After conducting the test, the results of testing network quality with QoS parameters are delay, jitter, packet loss, and throughput. The average delay of MQTT QoS 0 is 0.103 s, MQTT QoS 1 is 0.111 s, and HTTP is 0.124 s. HTTP and MQTT QoS 0 get 0% packet loss, while MQTT QoS 1 gets 0.1% packet loss. Throughput on the MQTT protocol is faster than the HTTP protocol. And the network quality of the MQTT protocol is better than HTTP.

Keywords: MQTT, HTTP, IoT, Subscribe, Publish and Broker.