Delivery Quadcopter Drone: For Delivery of Moderate Weight Packages

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Abstract— This paper represents to implementation of "Delivery quadcopter drone" which is used for delivering the moderate weight drugs and products and also, we reduce the air pollution with the help of this prototype drone model. The delivery drone can fly without human interference and it is controlled by autonomously. The main aim of our project is to design the delivery drone for delivering the moderate weight drugs and products. Delivery drone is also called as unmanned aerial vehicle for product. We go for this type of implementation of drone because of in mega city traffic is the main issue, due to this type of issue delivery vehicle can't afford to quick service to the customer. Hence, we created this type prototype model. To solve this type of issues or problems we going to create delivery drone, using delivery drone we afford the fast and quick service to the customer. The product is delivered to customer on the basis of GPS system we locate the position of the place where to product delivered and also, we track is current location with the help of android web application through satellite control. All data information is sending both consumer as well as supplier with the help of GSM module, and also with the help of GPS system the delivery drone goes the correct destination place. Hence, we used GPS system in our delivery drone. Using GPS system, we easily track the position of the drone location.

Keywords: Delivery Drone, GPS, Scanner, Easy Pilot, Autonomous Flight, APM

I. INTRODUCTION

In present time Unmanned Arial Vehicle is very popular in military world. Delivery drone is also called as package parcel drone. Delivery drone has been used for delivering the moderate weight food, drug or different types of products or vaccine. According to a different types of research paper reports from Radiant Insight, " the delivery drone system markets is 609 million dollars in 2014 and are forecast to reach 4.8 billion dollars worldwide by 2021.We are going to create this type of prototype model for moderate weight drugs and products delivery. The main aim of our project is to reduce traffic and pollution created by delivery two-wheeler vehicle in megacity (Mumbai, Delhi) and providing quick service to the customer. The customer would interact with UAV (Unmanned Arial Vehicle) using GSM model for authenticity and delivery purpose and with the help of GPS system UAV can easily locate the location of customer. The UAV is going to be autopilot using Aurdopilotmega (APM) and by Mission Planner software we would guide the UAV to its estimated location. The information regarding customer location is gathered from the customer using web application. If weather would not have been predicted and pilot flew the plane to the airport with bad weather than it would be a disastrous. So, the prediction or result generated should be very accurate. Using mission planner application we can install the firmware in APM or collaboration is done using mission planner application.

II. PROBLEM DEFINITION

A mega -city has a population above 12 million people. Example: Mumbai, Delhi etc. Traffic full roads are major issues. India spend 6.9 billion hours stuck in traffic which is up substantially in the past 10 years. Congestion is major problem when lifesaving drugs, critical supplies or organs need to be transported urgently. Drone life has developed a drone capable of transporting organs in plastic containers at a maximum speed of 90 km/h and keeping the cargo cool.

III. RELATED WORK

Now, we present some related research work. Autonomous quadcopter is used for the product home delivery, in this case the quadcopter used the aurdopilotmaster (APM) with an GPS module for tracking, by which it can autonomously deliver the product to customer. Total mass ejective is 800 grams. As the expected maximum capacity of the delivery drone has considered as 300 grams, so the delivery drone must be capable of flying with total mass of 1100 grams. Is in the case [1]. Another important use of drones is that they could easily support human activities by carrying out repetitive/mentally demanding or even dangerous tasks which an ordinary human can't do easily. This is the case of [2].

Where a drone has been used for monitoring the Tropical Amazon rainforest, of [3] where an unmanned helicopter is used for collecting and analyzing traffic data, or of [4] where the exploitation of a drone for gas leakage recognition is investigated. Similarly, presents how drones have been used in Africa to protect endangered species by monitoring them and identifying poachers. [5]. Moreover, as in the case of the specific use case related to drugs/medicine delivery, it is worth remarking that a drone-based shipment could be, relevant in cases in which urgent medications are needed in contexts of broken ground or bad roads connections. In this drone delivery system customer first register the drugs or products in system app[6]. Drones has been also used in the field of delivering, where the use of drones the investigation of a delivery drone has been increased in 2018. [https://uavcoach.com/drone-deliveries-2018] appear priority of drone is increasing's there is great social benefit using drones for delivering can easily reduce the harmful air pollution & it can even reduce noise pollution [7].

IV. PROPOSED SYSTEM

The main aim of our project is to design the delivery drone for delivering the moderate weight drugs and products. Delivery drone is also called as unmanned aerial vehicle for product. We created this type of prototype model for

moderate weight drugs or products delivery. We go for this type of implementation of drone because of in mega city traffic is the main issue, due to this type of issue delivery vehicle can't afford to quick service to the customer. Hence, we created this type prototype model. To solve this type of issues or problems we created delivery drone. Using delivery drone, we afford the fast and quick service to the customer, with the help of GPS system the delivery drone goes the correct destination place. Hence, we used GPS system in our delivery drone. Using GPS system, we easily track the position of the drone location. The System Architecture diagram as shown given below figure 1.

