ABSTRACT

Indonesia is the country with the largest plantation in the world, especially tea. With the vast area of land from plantations, it makes the planters have difficulty in monitoring the land, so that the impact on the harvest is obtained. At present, research on plantations, especially tea plantations, is still very little, as technology develops researchers are more interested in researching technology that is intended for urban areas, while technology intended for plantations and agriculture is still very rare. Unmanned Aerial Vehicle (UAV) or drone is proposed to be a solution to overcome this problem. But drones have limitations in power consumption, the drones can only last 30 minutes in the air, so an optimum path is needed to save energy efficiency in shooting in the air.

Design Autonomous drone control for monitoring tea plantation is a technique for monitoring tea plantations in the air. Drones used will be a solution for planters to be able to better monitor the land. The purpose of this research is to create a control system for drones to be able to monitor tea plantations in the air. In addition, the optimum path of the drone is needed to determine energy efficiency and good image results. The energy efficiency that is obtained must be able to be received with the results of the images obtained. The algorithm proposed in this study is Dynammic Programming to create a graph and look for possible paths encountered and the kruskal algorithm to calculate the paths generated from Dynammic Programming. This algorithm is used for the network , This algorithm will be implemented for finding the optimum path for taking picture. Drone for this research will be used for taking the information data, information from this research is tea leaves. In previous research, the Drone only included sensing data in the form of a landing pad to land the drone automatically, which could still be developed again. Therefore, in this research we use drones that can work well to overcome the need for monitoring tea gardens.

From the initial data, there are 3 different data, including height, path and image. From these data, 2 heights were taken which met the requirements for calculation, namely 100m and 80m. The results obtained from the height of 100m, obtained the optimum path for shooting with the assumption that the image error is 4 %, 2 % smaller than the previous data which is 6 %. In addition, using both algorithms has an impact on better power consumption. At a height of 100m there is a power consumption of 29 % or 25Wh each iteration, this result is better 26 % or 23Wh compared to the initial 100m data which has an average power of 55 % or 49 Wh each iteration, but the image results from 100m are different with the initial data so that the 100m height is not recommended. The 80m height is obtained by the optimum path for shooting assuming the image error is 3 %, this value is 1 % better than the previous one which had a 4 % error the results of the images obtained are still the same as the initial data. the average power consumption is 29 % or 25.8 Wh each iteration, this result is better 17 % or 15Wh than the initial 80m data which has an average power of 45.1 % or 40 Wh each iteration. So from the results of research that has been obtained in the field, one height is appropriate for monitoring tea gardens at the Research Institute for Tea and Cinchona (PPTK) with image accuracy rates above 95 %, which is 80m high and the optimum path that has been found to make the value of power consumption is more efficient than before. The results that have been obtained will be a solution where tea planters can use drones to monitor gardens in PPTK gambung, ciwidey.

Keywords: *Unmannedd Aerfly Vehicle, Monitoring, Tea Plantation, Dynamic Programming,Kruskal.*