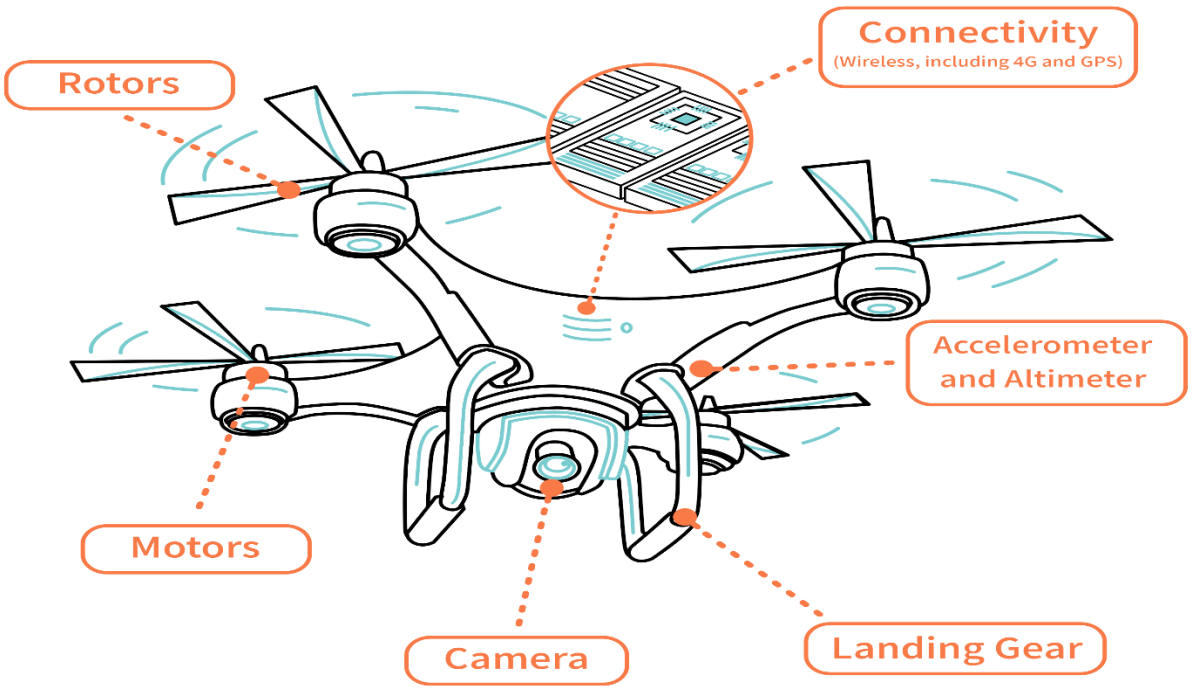
2.2 OVERVIEW OF THE MAIN DRONE PARTS



Here is an overview of the **main parts of a drone**:

1. Frame

- **Purpose**: The frame is the body or skeleton of the drone. It holds all the components together.
- **Materials**: Commonly made from carbon fiber, plastic, or aluminum for lightweight and durability.

2. Motors

- **Purpose**: The motors power the propellers, allowing the drone to lift and maneuver. Most drones have four motors (quadcopter), but there are hexacopters (six motors) and octocopters (eight motors) as well.
- **Type**: Brushless motors are most commonly used for efficiency and long life.

3. Propellers

- **Purpose**: Propellers generate the lift needed for flight. Each motor drives a propeller, and their coordinated speeds control the drone's movement.
- **Shape**: They are often bi-bladed or tri-bladed, with different designs for optimizing flight performance.

4. Electronic Speed Controllers (ESCs)

- **Purpose**: ESCs control the speed and direction of the motors by regulating power input. They take signals from the flight controller and adjust motor speeds accordingly.
- **Location**: Usually mounted on the arms of the drone near the motors.

5. Flight Controller

- **Purpose**: The brain of the drone, responsible for stabilizing and controlling the drone's flight. It processes input from the user and onboard sensors to manage motor speeds, flight path, and orientation.
- **Features**: Includes a gyroscope, accelerometer, and sometimes a barometer, GPS, and compass.

6. Battery

- **Purpose**: The primary power source for the drone. Most drones use lithium polymer (LiPo) batteries due to their high energy density and lightweight design.
- **Voltage**: The voltage (number of cells) determines the power available for the motors and flight time.

7. GPS Module

- **Purpose**: Provides location data to the flight controller. Essential for autonomous flight, return-to-home features, and positioning.
- **Optional**: Found in more advanced drones for precise navigation.

8. Transmitter (Remote Controller)

- **Purpose**: The user interface that sends signals to the drone, controlling its movement, speed, and orientation. It communicates with the drone’s receiver.
- **Frequency**: Commonly uses radio frequencies like 2.4 GHz or 5.8 GHz.

9. Receiver

- **Purpose**: Installed in the drone to receive commands from the transmitter. It sends these commands to the flight controller for execution.

10. Camera (Optional)

- **Purpose**: Allows for aerial photography or videography. Some drones have built-in cameras, while others support external mounts like GoPro.
- **Gimbal**: Often paired with a gimbal to stabilize the camera during flight for smooth footage.

11. Landing Gear

- **Purpose**: Protects the drone's body, especially during takeoff and landing. Some drones have retractable landing gear, while others have fixed legs.

12. Antennas

- **Purpose**: Used for communication between the drone and the controller, as well as for video transmission if a camera is used.
- **Types**: FPV (First Person View) drones have antennas for real-time video streaming to the user.

13. FPV (First Person View) System (Optional)

- **Purpose**: Provides a live video feed to the user, giving a real-time view from the drone's perspective. Often used in racing or for cinematic drone shots.
- **Components**: Includes a camera, video transmitter (VTX), and video receiver (VRX), usually integrated into goggles or screens.

14. Sensors

- **Purpose**: Drones often include additional sensors like:
  - **Ultrasonic sensors**: For altitude control and obstacle detection.
  - **Infrared sensors**: For detecting heat or object proximity.
  - **Barometer**: For measuring altitude by detecting air pressure.

15. Power Distribution Board (PDB)

- **Purpose**: Distributes power from the battery to the motors, ESCs, and other components like the flight controller and sensors.

These are the essential parts of a drone, each contributing to its flight, control, and functionality.