

Unmanned Aircraft Systems Terms and Abbreviations

Term	Definition
2.4 Ghz	The frequency used by digital (spread spectrum) radio communications in our applications, including 2.4Ghz RC, Bluetooth and some video transmission equipment. This is a different band than the older 72 Mhz band that is used for analog RC communications. To avoid radio frequency conflict is it often a good idea to use 72 Mhz radio equipment when you are using 2.4 Ghz onboard video transmitters, or use 900 Mhz video when using 2.4 Ghz RC equipment.
Accelerometer	A device that measures the acceleration forces in a certain direction and helpful in maintaining the Drones orientation. These devices are used to stabilize quadcoptors.
Aerial Photography	Capturing images and video while in the air with a camera mounted to your drone.
AGL	Altitude above ground level
AHRS	Altitude Heading Reference System. An IMU (see below) plus the code to interpret the output from its sensors to establish a plane's XYZ and heading orientation.
Altitude Hold (ALT Hold)	Allows pilot to focus on the camera while the drone hovers steadily in air by itself at a set height.
AMA	Academy of Model Aeronautics. The main US model aircraft association. The AMA works closely with the Federal Aviation Administration (FAA) to establish reasonable rules for the use of amateur UAVs. Each AMA chapter and field may have slightly different policies, but it's possible to fly and test air frames and some technology on AMA fields without violating the association's (or FAA/NAS) rules.
Arduino	An open source embedded processor project. Includes a hardware standard currently based on the Atmel Atmega168 microprocessor and necessary supporting hardware, and a software-programming environment based on the C-like Processing language.
ATC	Air Traffic Control
Autopilot	A capability of a drone to conduct a flight without real-time human control. For example, following pre-set GPS coordinates.
Autonomous Flight	There are some SUAVs's that are managed by internal programming that have instructions on where to fly as guided by an onboard GPS system. This is in opposition to steering mechanisms that are operated by radio control from the ground.

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Axis	One plane of potential flight. Most quadcopters have at least 4 axis controls, with 6+ being preferred.
Balanced Battery Charger	This is a charger or an internal system for Lipo batteries (or different chemistries) which uses smart technology to charge multiple cells properly that are located within the battery and balances them.
Barometric Pressure Sensor	This device used barometric readings to determine the altitude of the aircraft. It can help drones to be able to calculate their height above the ground, along with using combinations of other sensors. (Enables Altitude Hold feature)
Bind	The process of making the controller (Transmitter) communicate with the quadcopter or the drone.
BNF	Bind N Fly. The unit is ready to bind to your transmitter and fly.
BLOS	Beyond line of sight.
Brushless Motor	These motors have permanent magnets that rotate around a fixed armature, which eliminates any problems that could be associated with connecting current regarding a moving part. The brushless motors are much more efficient and hardy than brushed motors.
Camera gimbal	The holder of the camera used on drones. It can tilt and swerve, thanks to the servos that power it.
COA	Certificate of Authorization. A FAA approval for a UAV flight. See the faa.gov web site for more details
Commercial Flight	Flying a drone for money-making purposes.
Controller	The handheld device that is used by the drone pilot that is used to control the drone and the quadcopter. Controllers are also called transmitters.
Drone	UAV capable of autonomous flight
ESC	Electronic Speed Control. Device to control the motor in an electric aircraft. Serves as the connection between the main battery and the RC receiver. Usually includes a BEC, or Battery Elimination Circuit, which provides power for the RC system and other onboard electronics, such as an autopilot.
FAA	Federal Aviation Administration A United States Department of Transportation Agency, with the authority to regulate and oversee all aspects of American civil aviation.
Firmware	The software or sketch that is loaded into the non-volatile memory of microprocessor based products. It is called 'firmware' because it stays in the

