

History of Drones

Objectives:

1. Understand the Definition of Drones
2. Learn About the History of Drones
3. Familiarize Yourself with Drone Classification
4. Gain Knowledge of the Flight Principles of Drones
5. Get Acquainted with the Eagle Drone and Complete a Takeoff and Landing Task with a Controller



Lead-in



Lead-in



On the way home from school, Joy saw someone holding a remote control to fly an aircraft. Have any of you seen this type of aircraft before?



Lead-in



This type of aircraft is called an unmanned aerial vehicle (UAV), commonly known as a drone. It is an aircraft operated without a human pilot on board, controlled through radio remote control devices.



Analysis



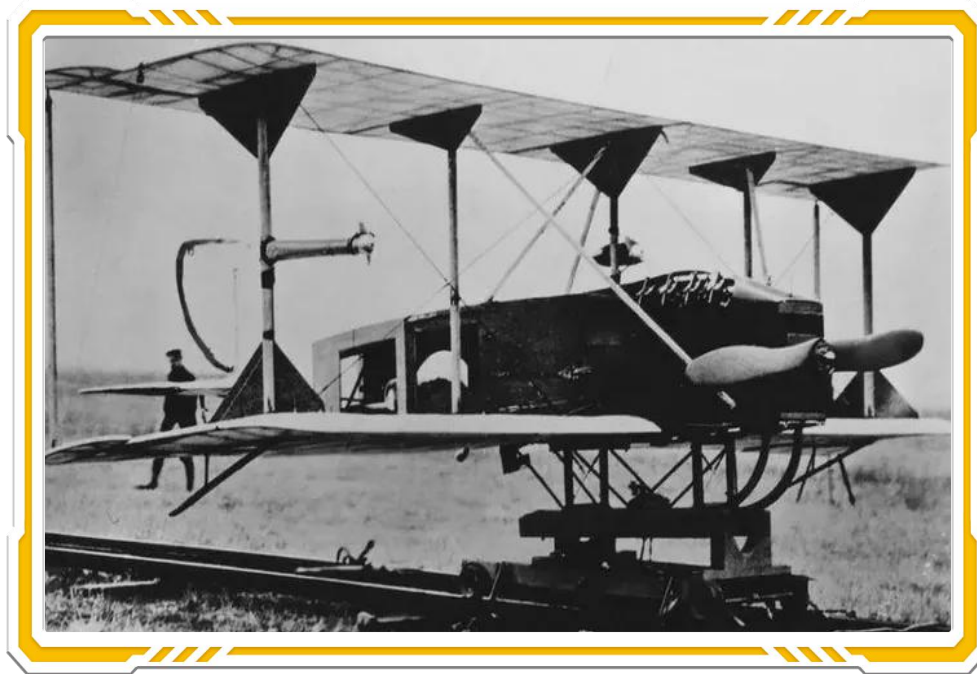
Analysis



Do you know when was the first drone invented? What's the history of drones?



Analysis



In 1917, Pete Cooper and Elmer A. Sperry created the first automatic gyroscope stabilizer. The United States used this technology to produce the world's first drone, known as the "Sperry Aerial Torpedo".



Analysis



It wasn't until 1935, with the invention of the "Queen Bee", that drones were able to return to their takeoff points. This is the true beginning of the drone era.



Analysis



In December 1986, the Pioneer series of drones had their first flight, helping people see pictures of places and things they needed to know about right away.



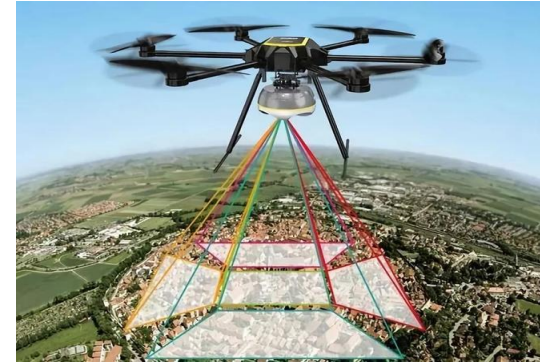
Analysis



In the early 21st century, mini drones were invented. They were much smaller and could stay steady in the sky. As time went by, more and more people started using these mini drones to take amazing pictures and videos from up high. This made the mini drones very popular.



