

# Drones/UAS Glossary:

## TERMS & DEFINITIONS FOR BEGINNERS

Learn the basic terminology for the drone/UAS technology. From accelerometers to yaw (and everything in between), CompTIA's Drone Advisory Council compiled a comprehensive list of words and phrases that beginners should know if they're looking to start a drone business initiative.

### **2.4 GHz Spread Spectrum**

GHz is short for gigahertz and describes the radio frequency rate used by a drone controller. The 2.4 gigahertz spread spectrum controllers have become the gold standard for low budget drones. Because the spread spectrum is "frequency agile," it can "hop" to different frequencies to account for atmospheric or other issues a drone pilot may experience, which means fewer crashes.

### **5.8 GHz**

Used in hobby and professional grade RC drones. A live feed sent from a drone's camera that provides better range and less lag. Popular in FPV racing and usually paired with a set of FPV goggles.

### **808 Camera**

A common term for a range of very small cameras, often sold as "keychain cameras." They are extremely lightweight and used by hobbyists to take photographs from a multi-rotor aircraft.

### **250 Racer**

A racing multicopter that's 250mm diagonally from end to end. A common type of quadcopter among FPV racers.

### **Accelerometer**

A device that measures the acceleration forces in a certain direction, helpful in maintaining the drone's orientation. Accelerometers are used to stabilize quadcopters.

### **Aerial Photography**

The hobby of capturing images and video with a camera mounted to your airborne drone.

### **AGL**

The altitude above ground level.

### **Altitude Hold Function**

Allows pilot to focus on the camera while the drone hovers steadily in the air at a set height. Typically, an onboard barometer is needed to allow altitude hold. Some cameras also have the ability to determine distance from the ground, further contributing to altitude hold.

### **Autopilot**

The capability of a drone to conduct a flight without real-time human control. For example, following pre-set GPS coordinates. Autopilots do not replace human operators. Instead, the autopilot assists the operator's control of the vehicle, allowing the operator to focus on broader aspects of operations (for example, monitoring the trajectory, weather, and onboard systems).

### **Autonomous Flight**

Some UAS are managed by internal software instruction sets that guide the aircraft's operations. Frequently, these systems utilize the GPS system for navigational control. Examples of non-autonomous flight are steering mechanisms operated by radio control from the ground.

### **Axis**

One plane of potential flight. Most multirotor UAVs have at least four axis controls, with at least six being preferred.

### **Balanced Battery Charger**

A charger or internal charging regulation and management system for lithium polymer and other rechargeable batteries. Uses smart technology to properly charge multiple cells that are located within the battery and balances them.



### **Barometric Pressure Sensor**

A device that uses barometric readings to determine the altitude of the aircraft. It can help drones calculate their height above ground level and can be used with combinations of other sensors. Barometric pressure sensors can be used to enable altitude hold.

### **Battery**

Onboard batteries may power the flight controller, receiver, FPV transmitter, and rotors (via ESCs).

### **Bind**

The process of making the controller (transmitter) communicate with the drone. Often, bind is used to create a connection between two or more software-controlled objects.

### **Brushless Motor**

Motors that have permanent magnets that rotate around a fixed armature, eliminating problems that could be associated with connecting current regarding a moving part. Brushless motors tend to be more efficient and harder than brushed motors.

### **BVLOS**

Beyond visual line of sight.

### **Carbon Fiber**

A composite material often used to build drone frames and components. Known for its light weight, strength, and durability.

### **Channel**

Referring to either a frequency used by an FPV transmitter (for video from a drone) or an assigned function linking a controller transmitter with a drone. For example, a channel may be assigned to control throttle, or turning lights on and off. Most drones use at least six channels for control.

### **Collision Avoidance**

Many UAVs have collision avoidance systems to prevent pilots from flying into fixed objects or other aircraft. It is also known as sense and avoid.

### **Controller (sometimes Flight Controller)**

A handheld device used by the pilot to control the drone. Controllers are also called a transmitter or radio. The computer on the drone that helps the drone fly. Controllers can be as simple as taking radio signals and signaling the ESCs, to working with accelerometers, GPS and other sensors to control all aspects of the drone's flight.