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	non-volatile memory even if power is removed - thus ‘non’ - volatile. In the case of the autopilots, it is the ‘program’ or application (App to smart phone users) that determines what the auto pilot does, and how.
Fly Away	Unintended flight outside of operational boundaries (altitude/airspeed/lateral) as the result of a failure of the control element or onboard systems, or both.
FPV	First-person view. A technique that uses an onboard video camera and wireless connection to the ground allow a pilot on the ground with video goggles to fly with a cockpit view.
GCS	Ground Control Station. Software running on a computer on the ground that receives telemetry information from an airborne UAV and displays its progress and status, often including video and other sensor data. Can also be used to transmit in-flight commands to the UAV.
GPS	Global Positioning System that is 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
Gyroscope	A gyroscope or gyro, measures the rate of rotation 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.
IMU	Inertial Measurement Unit: Usually has at least three accelerometers (measuring the gravity vector in the x,y and z dimensions) and two gyros (measuring rotation around the tilt and pitch axis). Neither are sufficient by themselves, since accelerometers are thrown off by movement (ie, they are “noisy” over short periods of time), while gyros drift over time. The data from both types of sensors must be combined in software to determine true aircraft attitude and movement to create an AHRS (see above).
INS	Inertial Navigation System. A way to calculate position based on an initial GPS reading followed by readings from motion and speed sensors using dead reckoning. Useful when GPS is not available or has temporarily lost its signal.
IOC	intelligent orientation control – Usually, the forward direction of a flying multi-rotor is the same as the nose direction. By using Intelligent Orientation Control (IOC), wherever the nose points,the forward direction has nothing to do with nose direction

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Kalman Filter	A relatively complicated algorithm that, in our applications, is primarily used to combine accelerometer and gyro data to provide an accurate description of aircraft attitude and movement in real time.
LIPO	Lithium Polymer battery, aka LiPoly. Varients include Lithium Ion (Li-Ion) battery. This battery chemistry offers more power and lighter weight than NiMh and NiCad batteries.
LOS	Line of Sight. Refers to being able to see your drone from your operating position with your naked eye. Your drone should always be within your line of sight.
MAVLink	The Micro Air Vehicle communications protocol used by the Copter and Plane line of autopilots
MAV	Micro Air Vehicle. A small UAV.
No Fly Zone	Areas where flying a drone is restricted by government regulations. Areas where a drone could interfere with an airplane or record sensitive information make up most of these areas.
OSD	On-screen display. A way to integrate data (often telemetry information) into the real-time video stream the aircraft is sending to the ground.
Payload	The amount of additional weight a drone is able to lift in addition to its own weight and batteries. If you attach a camera and gimbal to your drone, the combined weight is the payload.
PCB	Printed circuit board. In our use, a specialized board designed and “fabbed” for a dedicated purpose, as opposed to a breadboard or prototype board, which can be used and resused for many projects.
PDB	Power Distribution Board. A board used in multicopters to distribute power to multiple ESCs.
PIC	Pilot in Command. Refers to a FAA requirement that UAVs stay under a pilot’s direct control if they are flying under the recreational exemption to COA approval.
Pitch	A measure which describes the flight angle along one axis, usually measured from level in case of aerial vehicles.
POI	Point of Interest. Designates a spot that a UAV should keep a camera pointed towards.
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

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	to, such things as checking weather, route of flight, airspace, equipment configuration, support personnel, terrain and communications requirements.
PWM	Pulse Width Modulation. The square-wave signals used in RC control to drive servos and speed controllers. There is one PWM signal for each channel. The width varies from 1000 to 2000 microseconds, depending on the RC manufacturer.
RC	Radio Controlled – Control of a drone via radio waves.
RTL	Return to Launch. Fly back to the “home” location where the aircraft took off.
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	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.
sUAS	small Unmanned Aircraft System
Telemetry System	A two way radio system to allow flight data to be sent from your aircraft and also to allow control or adjustment information to be sent back to it from a “ground station”, commonly a laptop computer.
Throttle	Control that influences the RPM or the speed of electric motors.
TX	Transmitter or transmit
UAV	Unmanned Aerial Vehicle. In the military, these are increasingly called Unmanned Aerial Systems (UAS), to reflect that the aircraft is just part of a complex system in the air and on the ground.
UAS Incursion	<p>A non-participating UAS operating over or near a wildfire that:</p> <p>Intrudes into a Temporary Flight Restriction (TFR), or</p> <p>Interferes with fire management efforts and the interference is documented through the appropriate reporting system*.</p> <p>* Example of appropriate reporting systems would include SAFECOM, SAFENET, or a reporting system used by one of the states.</p>
Visual Observer	A crewmember that 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.

Term	Definition
VLOS	Visual Line of Sight. The pilot's ability to see an aircraft from the ground well enough to control it, without the use of artificial visual aids (aside from glasses).
WAAS	Wide Area Augmentation System. A system of satellites and ground stations that provide GPS signal corrections, giving up to five times better position accuracy than uncorrected GPS
Waypoint	A set of coordinates, which 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.
YAW	Quadcopter rotation around it's center axis on a level plane.