Analysis



Drones have now evolved significantly, and they are used across various industries. Do you know the different types of drones?



Analysis

Fixed-Wing Aircraft



Advantages: Long endurance; large payload capacity; high speed.
Disadvantages: Needs a runway for takeoff; needs a glide path for landing; cannot hover in mid-air.
Applications: Military and professional-level civilian use.

Unmanned Helicopter



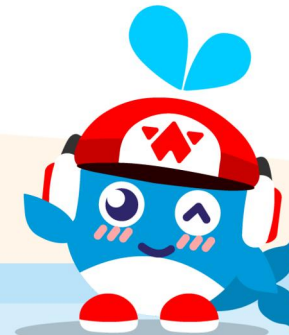
Advantages: Vertical takeoff and landing; hovering capability; high flexibility.
Disadvantages: Complex wing structure; high maintenance costs.
Applications: Military and professional-level civilian use.

Multi-Rotor Aircraft



Advantages: Vertical takeoff and landing; easy to operate; cost-effective.
Disadvantages: Limited payload capacity; high flight control requirements.
Applications: Consumer-level and professional-level civilian use.

Based on platform configuration, drones can be categorized into fixed-wing drones, unmanned helicopters, and multi-rotor aircraft. The most commonly seen in our daily lives are multi-rotor drones.



Analysis

Civilian Drone



Civilian-level drones are used in fields like agriculture and forestry, including tasks like spraying, seeding, and disaster monitoring. They are also used in law enforcement, fire safety, meteorology, traffic patrol, circuit inspections, urban infrastructure, resource exploration, and cartographic surveys.

Consumer Drone



Consumer-grade drones are well-suited for personal photography, cinematography, live broadcasting, and other recreational activities. Through mature technology, they have lowered the entry barrier, allowing the general public to experience the thrill of drones up close.

Drones used in our daily lives can be classified into two types based on their usage: civilian drones and consumer drones.



