Drones

A **drone** is a flying robot that can be remotely controlled or fly autonomously using embedded software that works with sensors and through a global positioning system (GPS). Initially, the sensors were designed to simply detect objects in front of the drone, but today drones may be equipped with ultrasonic, laser, distance, chemical, stabilisation and orientation sensors, and sensors to detect obstacles and avoid collisions. For landing, drones use visual positioning systems with downward-facing cameras and ultrasonic sensors, which determine how close the drone is to the ground.

Types of drones

There are four main types of drones:

- **Multirotor drones** are the easiest and cheapest. They offer great control over position so they are perfect for aerial photography and surveillance. They are called multi-rotor because they have more than one rotor, more commonly, they are tricopters (3 rotors), quadcopters (4 rotors), hexacopters (6 rotors), or octocopters (8 rotors). By far, quadcopters are the most popular ones. They are mainly used in visual inspections, thermal reports, photography, videography and 3D scans.

- **Fixed-wing drones** have one rigid wing that is designed to work like an airplane, so this drone type only needs the energy to move forward and not to hold itself in the air; this makes them energy-efficient. They are mainly used in aerial mapping, forestry/environmental surveys, agriculture and construction.

- **Single-rotor drones** are strong and durable. They look very similar to helicopters in structure and design. They have just one rotor which is like one big spinning wing, and a tail rotor to control direction and stability. They are mainly used in aerial LIDAR laser scanning, drone surveying and to carry heavy loads.

- **Hybrid VTOL** drones merge the benefits of fixed-wing and rotor-based designs: the rotors are attached to the fixed wings, allowing it to hover, take off and land vertically. They are mainly used in drone delivery.

Some other popular drones are **small drones**, which are used for recreational purposes, and **micro drones**, which can still provide valuable intelligence thanks to their micro-cameras. The British military commonly uses this type of drone called the Black Hornet.

Black Hornet

downward: *verso il basso*
to embed: *incorporare*
to hover: *librarsi*
to merge: *fondere*
to survey: *fare una mappatura*
tail: *coda*

1 Complete the map with the missing words.

DRONES

a flying **1.** ..... that can be remotely controlled or fly **2.** .....

features

- work with sensors and through **3.** .....
- **4.** ..... used: ultrasonic, laser, distance, chemical, stabilisation, orientation
- downward-facing **5.** ..... and ultrasonic sensors for **6.** .....

types

- multirotor drones: tricopters, quadcopters hexacopters and **7.** .....
- **8.** ..... drones: one rigid **9.** .....
- single-rotor drones: one rotor and a **10.** ..... rotor to control direction and stability
- hybrid **11.** ..... drones: rotors attached to fixed wings
- small drones: **12.** ..... purposes
- micro drones: micro **13.** .....

2 Complete the sentences with the missing expressions.

1. Drones are equipped with sensors that can ....., avoid collisions, and determine the distance from the earth.
2. Multi-rotors drones are so called because they have ..... and are mainly used in visual inspections, thermal reports, photography and videography and 3D scans.
3. Fixed-wing drones only need the energy to move forward and not to hold themselves .....
4. Single-rotor drones are ..... and look very similar to helicopters in structure and design.
5. Hybrid VTOL drones have rotors attached to the ....., allowing them to hover and take off, and land vertically.
6. The ..... uses a micro drone called the Black Hornet.

3 Read the text and summarise it.

What is a Drone? How does it work?

What is a drone? A drone is a flying robot that can be remotely controlled or fly autonomously using software-controlled flight plans in embedded systems working with onboard sensors and GPS. Also called Unmanned Aerial Vehicles (UAVs), drones perform tasks from grocery delivery to ultra-dangerous missions. Originally developed for military and aerospace use, they are now used widely because of their safety and efficiency.
UAVs operate without a pilot onboard and have varying autonomy levels, from remote control to advanced autonomy relying on sensors to calculate movement. Drones vary in range, height, and purpose. Very close-range drones can travel up to three miles and are mainly used by hobbyists.

Close-range UAVs reach about 30 miles. Short-range drones can travel up to 90 miles and are used for espionage and intelligence gathering. Mid-range UAVs can travel about 400 miles and support intelligence, scientific studies, and meteorological research. Longest-range endurance UAVs exceed 400 miles and fly up to 3,000 feet high.
Because they can be remotely controlled and fly at different distances and heights, drones handle difficult tasks, including disaster search and rescue, law enforcement and military surveillance, and scientific research in extreme environments worldwide today across many industries and critical missions everywhere.

Adapted from: *https://www.youtube.com/watch?v=khI3XgPXIMI*