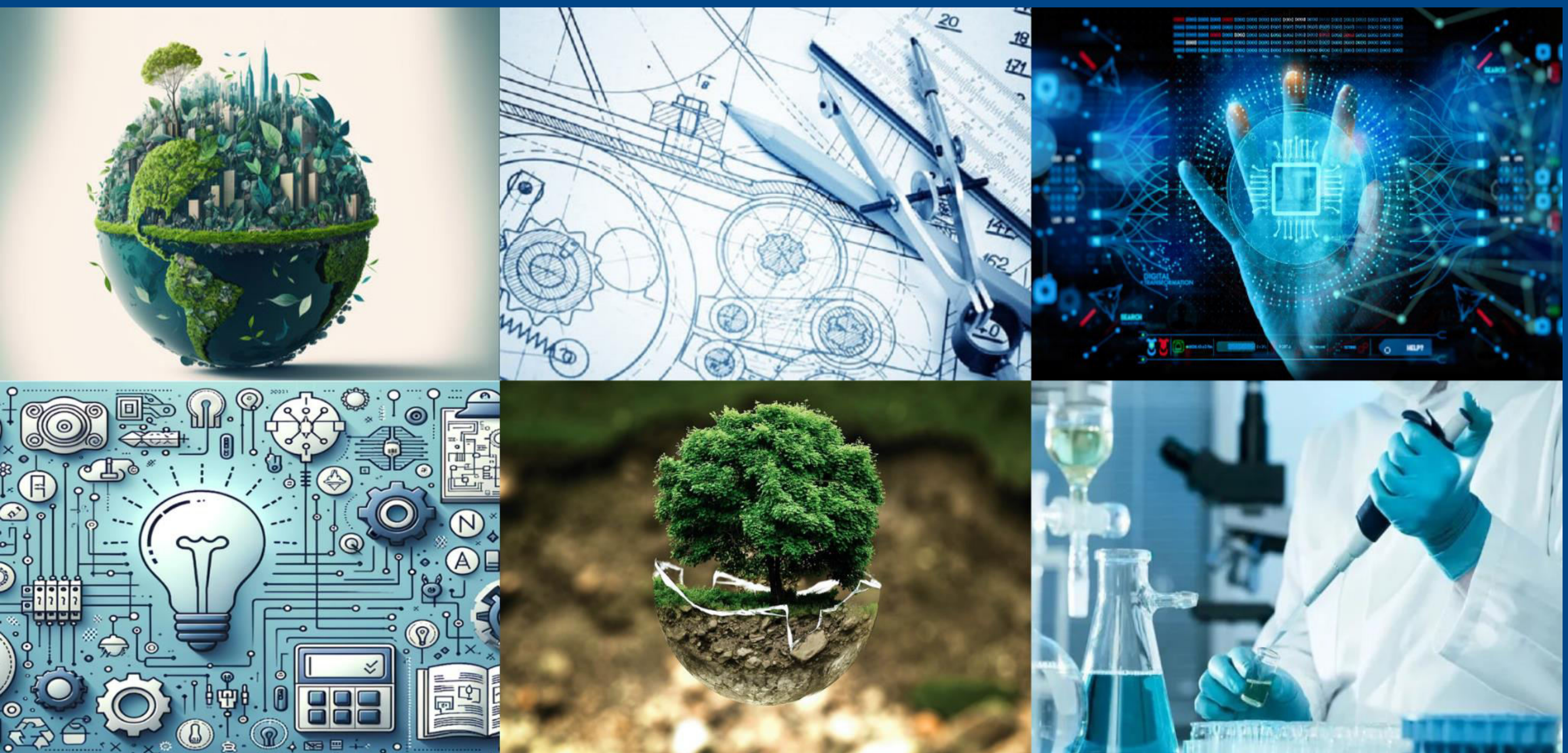
ISSN: 2582-7219

International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 3, March 2025

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)
(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Aerodrop: The Future of Drone Delivery

Adeeba Laraib [1], Javeriya Sikandar [2], Rimsha Tarannum A [3], Syed Inshaaz [4],
Prof. Madhusudan G [5]

U.G. Student, Department of Electronics & Telecommunication Engineering, JNN College of Engineering, Shimoga, Karnataka, India [1,2,3,4]

Assistant Professor, Department of Electronics & Telecommunication Engineering, JNN College of Engineering, Shimoga, Karnataka, India [5]

ABSTRACT: Our project introduces a deliver drone, The rapid development of drone technology has led to its widespread application in various fields. This project focuses on the development and implementation of an unmanned aerial vehicle (UAV) utilizing the APM 2.8 flight controller paired with a FlySky transmitter and receiver for remote control and autonomous flight capabilities. The APM 2.8, known for its versatility and reliability, is equipped with advanced sensors, including GPS and accelerometers, to enable precise navigation and stability control. The FlySky transmitter and receiver are integrated into the system to provide seamless communication between the operator and the drone, ensuring responsive and reliable control over long distances. offering a cost-effective solution for both hobbyist and professional drone applications.

KEYWORDS: Flysky FS-T6 Transmitter and receiver, APM 2.8 , Drone delivery.

