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Area Calculation Using Drone

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ABSTRACT: The applications of unmanned aerial vehicle (UAV) for slope mapping and also its important parameters including perimeter, area and also volume of certain selected area. With the development of modern technology, the utilization of UAV to gather data for slope mapping becoming easier as it is quick, reliable, precise, cost-effective and also easily to operate. Modern UAV able to take high quality image which essential for the effectiveness and nature of normal mapping output such as Digital Surface Model (DSM) and Digital Orthophoto. This photo captured by UAV willlater transfer to commercial software to generate full map of study area. With the help of established software, the measurement of selected study areas can be determined easily which can be considered as the main interest in this study.In addition, another outcome of this study is, this modern method of mapping will be compared to traditional method of mapping which proven to be more effective in term of low costing, low time consuming, can gather huge amount of data within short period of time, low man power needed and almost no potential risk of hazardous effect to man.

KEYWORDS: Unmanned Aerial Vehicle (UAV), K.K.2.1.5 Flight Controller.

I. INTRODUCTION

Nowadays, the instruments use for data acquisition in geological topography have been rapidly improved. With the development of modern technology, the equipment used to gather all information related to earth surfaces becomes cheaper, smaller, accurate and can gather large amount of data within a short period of time. These devices are light, mobile, easily to operate, completely automated and providing access to almost unavailable study areas. Advances in UAV technology have enabled the acquisition of high-resolution and real time aerial images for photogrammetry.[1] Dueto their low cost and versatility, Unmanned Aerial Vehicles (UAVs), also known as aerial drones or drones for short, are being utilized in many applications such as traffic monitoring, parcel delivery, surveillance and reconnaissance, environmental and desertification monitoring, drone-based wireless internet delivery, drone taxis, to name a few. In many of these applications, the drone regularly travels to the same location(s) to collect data or drop shipments with drone navigation achieved through human operators or autonomously. The latter mode relies on onboard sensors, such as Inertial Measurement Units (IMU) and Global Positioning [2].

A] **Scope of Project**

1. Infrastructure: -When it comes to designing and constructing new roads and bridges, infrastructure companies need toknow the details of the surrounding.
2. Archaeology: -Before archaeologists conduct digs, they need to survey the area to decide whether or not it looks like a promising location. Using drones allows them to do so quickly and at minimal expense, saving them time and allowingthem to pinpoint interesting areas.
3. Mining: - Quarries and open mines can be dangerous areas for traditional surveyors, but mining companies often need a mapping of their worksites. UAVs provide an excellent method of capturing aerial images and creating computer models while keeping their surveyors as safe as possible.
4. Farming: -In Farming it can be used for the calculating the farm. It will be easier to the farmers to know the accurate size of their farm.

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II. RELATED WORK

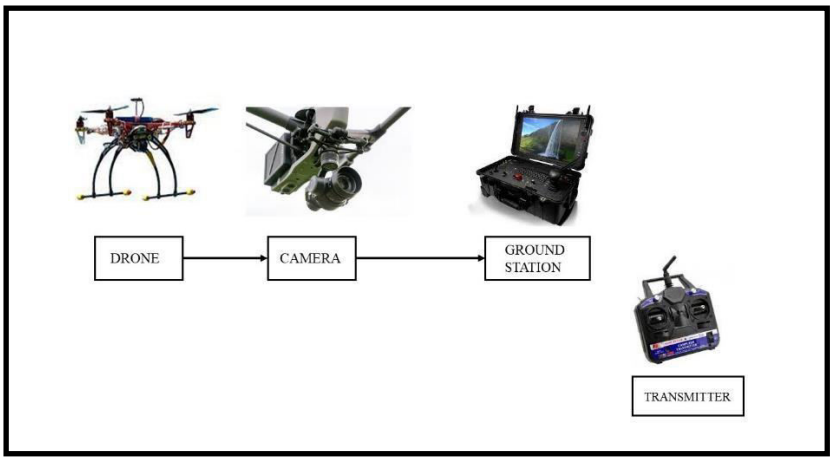

Fig.no.2.1 Block Diagram of System

Drone: - Drone is going to be used as the platform which will help to get the aerial image at a desired height. Camera: - Wireless cameras work by transmitting video and audio through radio waves. The data they capture is sent toa receiver. This camera communicates over Wi-Fi.

Ground Station: - Ground Station actually consist of laptop or computer. With the Software setup installed in the system. This software is used to get the expected outcome.

Receiver: - Fly sky is the transmitter receiver. A Drone Radio Transmitter is an electronic device that uses radio signalsto transmit commands wirelessly via a set radio frequency over to the Radio Receiver, which is connected to the drone being remotely controlled.

Quadcopter Frame: - A quadcopter, or multirotor, drone, or quadrotor, is a simple flying unstable, and require a flightcomputer to convert your input commands into commands that change the RPMs of the propellers to produce the desired motion. It is a Mechanical vehicle that has four arms, and in each arm, there is a motor attached to a propeller.

KK Flight Controller: - It takes the signal from the gyro then passes the signal to the Atmega which then processes these signals according the user's selected firmware and passes control signals to the installed Electronic Speed Controllers (ESCs). These signals instruct the ESCs to make fine adjustments to the motors rotational speed which in turn stabilizes your multi-rotor craft.

