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Cellular Signal Booster Drones

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Abstract—**A Drone is a flying robot that can be controlled remotely. It is formally known as Unmanned Aerial Vehicle (UAV) / Unmanned Aircraft Systems (UAS). It can be controlled by either pilot from the ground or autonomous. A drone can be controlled autonomously in their embedded systems through software-controlled flight plans. . In India, Drones are majorly used for military purposes. The main aim of the project is to provide many applications on single quad copter. It also tries to reduce human efforts in various fields. It's controlled by RC Controller Remotely. This project determines to provide Surveillance, Signal boosting, Obstacle Detection & Avoidance, Distribution of products & Navigation and detection using GPS_based on Raspberry Pi platform.**

***Keywords*---UAV, Drones, Signal Booster, GPS, Atmeg 328**

1.INTRODUCTION *(Size 11, Times New roman)*

Unmanned Aerial Vehicles (UAVs) have been around for centuries and were solely used for military purposes. The earliest recorded use of a UAV dates back to 1849 when the Austrians attacked the Italian city of Venice using unmanned balloons that were loaded with explosives. Although balloons would not be considered a UAV today, this was a technology the Austrians had been developing for months before, which led to further advancements. In 1915, British military used aerial photography to their advantage in the Battle of Neuve Chapelle. They were able to capture more than 1,500 sky view maps of the German trench fortifications in the region. The United States began developing UAV technology during the First World War in 1916 and created the first pilotless aircraft. Shortly after, the U.S Army built the Kettering Bug. While continuing to develop UAV technology, in 1930 the U.S Navy began experimenting with radio-controlled aircraft resulting in the creation of the Curtiss N2C-2 drone in 1937. During WWII, Reginald Denny created the first remote controlled aircraft called the Radio plane OQ-2. This was the first massed produced UAV product in the U.S and was a breakthrough in manufacturing and supply drones for the military. Our model mainly focuses on providing several applications on a single drone which is controlled using RC controller. Major application of our drone is Boosting Cellular Signals where weak signals are available for better call quality and data usage. It is also used for Surveillance of a place for better security. It is also used to Deliver Small Packages to a nearest place in emergencies and it is equipped with Automatic Detection and Avoidance of Obstacles**.** It can be operated using mobile if drone goes out of the range using LTE Model we can call it back to the operating range and control it also.

2. LITRATURE SURVEY

1) A review on Quadcopter Surveillance and Control
Dhriti Raj Borah1 , Lidia Debnath2 , MrigankaGogoi3 School of Technology, Technology, Assam Don Bosco University Airport Road, Azara, Guwahati - 781017, Assam. INDIA.

The aim is to design a low cost light UAV (Unmanned Aerial Vehicles) quadcopter system and make it comparable with others. The quadcopter will be controlled from a laptop or a pc from a certain distance wirelessly. There will be a simple avionics system and which include a camera and a GPS antenna for navigation and tracking the UAV. The quadcopter can also be used for measuring the height from the earth and is capable of measuring the temperature and humidity of the environment

2) Survey of Cellular Signal Booster
Elizabeth N. Onwuka, Michael Okwori, Salihu O. Aliyu, Stephen S. Oyewobi, Caroline O. Alenoghena, Habeeb Bello-Salau, Sani S. Makusidi, Victor Asuquo

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The development of wireless technology has facilitated the wide deployment of mobile communication systems. The beauty of wireless communication is that all nooks and corners can be reached at a cheaper and faster rate when compared with wireline. Wireless is now dominating the telecommunications market. Initially, the dawn of wireless was seen as the dawn of communications to poor countries and rural areas which were poorly covered by wireline devices due to high cost. Currently, the story has changed. Both the wired and unwired environments are clamoring for wireless connectivity. Considering the hype of R&D in broadband technologies and easy acceptance in the market place, wireline communications may soon die a natural death. However, wireless communications faces a few challenges. One of them is that the radio frequency (RF) carrier signals used in these communication systems degrades as it travels through the air interface due to attenuation and interference. As a result, the range of coverage may not be as planned leading to very weak reception or even dead zones where no communication can be done. This problem has resulted in the development of cellular signal boosters that help in receiving the weak signal, amplifying and then re-transmitting it to reach the uncovered areas. Boosters are now giving hope to the frustrated wireless users such as indoor users and those at the fringes of a cell site. These boosters are diverse in make, range, method of operation, deployment and cost. In this paper, a survey of various signal booster designs, deployment and performance is presented. It is hoped that this will serve as a one-stop shop for researchers and developers in the important field of wireless signal boosters and extenders, who wish to know what is available and existing challenges.

3) *Last mile delivery by drones: an estimation of viable market potential and access to citizens across European cities Jean-Philippe Aurambout1*, Konstantinos Gkoumas2 and Biagio Ciuffo2*

