Analysis Mapping of Long Dry With Drone Type Dji Spark in Hargowilis, Kokap, Kulonprogo
Indreswari Suroso 1,*, Hendriana Helda Pratama 2
1,2 Aeronautical Studies Program of Yogyakarta Higher Aeronautical Technology School
*Corresponding author e-mail: indreswari.suroso@gmail.com

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 Regency.

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)
2. UAV Type Multicopter

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

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

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

Research with drones for aerial images of areas affected by malaria. (Hardy, A., et al., 2018) Digital Earth system drones on aerial video drones are very good for mapping and ongoing research. (Kim, S. J et al., 2018)
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 second 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.

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

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. Figure 16 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. 14. The road to the Sermo Reservoir was photographed with fly altitude 50 meters by crossing the bald Menoreh hills

Fig. 15. Menoreh Hill which is dry and bald is photographed 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

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

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

Acknowledgements
The author acknowledge to the head of College of Aerospace Technology in Yogyakarta of which have provided the opportunity this research.

References
Afif, H. A., Saraswati, R., & Hernina, R. (2019). UAV Application for Landslide Mapping in Kuningan Regency, West Java. In E3S Web of Conferences (Vol. 125, p. 03011). EDP Sciences.
Ajayi, O. G., Palmer, M., & Salubi, A. A. (2018). Modelling farmland topography for suitable site selection of dam construction using unmanned aerial vehicle (UAV) photogrammetry. Remote Sensing Applications: Society and Environment, 11, 220-230.

Cahyono, A. B., & Zayd, R. A. (2018, March). Rapid mapping of landslide disaster using UAV-photogrammetry. In journal of physics: conference series (Vol. 974, No. 1, p. 012046). IOP Publishing.
Calantropio, A., Chiabrando, F., Rinaudo, F., & Losè, L. T. (2018). Use and Evaluation of A Short Range Small Quadcopter and A Portable Imaging Laser for Built Heritage 3D Documentation. International Archives of The Photogrammetry, Remote Sensing & Spatial Information Sciences, 42(1).
Di Stefano, G., Romeo, G., Mazzini, A., Iarocci, A., Hadi, S., & Pelphrey, S. (2018). The Lusi drone: A multidisciplinary tool to access extreme environments. Marine and Petroleum Geology, 90, 26-37.
Erhart, G. H., Kieffer, D. S., & Prager, C. (2019). UAV-Based Discontinuity Analyses and Rock Fall Source Mapping in Alpine Terrain (Pletzachkogel/Tyrol/Austria). In IAEG/AEG Annual Meeting Proceedings, San Francisco, California. 2018-Volume 1 (pp. 317-323). Springer, Cham.
Gupta, S. K., & Shukla, D. P. (2018). Application of drone for landslide mapping, dimension estimation and its 3D reconstruction. Journal of the Indian Society of Remote Sensing, 46(6), 903-914.
Hardy, A., Makame, M., Cross, D., Majambere, S., & Msellem, M. (2017). Using low-cost drones to map malaria vector habitats. Parasites & vectors, 10(1), 29.
Hartono, D., & Darmawan, S. (2018). Pemanfaatan Unmanned Aerial Vehicle (UAV) Jenis Multicopter untuk Percepatan Pemetaan Bidang Tanah (Studi Kasus: Desa Soloran Jeruk Kabupaten Bandung). REKA GEOMATIKA, 2018(1).
Lubis, M. Z., Taki, H. M., Anurogo, W., Pamungkas, D. S., Wicaksono, P., & Apriliyanti, T. (2017, December). Mapping the distribution of potential land drought in Batam Island using the integration of remote sensing and geographic information systems (GIS). In IOP Conference Series: Earth and Environmental Science (Vol. 98, No. 1, p. 012012). IOP Publishing.
Kim, S. J., Jeong, Y., Park, S., Ryu, K., & Oh, G. (2018). A survey of drone use for entertainment and AVR (augmented and virtual reality). In Augmented Reality and Virtual Reality (pp. 339-352). Springer, Cham.
Prasetyo, E. E., & Suroso, I. (2018). Analisis Pemetaan Daerah Rawan Longsor Dengan Drone Type Multicopter Di Semangari Kecamatan Kaligesing Kabupaten Purborejo. Teknika Stikft: Jurnal Teknik, Elektronik, Engine, 5(2), 5-15.
Rohman, A., & Prasetya, D. B. (2019, August). Rapid Mapping for Simple Flood Mitigation Using Commercial Drone at Way Galih Village, Lampung, Indonesia. In Forum Geografi (Vol. 33, No. 1).
Saad, A. M., & Tahar, K. N. (2019). Identification of rut and pothole by using multirotor unmanned aerial vehicle (UAV), Measurement, 137, 647-654.
Sato, Y., Ozawa, S., Terasaka, Y., Kaburagi, M., Tanifuji, Y., Kawabata, K., ... & Torii, T. (2018). Remote radiation imaging system using a compact gamma-ray imager mounted on a multicopter drone. *Journal of Nuclear Science and Technology, 55*(1), 90-96.

Suroso, I. (2018). Analisis Pemetaan Daerah Rawan Banjir Dan Longsor Dengan Drone Type Multicopter Di Girimulyo, Kabupaten Kulonprogo. *Teknika Sttkd: Jurnal Teknik, Elektronik, Engine*, 5(1), 34-43.

Suroso, I. (2018). Analisis Peran Unmanned Aerial Vehicle Jenis Multicopter Dalam Meningkatkan Kualitas Dunia Fotografi Udara Di Lokasi Jalur Selatan Menuju Calon Bandara Baru Di Kulonprogo. *REKAM: Jurnal Fotografi, Televisi, dan Animasi*, 14(1), 17-25.

Suroso, I. (2018). Analysis Of Mapping Multicopter Drones In The Entrance Area Of Prospective New Airports In Congot, Temon, Kulonprogo, Yogyakarta. *Journal of Applied Geospatial International*, 2(2).

Suroso, I. (2019, June). Analysis of Mapping Area of Flood With Drone Type Multicopter in Girimulyo, Kulonprogo. In *IOP Conference Series: Earth and Environmental Science* (Vol. 271, No. 1, p. 012013). IOP Publishing.

Suroso, I., & Irmawan, E. (2018). Analysis Of Aerial Photography With Drone Type Fixed Wing In Kotabaru, Lampung. *Journal of Applied Geospatial Information*, 2(1), 102-107.

Suroso, I., & Irmawan, E. (2019). Analysis of UAV multicopter of air photography in New Yogyakarta International Airports. *TELKOMNIKA*, 17(1), 521-528.

Widodo, A. W., Budisusanto, Y., & Cahyono, A. B. (2019). Development of Land Information Maps (PIBT) Through Community Participation Using Quadcopter UAV (Case Study Desa Pojok, Kec. Tawangsari, Kab. Sukoharjo). *IPTEK Journal of Proceedings Series*, (2), 22-27.