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A REVIEW ON SELF CHARGEABLE SOLAR POWERED DRONE

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ABSTRACT

Current era of drone technology has created a boom in everyone's mind, whether it's about small family functions, a destination wedding, quick product delivery, or for security purpose. Keeping the needs of people in mind we suggest a self-chargeable drone which can be used for a long time when needed without keeping it on charge for hours. This is going to be possible through solar plates implanted in it. The solar plates will absorb the sunlight and store that energy into a battery. Then in the night time the saved battery can be used as a backup so the drone can fly for a long.

Keywords: Solar Energy, Drone, Flight, UAV, Security, Camera.

I. INTRODUCTION

When it comes to security norms in military camp surveillance, aerial surveillance, and remote sensing a well-kenned product comes to mind that is an Unmanned Aerial Conveyance (UAV) commonly kenned as Drone. This is the contrivance that can be operated automatically via computer programming and withal by the pilot having remote control on the ground. We have a number of ranges in drone technology comparatively with price, size, working, look, and reliability. The functioning of the drone will depend on the sensors and capacity of the motors utilized. The main moto abaft this project is to minimise the expenses behind making a drone in low budget with extra features like backup charging. This drone can be utilizable for many purposes like distributing aliment, medical equipment, vaccines, wedding and day of inchoation party shoots, etc. Its' power backup feature makes it stand out as a product out of others in the market.

As a mundane drone takes 60 to 90 minutes to charge plenarily if a USB connector is being used and less time if it is being charged in the charging hub. Verbalizing about the fly time a mundane drone can fly up to 15 20 minutes after plenarily charged, but it's too early and we couldn't do as much work during this duration, so for backup, we require something which can be utilized in emergency cases.

To surmount this issue of early battery drainage we propose a solar powered self-charging drone which can charge the battery utilizing natural sunlight and store the energy for later use. This will not additionally increase the flight time but withal make utilization of natural resources. Which is a great step towards green environment theory.

Mohammad R. Hayajneh et al [1] this paper describes a design of low- cost and practical approach for recharging an unmanned aerial vehicle (UAV) autonomously for missions in remote areas.

K. S. Rahman et al [2] a flying quad copter equipped with green and environment friendly solar energy is designed and implemented in this study for monitoring purposes.

S Sivachandaran et al [3] the implication of the study is that it will provide a basis for further development, automation, and adoption of UAV in aerial security surveillance and reporting to authorities the information that will be used to raise alarms and enhance security.

Hasimah Ali et al [4] this paper proposed the development of surveillance drone system based on IoT for industrial monitoring- security applications.

Aurello Patrik et al [5] the main objective is to develop and efficient model to deal with difficulties. Such as delivering system.

Hanno Haildmann et al [6] we provide a brief overview of safety and security-focused application areas that we identified as main targets for industrial and commercial projects, especially in the context of keenly intellective autonomous systems and autonomous/semi-autonomously operating swarms. We discuss a number of

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challenges cognate to the deployment of UAVs in general and to their deployment within the identified application areas in particular.

A. Cesetti E et al [7] in this paper a vision bases approach for guideance and landinf of an uav proposed.

II. METHODOLOGY

2.1 Problem Statement:

For the past century, drones have become a piece of technology that has had a pervasive impact on our society whether it be for military, industrial, scientific, commercial, or recreational uses. According to the Federal Aviation Administration (FAA), as of in August 2021, there have been more than 865,000 drones registered in the Coalesced States. Drones can be optically discerned everywhere in our society is utilized for different purposes and have become affordable for even low-income families. For example, Amazon has solemnly considered utilizing drones in the distribution in what it is calling the Prime Air accommodation which is verbally expressed to be able to distribute packages within 30 minutes utilizing unmanned aerial conveyances, withal kenned as, UAVs. It is astonishing how current advances in technology sanction the utilization of drones for such purposes, but it raises alarms as to how efficient and environmentally convivial they are.

Current drones rely on lithium-powered batteries that are 100% recyclable, however, lithium mining and processing do have negative impacts on the environment. Not to mention the utilization of certain plastics for drones require chemical processing that can negatively impact our planet. We believe that implementing a solar-powered drone is a green solution for sundry industrial, scientific, and commercial applications. Our solar-powered drone will consummately abstract the utilization of any type of battery so that it is plenarily powered by the sun. In doing so we are making a UAV that is efficient and environmentally convivial. Such drones will have practical use in only areas with deftly ponderous sunlight, yet they will have positive impacts on our society by providing a green solution.

