# FLYING HIGH FOR HEALTH: DESIGN & IMPLEMENTATION OF SOLAR POWERED AUTONOMOUS VTOL TECHNOLOGY FOR MEDICINE DELIVERIES IN REMOTE AND INACCESSIBLE AREAS

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**Keywords:**

VTOL, UAV, fixed-wing, fixed-wing.

**Introduction:**

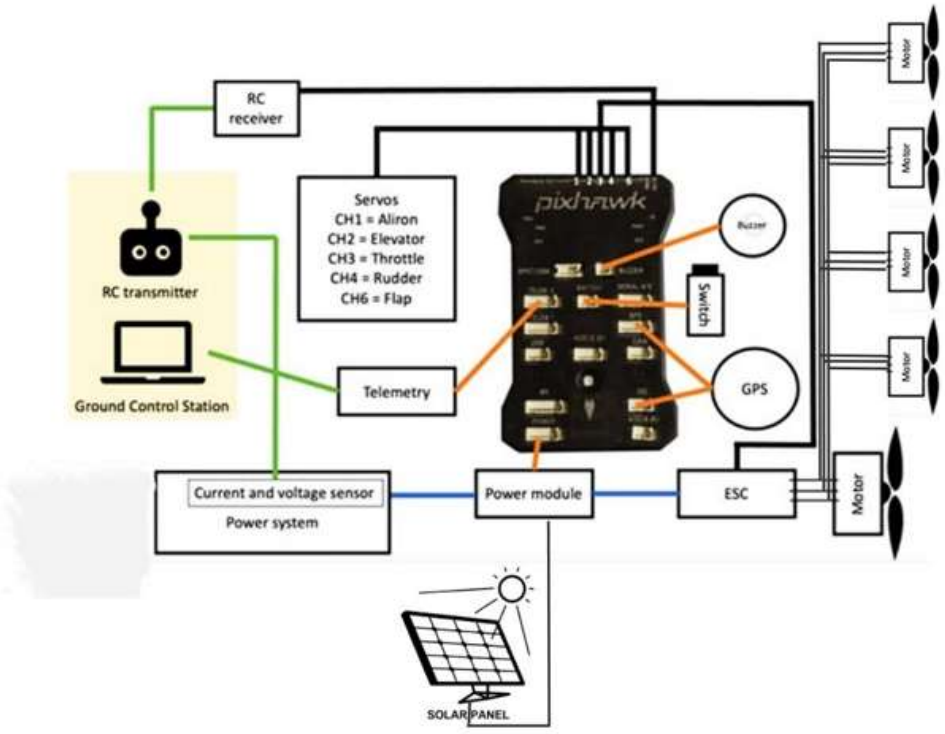
The proposed project introduces a Solar-Powered Vertical Take-off and Landing (VTOL) Unmanned Aerial Vehicle (UAV) designed for disaster management and medical emergencies. By combining solar energy with electric propulsion, the UAV ensures eco-friendly flights, extended durations, payload delivery, and communication capabilities. The integration of solar power signifies a shift in UAV design philosophy, emphasizing an integrated approach where components harmoniously work together. The project modifies a conventional remote-controlled plane to run on both solar and battery power, streamlining processes for cost-effectiveness and longer flight times. Beyond this, the broader UAV landscape distinguishes between fixed-wing and rotary-wing types, prompting the development of hybrid UAVs with extended flight time, considerable range, and vertical takeoff and landing capabilities.

**Objectives:**

1. To Develop a robust solar power system to ensure continuous energy supply for sustained autonomous VTOL operations.
2. To Design the VTOL system to maximize payload capacity while maintaining operational efficiency for medical cargo transportation.
3. To Develop and integrate cutting-edge autonomous technologies to enable the VTOL system to execute medical deliveries without human intervention in real-time.
4. To Create a versatile VTOL platform capable of adapting to different weather conditions and terrains commonly found in remote and inaccessible areas.
5. To Implement AI algorithms for real-time route planning and adaptive navigation.
6. To Create a user-friendly interface for healthcare professionals to track deliveries.

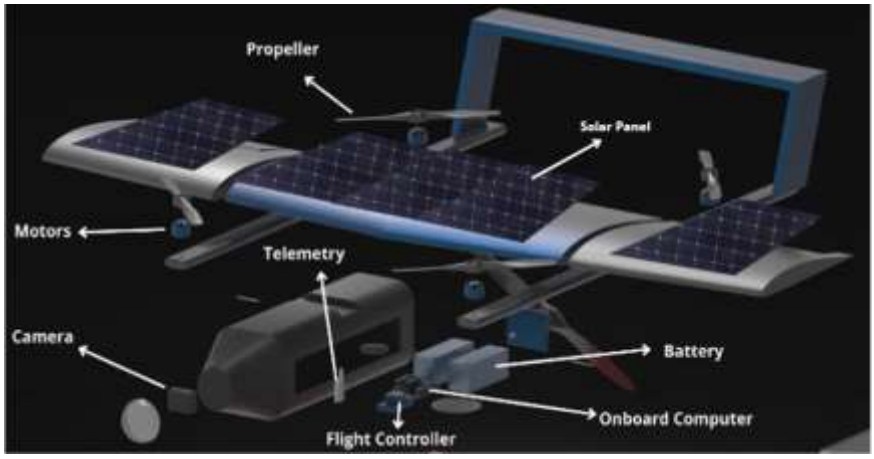
**Methodology**:

Building a Solar Powered VTOL (Vertical Take-Off and Landing) drone involves integration of various components. The frame construction is a crucial first step, utilizing materials such as carbon fiber rods for strength and foam or plywood for structure. Once the frame is constructed, the power system can be implemented.
This involves mounting a 700KV brushless DC motor securely onto the frame, connecting it to an Electronic Speed Control (ESC), and securing a LiPo battery in a balanced position. Solar panels are then affixed to the top surface of the frame and connected to a solar charge controller, allowing the LiPo battery to be charged by solar power. The next step involves the integration of the flight control system. The Pixhawk flight controller is mounted on the frame and connected to the ESC, GPS module, and other essential sensors. The GPS module enables accurate navigation and position maintenance. Additionally, a communication system is established by connecting a drone transmitter (remote) to the Pixhawk flight controller, allowing for effective control of the drone during operation. To enhance the drone's capabilities, a payload in the form of a camera can be mounted on the frame. This camera may be connected to the Pixhawk or a separate FPV (First Person View) system for real-time video streaming. Following the component integration, a thorough testing phase is crucial. This includes testing the power system, flight controller, communication system, and the effectiveness of solar charging during exposure to sunlight.



**Conclusion:**

The project's primary goal of equipping UAVs with solar power systems was achieved, resulting in a 20-25% reduction in battery usage, showcasing solar power's effectiveness under favorable weather conditions. This VTOL is designed to prioritize energy efficiency and handle a variety of medical delivery tasks ranging from supply runs, to emergency situations. The integration of solar power systems onto Unmanned Aerial Vehicles (UAVs) extending their flight duration, expanding their potential for various applications.




**Scope for future work:**

- Prioritizes continuous R&D on emerging technologies and materials.
- Exploration of control algorithms and sensor integrations.
- Monitors advancements in lightweight solar panels for enhanced endurance.