

Analysis Mapping of Long Dry With Drone Type Dji Spark in Hargowilis, Kokap, Kulonprogo

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Abstract

This research was conducted in the village of Hargowilis, Kokap District, Kulon Progo Regency with a temperature of 31°C, with a wind speed of 13 km/h, 55% air humidity, and a height of 35 m from the ground surface. This research was carried out on November 8, 2019 with hot weather conditions and wind speeds of around 13 km/hour. The purpose of this study is to map the drought area in Mount Menoreh Hargowilis Village, Kokap, Kulon Progo. The method used in this study are preparation for making a drone, survey of area Menoreh hills in Hargowilis, Kokap, Kulon Progo planning testing at certain altitude in the air; calibration drone; taking aerial photograph in area long dry and then analysis of data then mapping the area in Hargowilis, Kokap, Kulon Progo. Calibration drone DJI Spark is the way to calibrate the drone is automatically. When the drone is turned on it automatically calibrates the accelerometer; gyrometer; and GPS Drones use rotors for propulsion and control. Rotating rotors push air down, to be able to fly forward, it requires a push from the rotor. When the rotor presses air, air pushes the rotor. Lift force to control the force up and down. The faster the rotor rotates, the greater the lift. Multicopter has the advantage of being stable against wind speed. The battery capacity of drone is 2200 mAH with camera DJI Spark. Drone time used in this study ranges from 15 minutes at a speed of 30 mph. Aerial photo results show that the Hargowilis area, Kokap, Kulon Progo Regency experienced a drought so that the Menoreh Hills became a deforested forest.

Keywords: Drone, Long Dry, Mapping, Photography, Kokap

1. Introduction

The function of drone are mapping are flood, landslide, long dry, military, exploration, agriculture, and development tourism in the world. Drone multicopter have four or more propeller but drone type fixed wing have two wing. There are two types of drone are multicopter and fixed wing. Drone type fixed wing can be seen in **Figure 1** and multicopter can be seen in **Figure 2**. Research in Girimulyo, Kulon Progo with multicopter for mapping landslide can be seen in Figure 3. (Suroso, I., 2019) The Menoreh Mountains are located in the village of Hargowilis, Kokap, Kulon Progo. Land and mountain conditions Menoreh experiences drought and water shortages, dry soil conditions and deforested forests. The purpose of this study is to map the drought area in Mount Menoreh Hargowilis Village, Kokap, Kulon Progo. This study uses a DJI Spark multicopter type drone.



Fig. 1. Fixed wing
(Suroso, I., 2018)



Fig. 2. Drone type multicopter (Suroso, I., 2019)



Fig. 3. Research in Girimulyo, Kulon Progo with multicopter for mapping landslide (Suroso, I., 2019)

2. UAV Type Multicopter

The multicopter drone studied in Lampung for mapping area stadion can be seen in Figure 3. (Suroso, and Irmawan, 2018)



Fig.3. Results Of Fixed Wing Air Photos In Lampung Area (Suroso, I and Irmawan, E., 2018)

This drone is operated for 15 minutes at the entrance of the New Yogyakarta International Airport in Kulonprogo can be seen in Figure 4. (Suroso I., 2018)

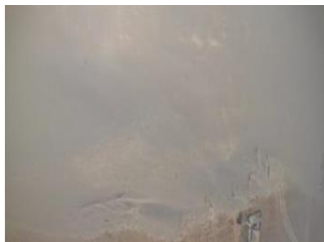


Fig. 4. Result of mapping from north Congot Beach and entrance area of New Yogyakarta International Airport (NYIA) in Kulonprogo in Congot Beach (Suroso, I., 2018)

Research with drones for aerial photographs of landslides in Somangari, Kaligesing, Purworejo can be seen in Figure 5. (Prasetyo and Suroso, 2018)



Fig. 5. Mapping of landslide in Somangari, Kaligesing, Purworejo (Prasetyo, E.E and Suroso, I., 2018)

Research with drones for aerial photography of the entrance of New Yogyakarta International Airports can be seen in Figure 6. (Suroso, I and Irmawan, E., 2018)



Fig. 7. West to the gate 35 meters above ground level (Suroso, I and Irmawan, E., 2018)