Rapid technological developments in autonomous unmanned aerial vehicles (UAV or drones) and an evolving legislation may soon open the way for their large-scale implementation in the last mile delivery of products. The use of drones could drastically decrease labour costs and has been hyped as a potential disruptor to the parcel delivery industry. Online retailers and delivery companies such as Amazon, are already filing up patents for the development of multi-level fulfilment centres for unmanned aerial vehicles or “drone-beehives” that would allow the deployment of this technology within built environment. A substantial amount of research has been carried out in the last years on the potential use of drones for parcel delivery, principally in the area of logistic optimisation. However, little is known about the potential market and economic viability of such services in Europe. This paper presents a modelling framework using EU-wide high-resolution population and land-use data to estimate the potential optimal location of drone-beehives based on economic viability criterion. It estimates the potential number of EU28 citizens that could potentially benefit from last mile-drone delivery services under four scenarios. The performed analyses indicates that under the scenario considered as the most technologically realistic, up to 7% of EU citizens could get access to such services. When considering technological improvements scenarios, the share reaches 30%. Furthermore, results suggest that due to the differences in population and land-use patterns in the different Member States, the potential drone coverage across Europe could be very heterogeneous, with the UK, Germany, Italy and France appearing as the most likely countries where drone-beehives may have the most efficient development. Keywords: Drones, Last mile

4) *Obstacle detection and collision avoidance using ultrasonic distance sensors for an autonomous quadrocopter*

Nils Gageik, Thilo Müller, Sergio Montenegro University of Würzburg, Aerospace Information Technology (Germany)

A simple approach for obstacle detection and collision avoidance of an autonomous flying quadrocopter using low-cost ultrasonic sensors and simple data fusion is presented here. The approach has been implemented and tested in a self-developed quadrocopter (Figure 1) and its evaluation shows the general realizability as well as the drawbacks of this approach. The presented approach is intended to be used as part of the AQopterI8 project at the department of Aerospace Information Technology (University of Würzburg), which aims to develop an autonomous flying quadrocopter for indoor application.

METHODOLOGY

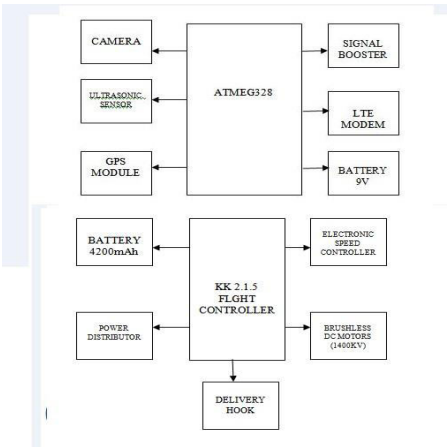

FIG: BLOCK DIAGRAM

CAMERA WITH GIMBLE: Drone surveillance is the use of unmanned aerial vehicles (UAV) to capture of still images and video to gather information about specific targets, which might be individuals, groups or environments. Drone surveillance enables surreptitiously gathering information about a target as captured from a distance or altitude.

ULTRASONIC SENSORS: Effective collision avoidance algorithm that detects and avoids obstacles autonomously in the vicinity of a potential collision by using a single ultrasonic sensor and controlling the movement of the vehicle. The objectives are to minimize the deviation from the vehicle's original path and also the development of an algorithm utilizing ultrasonic sensors available for lost cost systems.

GPS MODULE & LTE MODEM: There is a maximum limit of horizontal axis for each drone.when the drone exceeds its limit, it can be controlled by mobile phone using GPS signal.By mobile phone we can control the drone and bring it back to home.

CELLULAR SIGNAL BOOSTER: In forest areas, we'll be getting weak signals, by using cellular signal booster we can increase the strength of the weak signal improving call quality & data quality. This system works only where weak signals are available & can't be use in dead zones.

DELIVERY HOOK: This is used for distribution of products with minimal weight from one place to another.For Ex: as Amazon uses its drones to deliver its products accurately.

KK 2.1.5 FLIGHT CONTROLLER: It manages the flight of (mostly) multi-rotor Aircraft (Tri copters, Quad copters, Hex copters etc.). Its purpose is to stabilize the aircraft during flight and to do this, it takes signals from on-board gyroscopes (roll, pitch and yaw) and passes these signals to the Atmega324PA processor, which Pg 6 in-turn processes signals according the users selected firmware (e.g. Quad copter) and passes the control signals to the installed Electronic Speed Controllers (ESCs) and the combination of these signals instructs the ESCs to make fine adjustments to the motors rotational speeds which in-turn stabilizes the craft. The KK2.1 Multi-Rotor control board also uses signals from your radio system via a receiver (Rx) and passes these signals together with stabilization signals to the Atmega324PA IC via the aileron; elevator; throttle and rudder user demand inputs. Once processed, this information is sent to the ESCs which in turn adjust the rotational speed of each motor to control flight orientation (up, down, backwards, forwards, left, right, yaw).

APPLICATIONS

Drone is used as a Cellular Signal Booster in the Forest where weak signal is available. It is used for Delivery of Products that reduces the transportation cost and drastically decreases labor costs. It is also used as surveillance cameras where we can monitor a person, Groups that can prevent people from any dangers. It is equipped with automatic obstacle detection & Avoidance. They can be also operated by mobile phones using GPS module, when it's unavailable to the RC controller.

3. CONCLUSIONS

Our model aims to decrease the burden of human beings in industries and used for various purpose in forest enforcement and industries. It is an advance approach in forest to make the surveillance easy. Future of surveillance is using drones only. Our model aims to prevent any crime, inappropriate behavior in large groups and provide a visual to concerned authorities. It also features of easy operation, wide range working. Network boosters, radars can provide highly effective & reliability benefits towards industry and forest enforcement. It can also be used to dispatch emergency items for short ranges in limited time. It majorly provides constant cellular signal of minimum range within the forest. It also aims for automatic obstacle detection & avoidance and also provide two way controlling of drone (both RC controller & Mobile Phone).Finally our model aims to be useful for forest authorities and industries.

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