I. INTRODUCTION

Nowadays in this world, technologies are advancing day by day. For this reason, maximum devices need to be updated with smart technology. The advent of unmanned aerial vehicles (UAVs), commonly known as drones, has revolutionized various industries by offering cost-effective, efficient, and reliable solutions for tasks that were previously labor -intensive or time-consuming. One of the most promising applications of drones is in the field of delivery services, where UAVs can transport goods quickly and efficiently to remote or urban areas. This project focuses on the development and implementation of a drone-based delivery system using the APM 2.8 flight controller. The APM 2.8 is an advanced flight controller known for its versatility, offering essential features such as GPS navigation, different flight modes, and integrated sensors to ensure stable flight and accurate delivery capabilities.

II. LITERATURE SURVEY

1. Title: Drone based package delivery, Author: Taha Benarbia and Kyandoghere Kyamakya, Published on: 29/dec/2021, Description: This paper provides a comprehensive literature survey on a set of relevant research issues and highlights the representative solutions and concepts that have been proposed thus far in the design and modelling of the logistics of drone delivery systems
2. Title : Collaborative Truck-Drone Routing for Contactless Parcel Delivery During the Epidemic, Author: Guohua Wu; Ni Mao; Qizhang Luo; Binjie Xu; Jianmai Shi.Published on : 19/Dec/2022, Description: The COVID-19 pandemic calls for contactless deliveries. To prevent the further spread of the disease and ensure the timelydelivery of supplies, this paper investigates a collaborative truck-drone routing problem for contactless parcel delivery
3. Title: The drone delivery services: An innovative application in an emerging economy. Author: Le Thai Phong, Nguyen Thi Hanh. Published on : 2/Jun/2023, Description: The Drone Delivery system will track the consumer's live location and thus provide guaranteed package delivery to the right place and person (Scott & Scott, 2019). The GPS Drone delivery system will determine the consumer's location through GPS, detect the live location, and deliver the correct package within the specified time as each delivery date.
4. Title: Drone-Aided Delivery Methods, Challenge, and the Future: A Methodological Review. Author: Aliza Sharmin and Jose Topayachi. Published on: 26/Jan/2023. Description: unmanned aerial vehicle (UAV) delivery, has gained significant attention from academia and industries. Compared to traditional delivery methods, it provides greater

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

flexibility, improved accessibility, increased speed and efficiency, enhanced safety, and even some environmental benefits

III. METHODOLOGY

1. System Design and Component Selection

- **Flight Controller (APM 2.8):** The APM 2.8 is selected as the core of the drone's control system. It supports various flight modes such as manual, stabilized, and autonomous, making it suitable for the delivery system.
- **Transmitter/Receiver (FlySky):** A FlySky transmitter and receiver are integrated to provide reliable remote control and communication between the ground station and the drone.
- **Drone Frame and Motors:** A suitable drone frame and motor system are chosen based on the payload capacity and flight stability requirements. A multi-rotor (quadcopters or hexacopters) setup is preferred for its stability and ease of flight control.
- **GPS Module:** A GPS module is used to enable navigation and to accurately define the delivery route.
- **Payload Delivery Mechanism:** A lightweight and secure package delivery system is designed, such as a servo-operated release mechanism, ensuring that the drone can securely carry and drop off the package.
- **Battery and Power System:** A power system is selected based on the drone's weight, flight time, and payload capacity to ensure sufficient flight duration for the delivery.

2. Integration and Assembly

- **Component Assembly:** All components, including the APM 2.8 flight controller, FlySky receiver, GPS module, motors, battery, and payload delivery mechanism, are carefully assembled onto the drone frame.
- **Wiring and Connectivity:** Proper wiring for power distribution, control signals, and data transmission between the components is established to ensure smooth operation.
- **Flight Control System Setup:** The APM 2.8 is connected to the drone, and its firmware is installed. A mission planner software such as Mission Planner is used to configure the flight controller and calibrate the system.

3. Calibration and Configuration

- **Compass Calibration:** The APM 2.8's compass is calibrated to ensure accurate flight stabilization and heading control. The GPS module is calibrated for precise navigation.
- **Radio Calibration:** The FlySky transmitter and receiver are paired and calibrated to ensure responsive control during manual operation and remote adjustments.
- **Flight Mode Configuration:** The flight modes (manual, stabilized, and autonomous) are configured on the APM 2.8, ensuring smooth transitions between different operational stages.

4. Final Testing and Deployment

- **Initial Flight Testing:** The drone undergoes a series of test flights in a controlled environment to verify flight stability, GPS accuracy, and overall performance.
- **Payload Delivery Testing:** The payload release mechanism is tested under various conditions to ensure reliable package drop-off and secure attachment during flight.
- **Communication and Range Testing:** The FlySky transmitter and receiver are tested over varying distances to ensure reliable communication between the drone and ground station.
- **Real-World Delivery Testing:** The drone performs a final set of delivery missions in an outdoor environment, following real-world conditions. This testing ensures the drone can navigate around obstacles, follow GPS waypoints, and deliver packages effectively and reliably.