### **Drone**

Also known as unmanned aerial vehicles (UAVs), drones are aircraft without a human pilot aboard. They are either controlled by pilots on the ground or autonomously via a pre-programmed mission.

### **Electronic Speed Control (ESC)**

The device for controlling an electric aircraft's motor. It is the connection between the RC receiver and main battery. It usually includes a Battery Elimination Circuit (BEC), which provides power for onboard electronics like an autopilot and the RC system.

### **Fail Safe**

A system that helps protect a multicopter in case of some type of error. For example, if a quadcopter loses its control signal, a failsafe will have the quadcopter return to the point of takeoff (return home).

### **FAR**

Federal Aviation Regulation.

### **Federal Aviation Administration (FAA)**

The United States Department of Transportation agency with the authority to regulate and oversee all aspects of American civil aviation.

### **Field of View (FOV)**

FOV refers to the measurement of how much environment you can see through a camera lens, usually measured in degrees.

### **First-Person View (FPV)**

Also known as "Remote Person View" (RPV), a system in which the drone operator views the camera footage from the drone in real-time. The video stream is either viewed through a pair of special goggles, or to a device like a tablet or smartphone.

### **Firmware**

Software loaded into microprocessor-based products' non-volatile memory. It remains in a non-volatile memory state even when power is removed. In the autopilot's case, it is an application (App for smart phone users) or program that determines how and what the auto pilot does.

### **Flight Control System**

An interconnected network of controls that allows the pilot to fly the quadcopter or any other multi-rotor airborne vehicle.



### **Fly Away**

Unintended flight outside of operational boundaries (altitude/air-speed/lateral), often the result of a failure of the control element or onboard systems, or both.

### **FPV Camera**

A special camera used for first-person-view racing, piloting, photography, or videography.

### **FPV Goggles**

A special set of goggles used to view what the multirotor's camera is seeing in real time.

### **FPV Racing**

A sport in which pilots race small quadcopters around a predetermined track.

### **Frequency**

The radio band on which FPV equipment runs. The frequency can be brand dependent and multiple channels prevent pilots from interfering with each other's operations.

### **Geofencing**

The use of GPS technology to create a virtual geographic boundary, enabling software to trigger a response when a drone enters or flies within a particular area.

### **Gimbal**

This is a specialized mount for a camera, giving it the ability to swerve and tilt by utilizing servos. This gives the camera the capability of staying in one position, regardless of the movement of the drone. This allows for a very smooth and stabilized looking image.

### **GIS**

Geographic Information System designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

### **GPS**

Global Positioning System, used to track the position of an object in relation to the global spatial plane, track movement, or cause an airborne vehicle such as a quadcopter to hold position.

### **Ground Control Station**

Software that runs on the ground on a computer. It receives telemetry information via an airborne UAV and displays status and progress. This frequently includes sensor and video data. It can also be used for transmitting in-flight commands up to the UAV in the air.

### **Gyroscope**

A gyroscope, or gyro, measures the rotation rate of the UAV and helps keep the craft balanced correctly with respect to yaw, pitch, and roll. Helps to maintain the orientation of the quadcopter while in flight. In most cases, quadcopters use a triple-axis gyroscope.

### **Hexicopter**

A multi-rotor aircraft that uses six rotors. An advantage of a hexicopter is that it can lose any single engine and still maintain control to land.

### **Hobbyists**

Noncommercial pilots that fly UAVs domestically. Their aircrafts can't go more than 400 feet in altitude and must be line-of-sight.

### **Inertial Measurement Unit (IMU)**

A controller that combines an accelerometer and a gyro, with the purpose of helping with the orientation and stabilization of a quad.

### **Inertial Navigation System (INS)**

A means of calculating position based on an initial GPS reading. This is followed by speed and motion sensor readings that use dead reckoning, useful when the GPS temporarily loses its signal or is not available.

### **Intelligent Orientation Control (IOC)**

Usually, the forward direction of a flying multi-rotor is the same as the nose direction. By using Intelligent Orientation Control, the forward direction is unrelated to nose direction.

### **LAANC System**

Low Altitude Authorization and Notification Capability system, an industry-developed application with the goal of providing drone operators near real-time processing of airspace notifications and automatic approval of requests for flights in controlled airspace.