Further Study



Further Study

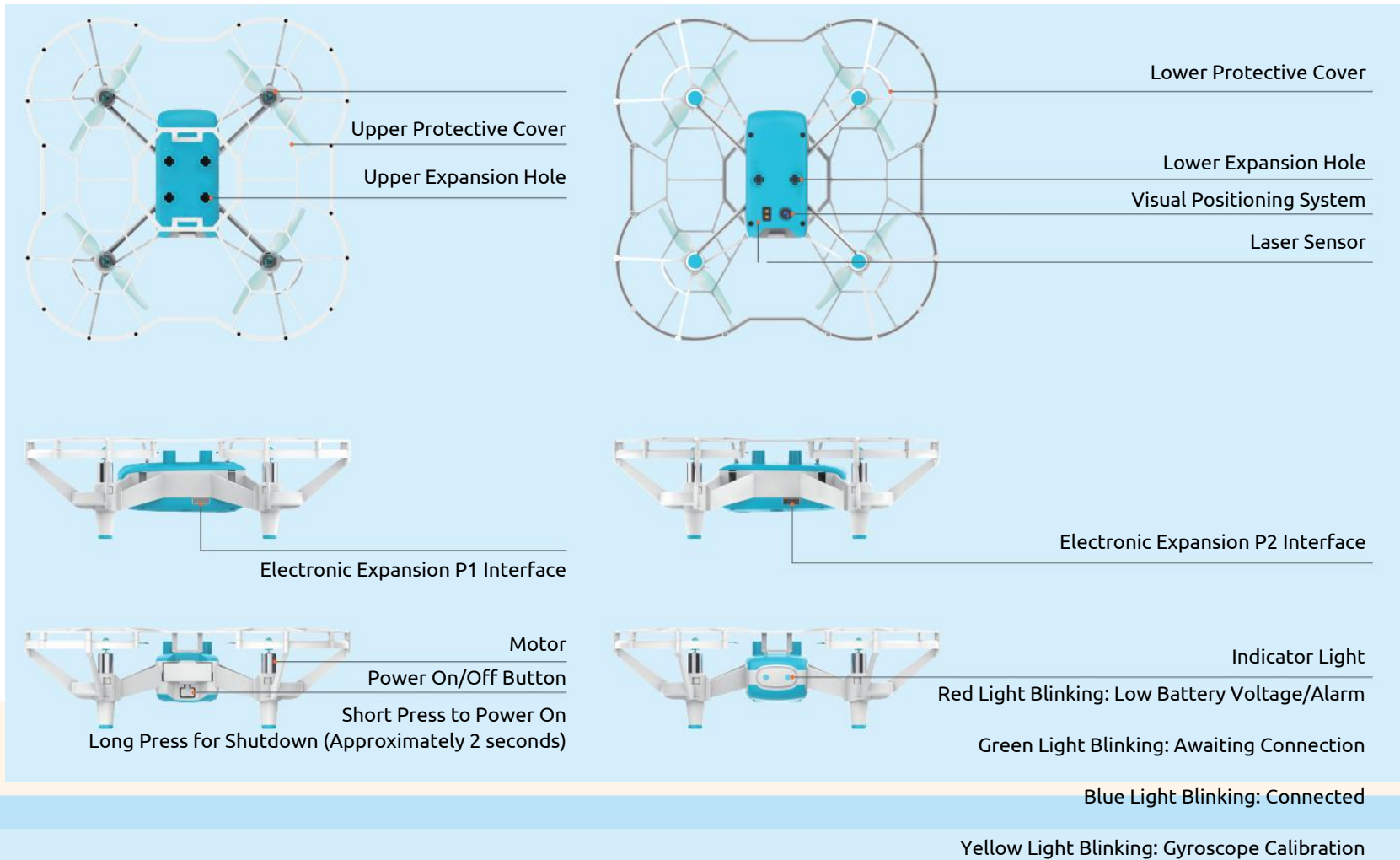
Getting to Know Eagle Drone

The Eagle drone is an educational programming drone equipped with a high-performance visual processor and the innovative WhalesBot flight control system.



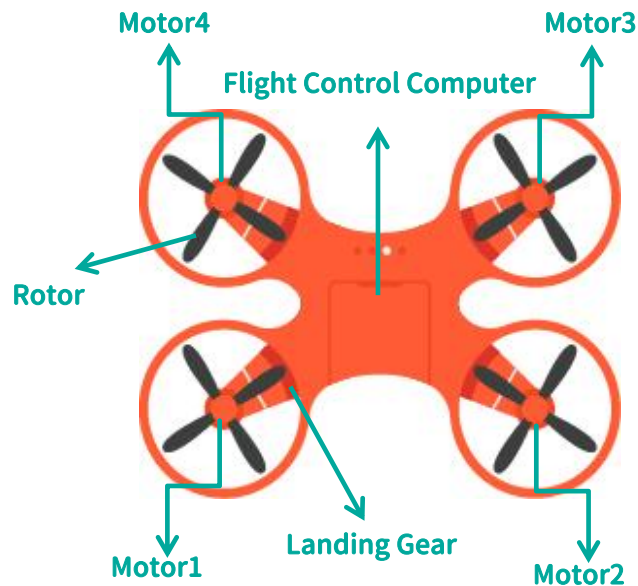
Further Study

Getting to Know Eagle Drone



Further Study

Quadcopter Structure



The four rotors are symmetrically distributed in four directions: front, back, left, and right, all at the same height and with the identical radius. The four motors are symmetrically mounted at the ends of the landing gear, with the flight control computer and external equipment installed in the space between the landing gear.

Operating Principle:

A quadcopter adjusts the rotor speeds of its four motors to alter rotor speeds and, consequently, lift, allowing it to control its attitude and position in flight.

Further Study

Exploring the Principles of Fluid Mechanics

- (1) Take an A4 paper and fold it into a C shape, then place it upside down on the table (as shown in Figure 1). Blow air through the arch formed in the middle and guess what will happen.
- (2) You will observe that the paper is not blown away but deformed (as shown in Figure 2).



