ABSTRACT

One of the most important aspects of an affective disaster response is the ability to communicate effectively, either between emergency responders with each other, or between emergency responder and victims. Reliable and clear communication is necessary in order to coordinate more effectively. However, disasters are often damaging to the infrastructure of the area, which make establishing communication difficult. As such, this project aims to create a system that can quickly establish an emergency communication network that is stable, reliable, and is dynamic enough to be able to adapt to the local situation, which may be unpredictable and ever-changing.

The data collection was gathered using testing of the performance of the drone and the mesh network running on the Onion Omega 2+. The tests were done on varying conditions, which tests the system's coverage, flexibility, operational duration, and latency. The system should ideally be functioning independent from the local infrastructure. The proposed solution involves using an 802.11s Wireless Mesh Network which acts as the main backbone of the system. This network is running on Onion Omega 2+ IoT devices, which are connected to HolyBro V2 drones. The drones will fly over the affected area, allowing access to the network to any devices in the area.

The proposed method provides internet access up to 50-60 meters with the setup time of the ground control station and drone of only 1-2 minutes on average. The drone can fly for up to 30 minutes before it needs to change its battery. The mesh connection has a throughput of up to 26.54 Mbps using Ookla test and 17.1 Mbps using iPerf test. The mesh connection has an SNR between 6 to 36 dBm depending on the distance.

Keywords: Disaster Response, Drone, Onion Omega 2+, Telecommunication, Wireless Mesh Network