



Smart-Drone: Building a Tiny, Intelligent Flying Machine

We aim to create affordable, easy-to-use drones that can be operated out of the box without any setup or tuning required. Our concept involves connecting a microcontroller to a Linux mini PC to control flight and enable artificial intelligence and 4G connectivity for more advanced applications. Follow our journey to build the ultimate tiny drone!



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The Perfect Build: Components and Design



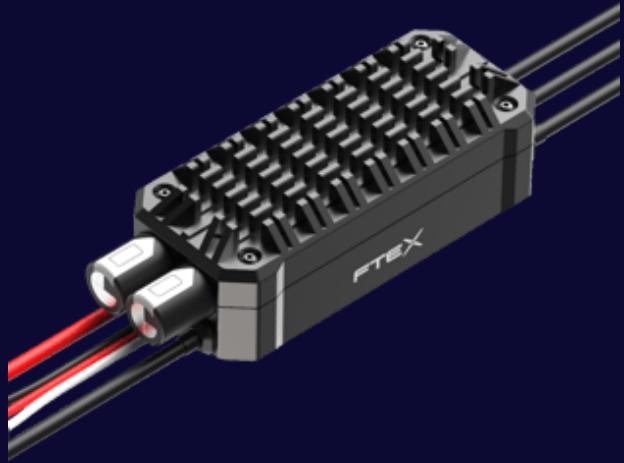
Propellers

We use high-quality propellers that are durable and built to last.



Motors

Our powerful drone motors provide the lift needed for stable, smooth flight.



ESCs

Our ESCs offer precision control and can handle high-speed movements for fast and agile flight.



Frame

Our lightweight, durable frames are made from carefully selected materials and designed for optimal aerodynamics.

From Microcontrollers to Linux Mini PCs

Microcontroller

A microcontroller with plenty of pins is the foundation of our Smart-Drone design, providing real-time flight control and the ability to communicate with a mini PC.

Linux Mini PC

We connect a mini PC like the Raspberry Pi Zero to the microcontroller to enable advanced AI capabilities and 4G communication with the ground.

Software Tools

We use a variety of software tools to facilitate communication and enable changes to flight parameters from the ground.

The Development Process: Our Step-by-Step Journey

1 Project Preparation

We gather all the necessary components and prepare our project to start building the drone.

2 Motor and Propeller Check

We test the motor and propellers to ensure they work well together and provide enough lift for stable flight.

3 Designing the Frame

We design a lightweight, aerodynamic frame that meets our strict specifications for drone design.

4 First Takeoff

We make our first takeoff with no changes to the drone and test its flight capabilities.

5 Upgrading the Microcontroller

We switch to a more powerful microcontroller with a larger number of pins to enable more advanced features.

6 Connecting to a Linux Mini PC

We connect our microcontroller to a Linux mini PC to enable advanced AI and 4G communication capabilities.

7 Software Preparation

We prepare the software tools necessary to facilitate communication and enable changes to flight parameters from the ground.

Cost Breakdown: Building a Smart-Drone

Propellers	Already included
ESCs	£20
Motors	£31.96
Frame Material	Discounted
Microcontroller	£5 for D1 Mini
Linux Mini PC	£30-40
3D Printing	£10-20
Total	£116.96

Unlocking the Potential of Smart-Drone: Use Cases

Environmental Monitoring

Smart-Drones can be used to measure radiation in the atmosphere and analyze air quality, providing critical information for environmental scientists and policymakers.

Delivery

With 4G connectivity and advanced AI capabilities, our drones can be used for fast, efficient, and safe delivery of goods, even in difficult or remote locations.

Emergency Response

Smart-Drones can be used for quick and efficient delivery of medical supplies, emergency equipment, and communication devices, enabling faster response times during emergencies.



Powerful Communication: Digital Signal Via SPI Interface

We suggest using the SPI interface for communication between the microcontroller and the Linux mini PC because it supports high-speed communication between devices. The SPI interface also allows for easy integration with most microcontrollers.

Autopilot: The Future of Smart-Drone



Advanced Flight Control

With autopilot mode, our drones will be capable of handling complex flight operations with precision and accuracy, unlocking new possibilities for commercial and industrial applications.



Integrated Sensors

Smart-Drones will be equipped with integrated sensors that can detect obstacles, monitor weather conditions, and collect critical data for research and technical purposes.



Automation

With advanced AI capabilities and intuitive design, smart-drones will be able to operate with minimal human input, making tasks faster, safer, and more efficient.