Figure 1

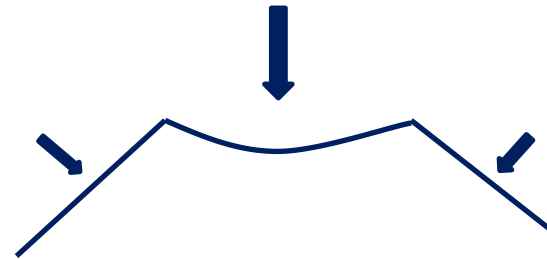
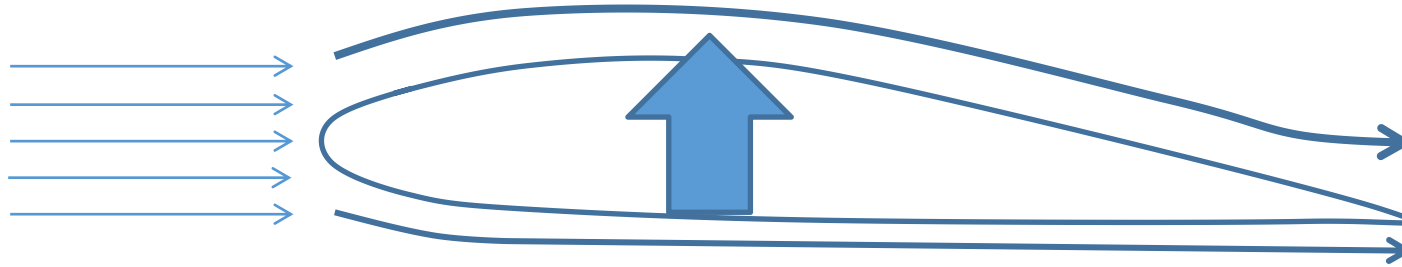


Figure 2

This is because the airflow in the middle has a higher velocity, resulting in lower pressure, while the external airflow exerts pressure on the middle. On the other hand, the airflow on the sides has a slower velocity and higher pressure.

Further Study



The airflow passing above has higher velocity and lower pressure. Conversely, the airflow passing below has slower velocity and higher pressure.

According to the principles of fluid mechanics, when an aircraft is in motion, the air pressure on the upper surface of the wing is lower than on the lower surface, which generates an upward force, known as lift.

Further Study

Let's think about how we can make the drone take off.