The Drone study in Plumbon Village, Temon Subdistrict, Kulonprogo Regency has four propellers, which are used to map the southern route to the entrance of New International Yogyakarta Airports. (Suroso, I., 2018) Study of landslides in a forest area in Tasliciftlik, Turkey using UAVs and analyzed using PIX4D software. (Afif, H. A., et al., 2019). 3D mapping with UAVs has the advantage of being cheaper and applying it to the geographical information system of agricultural land in Lafia, Nigeria. (Ajayi, O. Get al., 2018). Research on landslide mapping in Jombang, East Java using a UAV. (Cahyono, A. B., & Zayd, R. A. 2018) UAV and TLS (Terrestrial Laser Scanner) are unmanned aircraft that are small in shape, cheap in price and useful for 3D mapping. (Calantropio, A., et al., 2018). The drone by the name of Lusi has a CH4 and CO2 sensor with an infrared camera to take aerial photographs. (Di Stefano, G et al., 2018) UAVs are able to map aerial photographs geologically and morphologically in the Mount Pletzachkogel area in Tyrol, Austria. (Erharter, G. H., et al., 2019) UAV with a digital elevation model system can map aerial photographs nicely in landslides with a DJI Phantom camera. (Gupta, S. K., & Shukla, D. P., 2018). UAVs with quadcopter types can map 1000 Ha land for PTSL (Complete Systematic Land Registration) with very high costs in the area of Desa Solokan Jeruk, District of Solokan Jeruk, Bandung Regency. (Hartono, D., & Darmawan, S., 2018). Drones with low cost can also be used to map areas affected by malaria. (Hardy, A., et al., 2017) Digital Earth system drones on aerial video drones are very good for mapping and ongoing research. (Kim, S. J et al., 2018) Research on mapping landslide-prone areas in Somangari Village, Kaligesing District, Purworejo Regency using a camera mounted on a drone. (Prasetyo, E. E., & Suroso, I., 2018) Research in the

area of flood and landslides with UAVs in Galih Village, Lampung. (Rohman, A., & Prasetya, D. B., 2019) Low altitude UAVs produce good aerial photography. (Saad, A. M., & Tahar, K. N., 2019) Multicopter with a good Compton camera produces aerial photographs of radioactively contaminated buildings at the Fukushima Daiichi Nuclear Power Plant. (Sato, Y., et al., 2018). Mapping areas of land drought due to the long dry season on Batam Island is done by remote sensing system. The biggest potential for drought is in Sekupang District, Batam. (Lubis at al., 2017)

3. Method

- A. Location : The area around Hargowilis, Kokap, Kulonprogo, Yogyakarta
- B. Instrument : Drone type multicopter.
- C. Method:
 1. Preparation and assembly of drone in Hargowilis, Kokap, Kulon Progo.
 2. Study from reference about drone.
 3. Plan altitude drone fly in the sky.
 4. Testing drone in Hargowilis ground and calibration the drone.
 5. Calibration the drone is the way to calibrate the drone is automatically. When the drone is turned on it automatically calibrates the accelerometer; gyrometer; and GPS.
 6. Primer source about specification of drone, observation, and interview then secunder source about references.
 7. Check flight and drone testing in Hargowilis, Kokap, Kulon Progo, Yogyakarta.
 8. Result of aerial photos and analysis.
 9. Conclusion.

D. Flowchart can be seen in Figure 8.

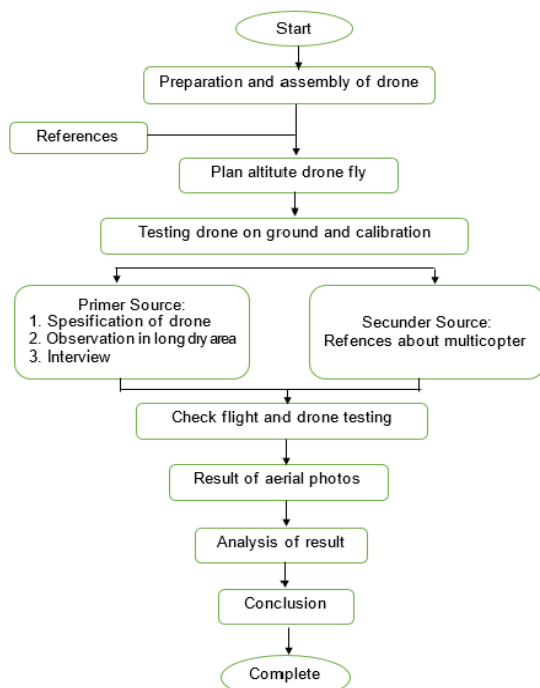


Fig. 8. Flowchart

4. RESULT AND DISCUSS

The surface condition of the land in Hargowilis Kokap, Kulon Progo is very dry, soil cracks occur, and experience water shortages. The Menoreh Mountains are barren, no trees grow. This research was conducted in the village of Hargowilis, Kokap District, Kulon Progo Regency with a temperature of 31°C, with a wind speed of 13 km/h, with 55% air humidity, and a height of 35 m from the ground surface. Drone with camera DJI Spark can be seen on **Figure 10** and remote control can be seen in **Figure 9**. This research was carried out on November 8, 2019 with hot weather conditions and wind speeds of around 13 km/hour. Multicopter has the advantage of being stable against wind speed. The battery capacity of drone is 2200 mAh with camera DJI Spark. Drone time used in this study ranges from 15 minutes at a speed of 30 mph. Drone takeoff weight is about 300 grams with a size of 143x143x55 mm drone. The remote control has a 2970 mAh battery with temperatures of 32 to 40°C. The battery in the drone has a capacity of 1480 mAh, voltage of 11.4 Volts with 16.87 WH of energy and a type of LiPo 35 battery.