© 2025 IJMRSET | Volume 8, Issue 3, March 2025| DOI: 10.15680/IJMRSET.2025.0803056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Software Setup:

- **ArduPilot Mission Planner**

Purpose: Mission Planner is a ground control software used for configuring, monitoring, and controlling the drone. It allows users to plan autonomous flight missions, calibrate sensors, analyze telemetry data, and fine-tune parameters for stable flight.

- **Firmware for APM 2.8:** The drone uses ArduPilot firmware compatible with the APM 2.8 flight controller.
- **Mission Planner Dependencies:** The software requires Windows and .NET Framework to run efficien

IV. BLOCK DIAGRAM

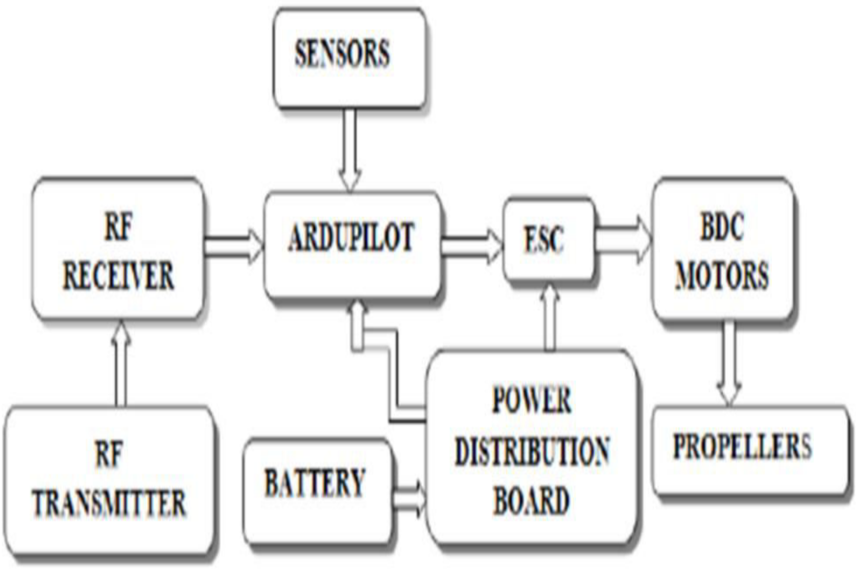


Fig. 1. System block diagram

© 2025 IJMRSET | Volume 8, Issue 3, March 2025| DOI: 10.15680/IJMRSET.2025.0803056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

V. HARDWARE COMPONENTS

Fig. 2. Components used in building smart mirror.

VI. EXPERIMENTAL RESULTS

During test flights, the drone achieved an average flight time of approximately 15 minutes with a fully charged battery. The maximum altitude recorded was 50 meters, and horizontal flight range extended up to 200 meters without significant signal loss. The stability of the drone was observed to be satisfactory, with minimal drift under stable conditions. However, minor oscillations were noticed under windy conditions, which could be attributed to PID tuning adjustments. Overall, the project successfully demonstrated the feasibility of constructing a stable and functional drone using the APM 2.8 controller and ArduPilot Mission Planner. Future improvements could focus on increasing flight efficiency, improving navigation accuracy, and expanding payload capacity to enhance the drone's applicability for real-world.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VII. CONCLUSION

In conclusion, the Drone Delivery Project has provided valuable insights into the capabilities and challenges of using drones for commercial deliveries. As technology progresses, drones are likely to become a fundamental tool in modern logistics, contributing to faster, safer, and more sustainable delivery solutions across industries.

REFERENCES

[1] M. Miele, "The Future of Drone Delivery: Opportunities and Challenges," *Journal of Transportation Technologies*, vol. 12, no. 4, pp. 134-145, 2020.

[2] M. Makhijani and R. Gupta, "Drone Delivery Systems: Design, Applications, and Challenges," *Int. J. UAVs and Robotics*, vol. 15, no. 3, pp. 201-220, 2021.

[3] R. Brandenburg and G. Klemmer, "Drone Delivery in Urban Areas: A Feasibility Study," in *Advances in UAV Applications*, Springer, 2020, pp. 45-67.

[4] Federal Aviation Administration (FAA), "Part 107 Small UAS Rule," 2022. [Online]. Available: https://www.faa.gov/uas. [Accessed: Feb. 21, 2025].

[5] S. Crosby and R. Hughes, "Regulation and Policy Implications for Drone Delivery Services," *Int. J. Logistics*, vol. 22, no. 1, pp. 78-92, 2023.

[6] Amazon Prime Air, "The Future of Drone Delivery," Amazon, Inc., 2021. [Online]. Available: https://www.amazon.com/prime-air. [Accessed: Feb. 21, 2025].

[7] European Union Aviation Safety Agency (EASA), "UAS Operations - Deliveries with Drones," 2023. [Online]. Available: https://www.easa.europa.eu. [Accessed: Feb. 21, 2025].

[8] "A Review of Drone Delivery Systems in Logistics," *Logistics Research*, vol. 15, no. 3, pp. 112-130, 2022.