Further Study

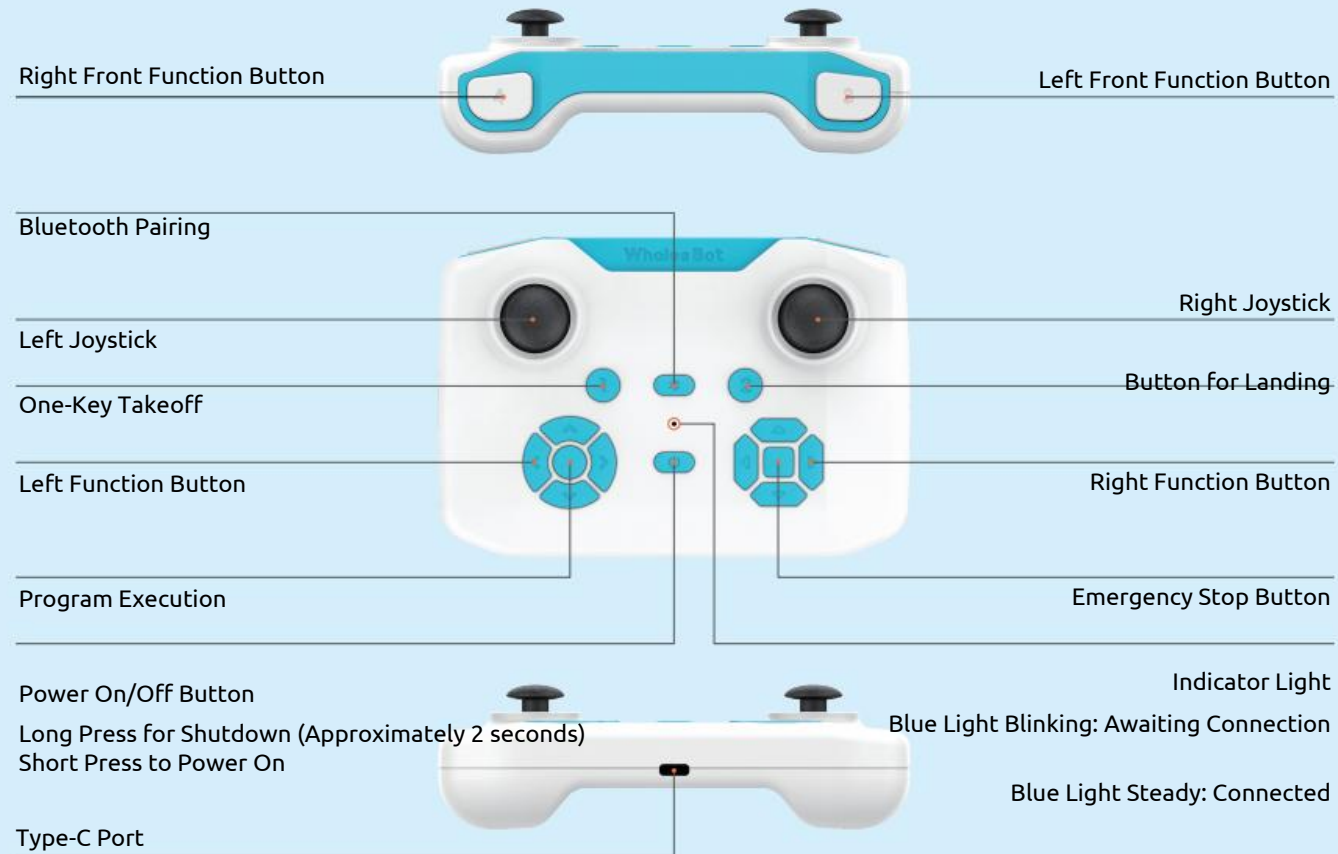


The Eagle drone is an educational programming drone that can be controlled both manually with a remote control and through programming.

In this lesson, let's start by learning the relatively simple remote control flight.

