UNIVERSITI TEKNOLOGI MARA

ASSESSMENT OF DEM GENERATED BY UAV PHOTOGRAMETRY FOR VOLUME CALCULATION

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ABSTRACT

Volume calculation are apart of measurement of engineering survey where it needed to know the total materials available and to manage quantities. To calculate volume precisely and accurate, ground survey need to be done by surveyors which is also take more cost, man power, and also time taken to calculate volume of material available. The most effective technique for volume calculation again large amount of stockpile is photogrammetry. The aim of this study is to test the capability of unmanned aerial vehicle (UAV) in volumes measurement. The main software that will be use in this study is Agisoft Metashape and Global Mapper. Method used in this research is compare the result of volume between UAV and total station survey. The result is comparing RMSE, area, volume, and surface of the DEM generated by both method. Base on the result, the different of UAV and total station survey is 2.951%. Importance of this study is surveyor will be more confident to make volume measurement using UAV in future project.

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Alhamdullilah, thanks to Allah finally I manage to complete this study after being struggled almost one year of hard worked and be patient. During finishing this study, a lot of challenges I faced but I still strong until now to finish it. I have learn a lot of things in term of knowledge and experience. Thanks a lot to my beloved parent because they always support and gave me strength inside heart and soul to finish this. I also want to thankyou to my friends that always by my side when I need help especially in field survey that required team to collect data. Without them, I maybe not be able to finish this study.

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At last, I just shared my knowledge and experience about this study and hope it will help a lot of people especially surveyor in conducting their survey using UAV against volume measurement.

TABLE OF CONTENT

CHAPTER 1

INTRODUCTION

1.1 Background of study

Volume is measurement value of space inside some solid objects that can be in form of cylinder, pyramid, and cube volume where the amount of three dimensional space in some closed boundary (Ghilani & Wolf, 2012; Rahman et al., 2017). Nowadays, volume calculation are mostly use in surveying and engineering purposes. In surveying, there are several unit measurement of volume such as cubic yard, cubic feet, and cubic meter. Various type and material of building is defined as earthwork. In quarry, volume calculation is needed to know the total materials available and to manage in and out quantities. In contact of stockpile volume management, its important to know the quantity of stocks left in inventory for easy management and sale operation. In construction contact, the calculation must be accurate in order to know the cost or budget of that project. In surveying, photogrammetry is an effective way to deal with large area with faster data collection by airplane or unmanned aerial vehicle (UAV).

Currently the UAV systems have become an alternative for different engineering applications (Siebert and Teizer, 2014). In engineering surveying, there are many methods to calculate volume which is ground survey, aerial survey, and hydrographic survey. Normally in ground survey, volume can be obtain by using tachometry survey which is consume more times. However there are several application to calculate volume which is aerial data capture by UAV (Mat, Tarmizi, Din, & Samad, 2014), terrestrial laser scanning (Zhao, Lu, Koch, & Hurdsman, 2012), and ground positioning system (GPS) using RTK method (Raeva, Filipova, & Filipov, 2016), and UAV proven can give a accepted result in volume.