The continuous increasing growth in the number of connected wireless devices leads to an increasing demand for network connectivity. The recent development of the society has caused new types of problems such as gaps of depopulation, population aging, and income between urban areas and local areas. The gap of communication networks is also one of the major problems, and the poor network circumstance in local areas might affect the future Medicare or welfare services by using Information Technology. Also, when there is a natural disaster such as earthquakes tornadoes, tsunamis and other geologic processes these local areas are likely to be isolated from others because of the possibility disconnection of communication cables or breakdown of network devices. Therefore, aerial networks may play an important role by extending the concept of wireless access networks.

This paper describes and analyses one of the most promising applications of Unmanned Aerial Vehicles, more commonly known as drones, in the field of wireless communications: Extending the capacity or coverage area of wireless systems through the deployment of aerial communication networks. Presented in this paper is a comprehensive characterization study of an experimental system to deploy an aerial WIFI network. To do so, a Raspberry Pi 3 b+ board was appropriately configured and equipped as a network access point playing either the role of an access point using the 802.11a(5GHz) and 802.11g(2.4GHz) protocols. This device was then integrated onboard a drone. To be able to monitor these protocols in terms of their network performance a dedicated tool was used which was able to scan the area from different physical locations.

The findings which were found when conduction this experiment was divided into four sections. The sections on which the WIFI nodes were assessed on are coverage area, throughput, signal strength and energy efficiency. All of these finding were compared with theoretical studies which were performed before doing the real-world tests. Preliminary the results revealed that there is a trade-off between the theoretical study and real-word tests, it was seen that some losses were encountered during the tests. These results lead to the conclusion that the 802.11g mode performs better for long range, and energy efficiency, where the 802.11a mode is more ideal for short range.

Taking all these factors into consideration a drone can be found useful to be used for extending wireless networks however due to the complexity and time restriction this area merits further investigation for improvements mainly using an external antenna added to the Raspberry Pi board to try to increase the speed and range from where the network can be reached