### **Landing Gear**

The undercarriage of an aircraft, including the wheels or pontoons on which it rests while not in the air.



### **LCD Monitor**

A video screen, usually attached to the controller, used to view what a multirotor's camera sees. Often used instead of goggles.

### **Line of Sight (LOS)**

The ability to see your drone from an operating position with your naked eye. Typically, drones should always be within your line of sight.

### **LiPo**

Short for Lithium Polymer, LiPo is a type of battery favored by most drone manufacturers due to its low weight and maximized charge capacity and power. Although LiPos are typically safe, overcharging the battery or breaking the flexible polymer case could result in fire.

### **Lithium Polymer battery**

LiPo or LiPoly. The Lithium-Ion battery (Li Ion) is a variant. Lighter weight and more power are offered by this battery chemistry compared to NiCad and NiMh batteries.

### **mAh:**

milli Amp Hours. A unit of measurement that describes how much power a battery can provide before it needs to be recharged.

### **Mod**

Modifications that drone owners make to their machines to integrate new functions or cool features.

### **Mode 1 Transmitters**

Transmitters with throttle on the right stick (popular in the UK).

### **Mode 2 Transmitters**

Transmitters with throttle on the left stick (popular in the USA).

### **Multicopter**

Generic name for a drone with multiple propellers, also known as rotors. Depending on the number of rotors, there are tricopters, quadcopters, hexacopters, octocopters, etc.

### **Multi-Rotor Copters**

A UAV featuring multiple rotors. Other names include: drone, quadcopter, quadricopter or quadrocopter.

### **Nano**

An extremely small drone, often one that can fit in the palm of your hand and is easy to fly indoors.

### **National Airspace System (NAS)**

The airspace, navigation facilities and airports of the United States, along with their associated information, services, rules, regulations, policies, procedures, personnel, and equipment. It includes components shared jointly with the military.

### **NAZA**

A flight controller used on the DJI Phantom Drones and contains the main control chip, an accelerometer, a gyroscope, and a barometric altimeter.

### **No-Fly Zone**

Areas where flying a drone is restricted by government regulations because the drone could interfere with an airplane or record sensitive information.

### **Octocopter**

A drone with eight horizontal propellers or rotors.

### **On-Screen Display (OSD)**

A screen that shows flight data in text or graphical form. Typically used to show telemetry information such as speed, battery life, heading, etc.

### **Part 107**

Required in the U.S. when operating a drone for commercial purposes. Refers to CFR Part 107 of the Federal Aviation Administration. Regulations for non-hobbyist unmanned aircraft operations, which covers a broad spectrum of commercial uses for drones weighing less than 55 pounds.

### **Payload**

The amount of additional weight a drone is able to lift in addition to its own weight and batteries. For example, when attaching a camera and gimbal to your drone, the combined weight is the payload.

### **Pilot in Command (PIC)**

The person responsible for the operation and safety during flight of an unmanned aerial vehicle.

### **Pitch**

A measure capturing the flight angle along one axis, usually measured from level in the case of aerial vehicles. Forward and backwards motion.



### **Power Distribution Board (PDB)**

A board used on multicopters to help distribute power to each motor in order to provide proper stabilization of the unit.

### **Pre-Flight Planning**

The activities conducted by the pilot and flight crew prior to takeoff to ensure that the flight will be conducted safely and in accordance with all applicable standards and regulations. The activity includes, but is not limited to, such things as checking weather, route of flight, airspace, equipment configuration, support personnel, terrain, and communications requirements.

### **Prop**

Short for Propeller.

### **Quadcopter or Quad**

A UAV that typically has four rotors, each with its own motor and propeller, situated in a square formation for smooth and precise flight.

### **Raceband**

A set of 5.8 GHz frequencies commonly used in drone racing when multiple pilots are flying.

### **Radio**

Also known as a transmitter or controller, a device set to broadcast on a specific frequency or channel that sends a signal to control pitch, yaw, roll direction of the drone.

### **Radio Controller**

Wireless handheld device used to control flight of the drone.

### **R/C**

Synonym for radio controlled.