Fig. 9. Remote of drone



Fig. 10. Drone DJI Spark

Figure 11, Figure 12 and Figure 13 shows that the drought in the hills of Menoreh, Hargowilis, Kokap, Kulon Progo has become a concern for the Kulon Progo Regional Government because it is prone to drought. Drone with fly altitude 50 meters.

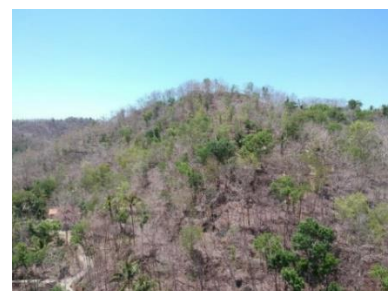


Fig. 11. Drought-prone areas in the Menoreh Hills, Hargowilis, Kokap are seen from the south side. Drone with fly altitude 50 meter



Fig.12. Drought-prone areas in the Menoreh Hills, Hargowilis, Kokap are seen from the west side. Drone with fly altitude 50 meters



Fig.15. Menoreh Hill which is dry and bald is photographed with fly altitude 50 meters



Fig. 13. Drought-prone areas in the Menoreh Hills, Hargowilis, Kokap are seen from the east side. Drone with fly altitude 50 meters



Fig. 16. Menoreh Hill which is dry and bald is photographed with fly altitude 50 meters. It seen from the east side

Figure 14 shows the road to the Sermo Reservoir was photographed 50 meters high by crossing the bald Menoreh hills. **Figure 15** shows Menoreh Hill which is dry and bald is photographed with a height of 35m. **Figure16** Menoreh Hill which is dry and bald is photographed with a height of 50 meters. It seen from the east side. **Figure 17** Menoreh Hill which is dry and bald is photographed with a height of 35m. It seen from the southeast side. **Figure 18** Menoreh Hill which is dry and bald is photographed with a height of 50 meters. It seen from the south side. **Figure 19** The road to the Sermo Reservoir was photographed 50 meters high by crossing the bald Menoreh hills. It can be seen from west side. **Figure 20** The road to the Sermo Reservoir was photographed 50 meters high by crossing the bald Menoreh hills.



Fig. 17. Menoreh Hill which is dry and bald is photographed with with fly altitude 50 meters. It seen from the southeast side

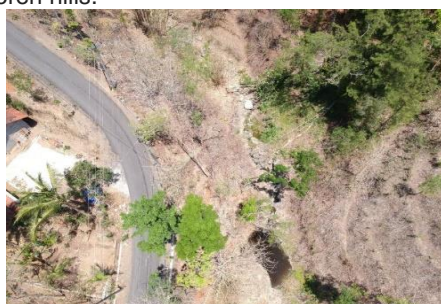


Fig.14. The road to the Sermo Reservoir was photographed with fly altitude 50 meters by crossing the bald Menoreh hills

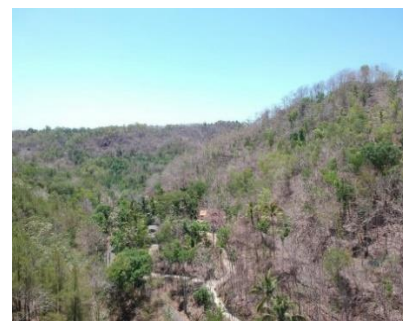


Fig.18. Menoreh Hill which is dry and bald is photographed with with fly altitude 50 meters. It seen from the south side



Fig.19. The road to the Sermo Reservoir was photographed with fly altitude 50 meters high by crossing the bald Menoreh hills. It can be seen from west side



Fig.20. The road to the Sermo Reservoir was photographed with fly altitude 50 meters high by crossing the bald Menoreh hills.

CONCLUSION

This research was conducted in the village of Hargowilis, Kokap District, Kulon Progo Regency with a temperature of 31°C, with a wind speed of 13 km/h, with 55% air humidity, and with fly altitude 50 meters from the ground surface. This research was carried out on November 8, 2019 with hot weather conditions and wind speeds of around 13 km/hour. Multicopter has the advantage of being stable against wind speed. The battery capacity of drone is 2200 mAH with camera DJI Spark. Drone time used in this study ranges from 15 minutes at a speed of 30 mph. Aerial photo results show that the Hargowilis area, Kokap, Kulon Progo Regency experienced a drought so that the Menoreh Hills became a deforested forest.

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