ABSTRACT

One of the defining factors in deciding the success of a Search and Rescue (SAR) operation during a natural disaster is in how quickly survivors can be found and delivering life-sustaining items for said survivors. The usage of Unmanned Aerial Vehicles can support SAR operations, and to improve the coordination between UAVs, an inter-UAV communications algorithm is developed. The type of network model being used is a Flying Ad-hoc Network (FANET), and the communications technology chosen to build the FANET is Wi-Fi by using ESP32 microcontrollers and the PainlessMesh library. This research built a mesh network of ESP32 nodes, with each drones being placed 30 meters apart, in which it is able to send GPS location data from the sender drone to the receiver drone with a maximum packet loss of 89 percent, median throughput of 4908,504 B/s, and median round-trip delay of 164 ms. Overall tests resulted in inconclusive correlation between throughput/round-trip delay and RSSI, with non-flying tests showing negligible correlation while flying tests resulting in moderate correlation between throughput/round-trip delay and RSSI.

Keywords: PainlessMesh, ESP32, Unmanned Aerial Vehicles, Drone, Network Communications