Further Study

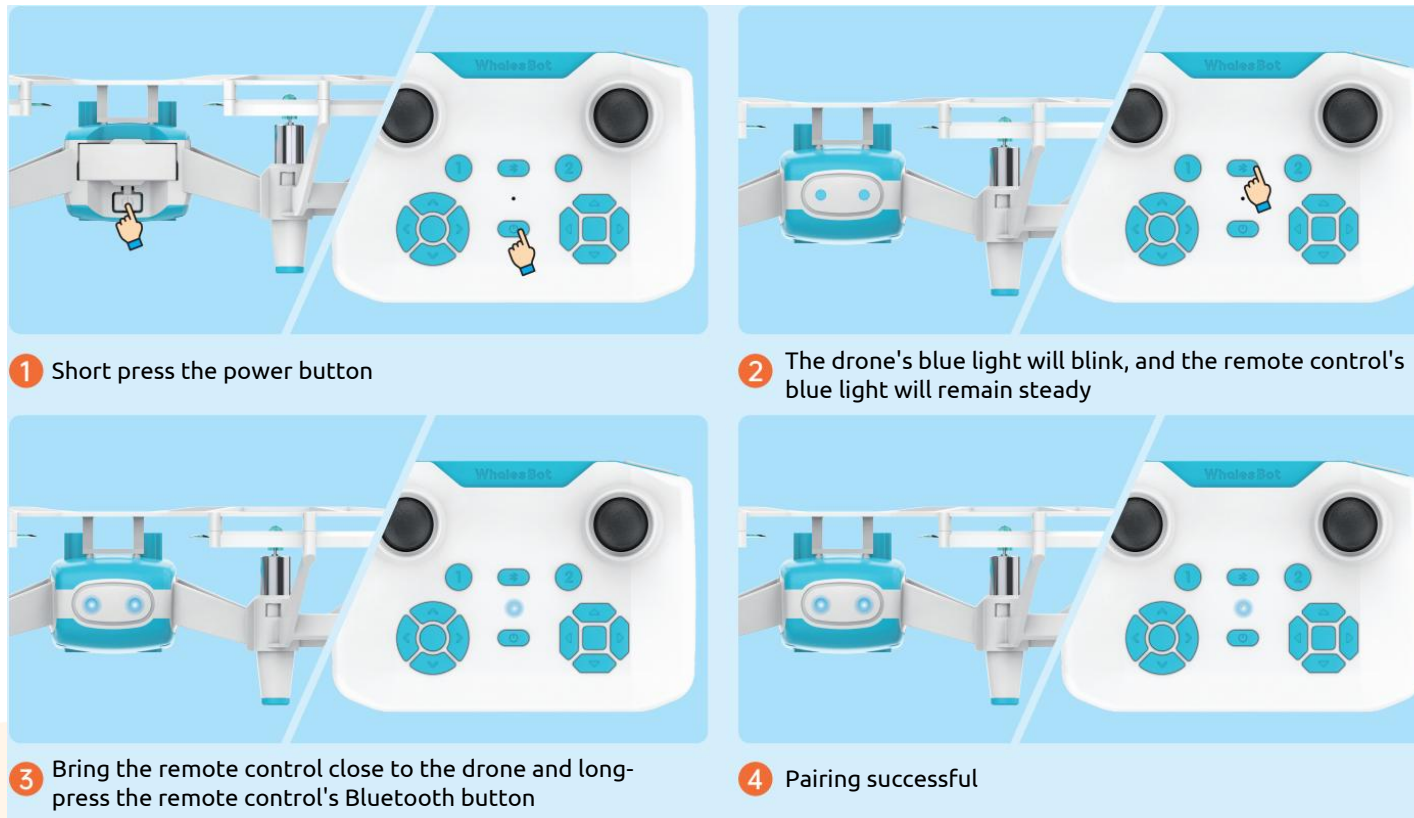
Getting to Know the Remote Control



Further Study

Pairing the Drone with the Remote Control

To control the drone through the remote control or programming, you need to pair the drone with the remote control. Please follow these steps to complete the pairing process:



Further Study

Takeoff and Landing

Once paired, you can unlock the drone and use the remote control to take off and land. Give it a try!

Unlocking

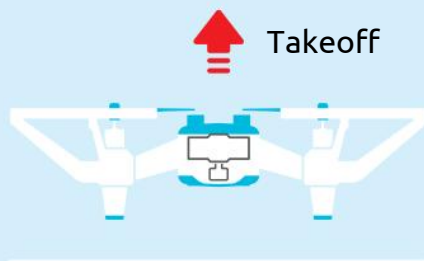
Move the remote control's joysticks simultaneously as shown in the diagram. When the drone's propellers spin at a low speed, it indicates that the drone is unlocked.



Note: After unlocking the drone, do not approach the rotating propellers.

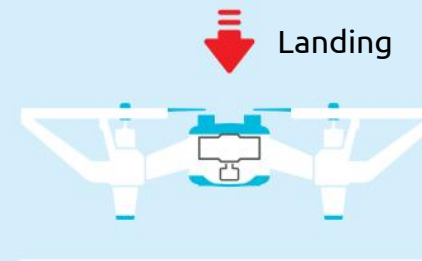
Takeoff

Press the "1" button on the remote control to make the drone take off.



Landing

Press the "2" button on the remote control to make the drone land.



Conclusion



Conclusion

Students, could you please review what we learned in this lesson?

1. Definition of a drone
2. The main history of drones
3. Classification of drones
4. Principles of drone flight
5. Using the remote control to control the takeoff and landing of the Eagle drone.

Conclusion



Let's memorize the use of the remote control and practice how to control the drone's takeoff and landing!

See you next time!