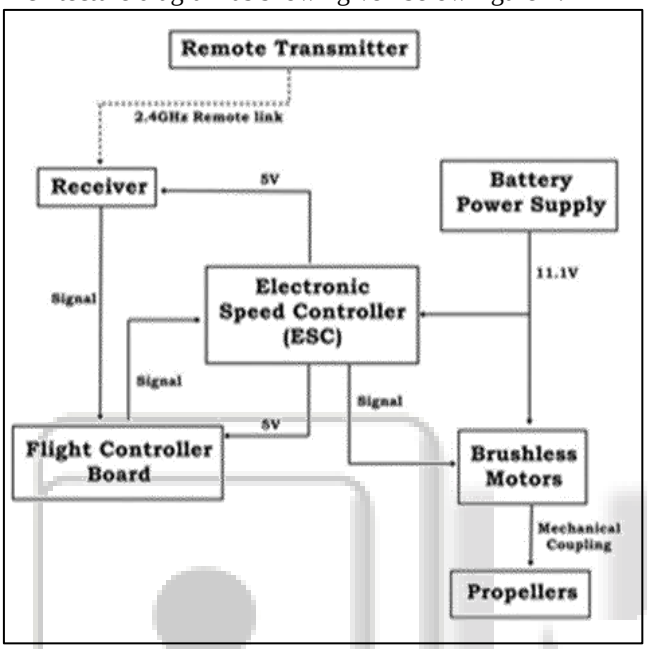

Fig. 1: System Architecture

In system Architecture diagram shows each motor are inter-connected with one ESC (i.e. 1 motor 1 ESC) and propeller connected to brushless motor using mechanical coupling. Control System of quadcopter are subdivided in two types onboard and offboard system, as shown below figure.2

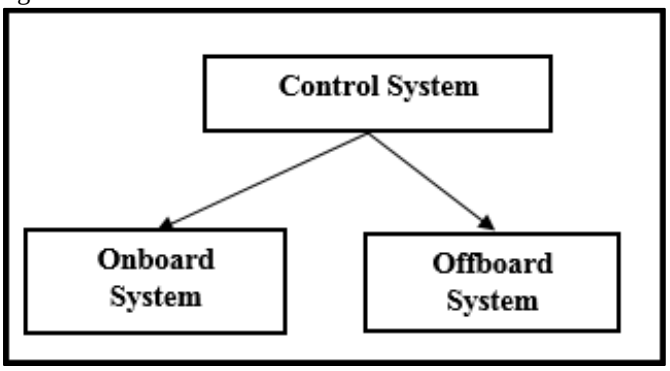

Fig. 2: Control System Diagram

1) Onboard System: On board services are GPS and GSM model are interfaced with ArduPilot mega (APM) of quadcopter for two purpose.
   GPS: The onboard system also contains a GPS which is also interfaced with the APM. The GPS model would provide the location to quadcopter for delivering purpose.
   APM: It is used as the main operating board. It is the motherboard for the quadcopter. It has in built, Gyro, accelomer
2) Offboard System: Offboard control system consists of a computer of room and receiving the information from user using web application. The computer room of the control room provides necessary data to the quadcopter like GPS location of the customer. The control room also monitor the position of quadcopter during the transportations via GPS. The GSM model will send continuous notifications to the user mobile after every five minutes interval.
3) Mission Planner Software: Using mission planner software we can install firmware in auto pilot (APM). After installing the firmware, we can start the collaboration process of motors, transmitter, GPS, and ESC (electronic speed controller). See in figure 3 and 4 as shown given below.

Fig. 3: Mission Planner Application

Fig. 4: installing firmware or other collaboration process

An activity diagram shows to things in one diagram first one is activity diagram of system and second one is process of delivery quadcopter as shown given below.

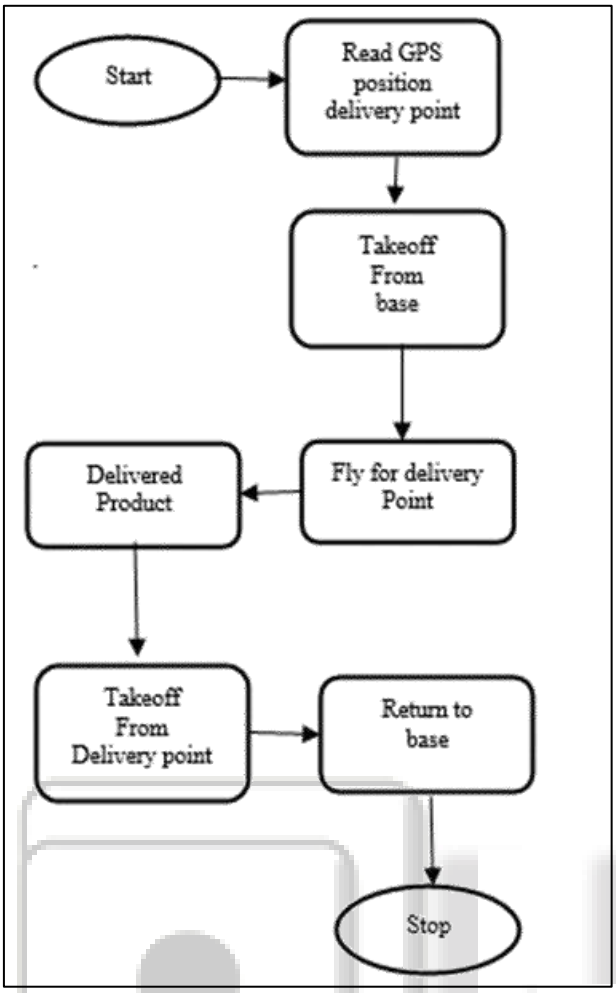

Fig. 5: Activity Diagram

V. SYSTEM DESIGN AND IMPLEMENTATION SNAPSHOT

VI. CONCLUSION

A prototype system for a drone-based delivery service has been presented. The design of the proposed system has first been discussed from the hardware point of view. Then, the software framework developed to place and manage orders has been presented. Particular attention has been paid to issues related to autonomous deliveries and to possible solutions that could be adopted in order to prevent potential risks that could arise in this particular application context. The system has been targeted to drug deliveries, due to the fact that medications could be required more urgently than other goods, and could be small and lightweight enough to be delivered by a drone. Nevertheless, it is worth remaking that the designed system could be possibly adapted to be used in a number of different scenarios.

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