### **Receiver**

Accepts the camera's feed and relays it to your screen/goggles of choice.

### **Return to Home**

A GPS feature that returns the drone to the "home" position where it took off.

### **Rx**

Abbreviation for receiver.

### **Sense and Avoid**

The capability of a UAS to remain well clear from and avoid collisions with other airborne traffic. Sense and Avoid provides the functions of self-separation and collision avoidance.

### **Servo**

A shorter name for servomotor or servomechanism. Aerial vehicles use servomotors for various functions such as pan cameras and wing flaps adjustments which can be controlled from the ground.

### **Spotter**

A person that keeps track of your drone by line-of-sight while you fly via FPV. They are helpful to let pilots know about hazards which may be out of the pilot's field of view through goggles.

### **sUAS**

Short for small unmanned aircraft systems.

### **Telemetry**

Data referring to all aspects of a flying drone. Speed, altitude, pitch, roll, yaw, battery life, position, etc.

### **Throttle**

A control that influences the RPM or the speed of electric motors. Higher throttle generates more thrust.

### **Thrust**

The combined amount of force from a propeller and a motor which generates lift. Lift is what takes you up and into the sky.

### **Transmitter**

A device that sends commands to the drone from the pilot or a component that relays the camera's feed to the receiver located on the goggles.

### **Trim**

A setting to adjust the way a drone hovers in the air. Adjusting trim settings can help to keep it in place while hovering.

### **TX**

Abbreviation for transmitter or transmit.

### **UA**

Unmanned aerial. A description most often followed by "S" for systems or "V" or vehicles. Describes a system in which a pilot operates of a device remotely.



## **UAS**

Unmanned aircraft systems. A term adopted by the United States Department of Defense (DoD) and the United States Federal Aviation Administration (FAA) in 2005 to emphasize the inclusion of other elements in a solution besides the unmanned aerial vehicle (UAV), including support equipment, stations, applications, and networking components.

## **UAV**

Unmanned aerial vehicle. A device that can propel itself through the air without a pilot onboard. Drones and quadcopters are UAVs.

## **Ultrasonic Sensor**

A sensor that uses the ultrasound wavelength to communicate with a transmitter. In aerial vehicles, ultrasonic sensors are used for calculating the distance to the ground by bouncing sound waves back and forth. They don't work further than a few meters from the ground.

## **UTM**

Abbreviation for Unmanned Traffic Management, a concept created by NASA to safely integrate manned and unmanned aircraft into low-altitude airspace. This cloud-based system will help manage traffic at low altitudes and avoid collisions of UASs being operated beyond visual line of sight.

## **Video Latency**

Lag in time between what a camera sees and what it transmits to a monitor or goggles.

## **Visual Line of Sight (VLOS)**

How the pilot can see the aircraft from the ground without the use of artificial vision.

## **Visual Observer**

A crew member who assists the UAS pilot in the duties associated with collision avoidance. This includes, but is not limited to, avoidance of other traffic, airborne objects, clouds, obstructions, and terrain. Most associated with FPV flying.

## **Waiver**

The FAA issues waivers (or authorizations) to certain requirements of Part 107 if an applicant demonstrates they can fly safely under the waiver without endangering people or property on the ground or in the air.

## **Waypoint**

A set of coordinates that define a point in space. Waypoints are useful in designing various autonomous missions for quadcopters. Mapping out would be impossible without a possibility to define these physical locations.

## **Wi-Fi FPV**

Mostly found on cheaper drones, usually performed by a downloadable app that allows you to connect to a live feed. The signal is compatible with most Android/iOS smartphones and tablets.

## **Yaw**

The rotation of a quadcopter around its center axis on a level plane.

1 Airdronecraze.com. 2017. "Quick Reference Guide of Drone Terminology." Retrieved Feb. 28, 2018 (<https://www.airdronecraze.com/quick-reference-guide-of-drone-terminology/>).

2 Go Professional Cases. 2017. "UAV, Drone and Multirotor Glossary of Terms." Retrieved Feb. 28, 2018 (<https://goprofessionalcases.com/drone-case-resources/uav-and-drone-and-multirotor-glossary-of-terms>).