Electronic Speed Control: - It has super current endurance. It also has multiple protection features like low voltage cut-off protection, over-heat protection, and throttle signal loss protection. It is compatible with fixed-wing aircraft and helicopter with smooth, linear and precise throttle response.

Brushless Motors: - A brushless DC (BLDC) motor specifically made to power Quadcopters, UAV and Multirotor.It provides high performance, high lift capacity and brilliant energy efficiency.

Propellers: - A Propeller is a Wing with a Twist. In cross section, a propeller is shaped like a wing to produce higher airpressure on one surface and lower air pressure on the other. A propeller is a device with a rotating hub and radiating blades that are set at a pitch to form a helical spiral which, when rotated, exerts linear thrust upon a working fluid such as water or air.

Battery - Li-ion batteries are the most common type of rechargeable batteries in the market at the moment. They are loved because of the many advantages they have over other older battery technologies that existed before them.

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Fly sky: - Controller & Receiver the perfect transmitter for sports modellers who want the power of a programmable transmitter but don't necessarily need a lot of excess features they do not use

III. METHODOLOGY

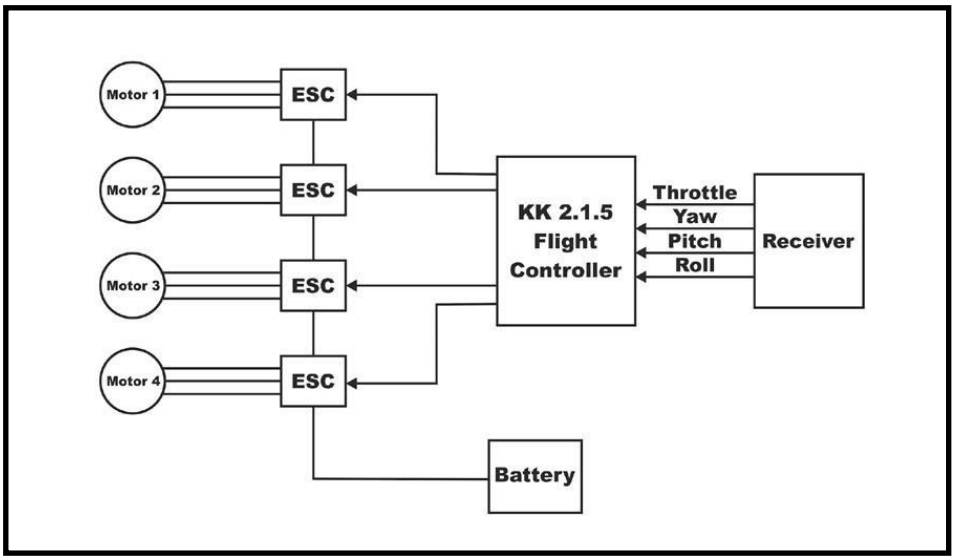

Fig.no.3.1 Block Diagram of Drone

As we can see in below block diagram, all the motors are connected with KK2.1.5 through ESCs. A receiver is connected directly with KK2.1.5 board. In the image given below, we have shown the block diagram of quad copter. KK2.1.5 is a flight controller; the flight controller is also called the brain of the drone because with this all the operation of the drone is controlled. KK2.1.5 has ATMEL mega 664PA IC inbuilt inside it. It is 8-bit AVR RISC based microcontroller with 64k of memory. It has inbuilt accelerometer and gyroscope, 6050 MPU and auto level function. It has eight motor output at right side of board, we connect ESC here. It is used to stabilize the quadcopter during flight and to do this, it receives the signal from gyroscope (roll, pitch and yaw) and send these signals to processor (ATMEL mega664PA) and then it passes control signal to ESCs and the combination of these signals instructs the ESCs to make fine adjustments to the motor's rotational speeds which in-turn stabilizes the craft.

- Step 1: Is to prepare the base on which the parts will be placed.
- Step 2: Attach the Quadcopter Frame and attach them to the base.
- Step 3: Assemble the Flight Controller and Motors.
- Step 4: Solder the Circuits. • Step 5: Done all the Connections.
- Step 6: Tested the Transmitter and Receiver.
- Step 7: The UAV (Unmanned aerial vehicle) is ready.

IV. CONCLUSION

The main objective of this paper was mapping images taken from UAV. The results indicate that using UAV's, with proper training and techniques, it is possible to obtain high quality photogrammetric products comparable to ground surveying equipment. Comparing to the time and cost it would have taken to produce such data using traditional equipment, UAV is a more promising alternative for photogrammetric surveying. The main objective of this paper was mapping images taken from UAV. The results indicate that using UAV's, with proper training and techniques, it is possible to obtain high quality photogrammetric products comparable to ground surveying equipment. Comparing to the time and cost it would have taken to produce such data using traditional equipment, UAV is a more promising alternative for photogrammetric surveying. The first step of flight planning and image acquisition needs to be done accurately so that the final result will be high quality. Also, in these study QGIS as

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open-source geographic information system software has shown great performance, easy to work with and capable to prepare aerial photographs in a way that removes distortion from the image and mapping them using at least 4 ground control points.

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