2.2 Proposed System:

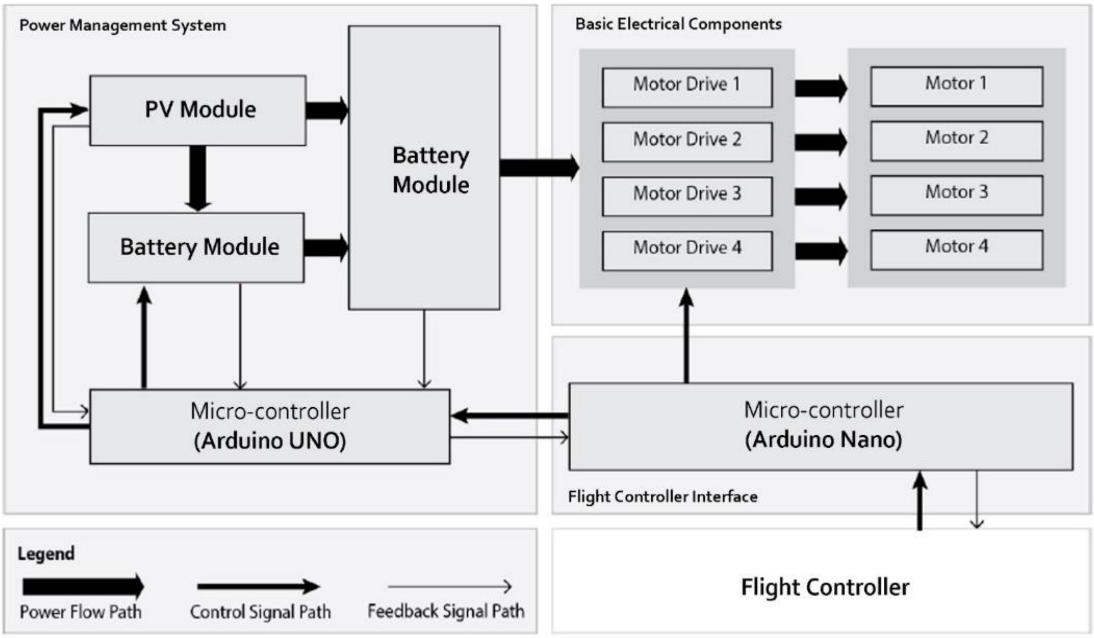

Figure 2.2.1: Proposed System Architecture

2.2.1.1 Power Management System:

The power management system refers to the puissance control unit where the potency is stored from the solar plates in the battery. As mentioned in fig. 2.2.1 PV module is a semiconductor material commonly kens as solar panels a web that magnetizes the solar power and transforms it into useable energy. The battery will be utilized as a puissance storage module for further use. All the modules of the puissance control system will be directly connected to the microcontroller (Arduino UNO), which will perpetually pass the signal to other electrical components as well as sensors implemented in the drone.

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2.2.1.2 Electrical Components:

This section contains 4 motor drivers who are responsible for drone flying, from the battery they will get a potency supply and will work on the injunctive authorizations of microcontrollers and the flight control unit from the ground, which has Arduino nano as its system control unit.

III. MODELING AND ANALYSIS

3.1 Requirements:

Figure 3.1.1: Drone Motor

These motors are responsible for flying the drones and by spinning the propellers in the correct direction. By providing the three-phase current at the given frequency the motor spins with the propeller. Generally, Mundane motors use 20-200 watts/kg to fly.

Figure 3.1.2: RC Receiver

RC receiver is an electronic contrivance that transmits electrical energy to utilizable information while in the air. It takes 4.8 - 6.0 volts of potency to work.

Figure 3.1.3: RC Controller

RC controller is built in with a radio transmitter that perpetually reads stick input and transmits the information to the receiver in the drone.

Figure 3.1.4: Drone Propellers

The propeller hoists the drone by engendering airflow and spinning, resulting in a pressure distinction between the bottom and top surface.

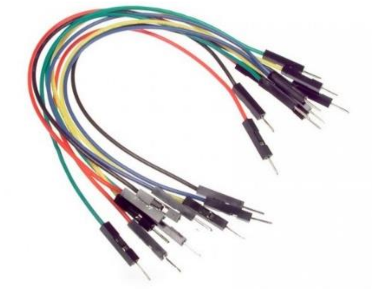

Figure 3.1.5: Jumper Wires

Jumper wires are used to connect the sensors with microcontrollers and other components. It has 3 types M2M, F2M, F2F.

IV. RESULTS AND DISCUSSION

Figure 4.1: Expected Outcome

V. CONCLUSION

The addition of solar power to UAVs has the potential to expand the range of applications for these aircraft by increasing their flight time. The main goal of this project is to equip the RC glider 759-2 Phoenix 2000 with a solar power system in order to increase its flight time. In the end, the flight test proved that the project's goal had been accomplished. The installation of the solar power system on the aeroplane results in a 22.5% reduction in the use of battery stored capacity under good experimental settings with suitable weather (solar radiation level exceeding 700 W/m2). The rate of battery voltage declines for the solar-powered UAV ('Sun') is substantially faster when compared to the battery voltage graphs during circuiting.

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