

Glossary of Terms

2.4 GHZ - 2.4 GHZ or 2400 MHZ – Model airplanes use a section of the Radio Spectrum band from 2.4 GHZ to 2.40835 GHZ. This is in the I.S.M. band for Industrial, Scientific and Medical uses. The radio transmitters are Smart in that when they turn on, they scan the band for channels that are unused and noise free. Once the band is scanned and frequencies established by the transmitter, it allows the receiver to communicate with its respective transmitter. All transmitters in this band use modulation called Spread Spectrum. This technology helps eliminate potential interference and frequency conflicts. All manufacturers use different algorithms to try to obtain interference free operation.

27 MHZ - Mostly toy models use these frequencies, maybe subject to interference from adjacent Citizen Band (CB) operation.

72 MHZ - 72 MHZ, model airplane radios occupy 1 MHZ of band up to 73 MHZ. The Channels run from 72.010, spaced 20 KHZ apart to give us 50 channels for the exclusive use for Radio Controlled Model airplanes.

2 STROKE - The fuel/air mixture is drawn in through the carburetor, ignited and exhausted with one single revolution of the piston inside the engine. In a 2-cycle engine the fuel/air mixture (as metered by the carburetor) is forced into the combustion chamber during the down stroke of the piston. During the upstroke the mixture is compressed and when the piston reaches the top of its stroke, the glow plug ignites the compressed gases, forcing the piston down. On the way down exhaust gases escape through the exhaust port while the fuel mixture enters the chamber. The entire power cycle takes place in 2 strokes of the piston.

4 STROKE - 4 stroke engines take 2 revolutions to do what a 2 stroke does in one. In a 4-cycle engine the fuel/air mixture (as metered by the carburetor) is brought into the combustion chamber during the down stroke of the piston through a valve operated by the crankshaft. On the upstroke the valve closes and the mixture is compressed. When the piston reaches the top of its stroke, the glow plug ignites forcing the piston down. On the next upstroke of the piston a second valve opens and allows the exhaust gases to escape. The fuel mixture then again enters on the down stroke. The entire power cycle takes place in 4 strokes of the piston.

3D - A complex form of aerobatic flying, usually with more than one maneuver being performed simultaneously. 3D airplanes have over-sized control surfaces, exaggerated control surface deflection and excess power for maximum performance and sensitivity.

ABC / Non Ringed - A acronym for aluminum, brass and chrome or a composite such as nickel. These engines have an aluminum piston and a chrome or composite coated brass cylinder sleeve

which allows them to be more efficient for higher performance. They have no piston ring and rely on a very tight piston/cylinder fit to obtain a piston/cylinder seal. New ABC engines are normally hard to turn over by hand. Because of the tight fit, it is very important that the engine is broken in properly.

ACC – AERO CLUB OF CANADA – is the Canadian national airports authority member of the Fédération Aéronautique Internationale (FAI). The ACC is the umbrella organization for sports aviation member associations (including MAAC) in Canada.

ADVISORY CIRCULAR (AC) – A Transport Canada (TC) document that provides for information and guidance purposes. It describes an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards.

AEROBATICS - Any maneuver or series of maneuvers that involve loops rolls spins etc.

AERODYNAMIC BALANCE - means that when the control surface moves in one direction, the part of the surface that's in front of the hinge moves in the opposite direction. The airflow over the surface helps to push the control surface that's behind the hinge line in the desired direction.

ADVERSE YAW - Yaw generated when the ailerons are used. The lifting wing generates more drag, causing an airplane to yaw (turn) toward it.

AERODROME – Any area of land or water (including the frozen surface) or other supporting surface used or designed, prepared, equipped or set apart for the arrival and departure, movement or servicing of aircraft. It includes any buildings, installations and equipment in connection therewith.

AERO MODELING - The general term used to describe the hobby of building and flying model airplanes and aircraft.

AERO MODELERS - The people who build and fly R/C aircraft.

AGL (or also - ABOVE GROUND LEVEL) - The altitude expressed as feet above the terrain or the airport elevation.



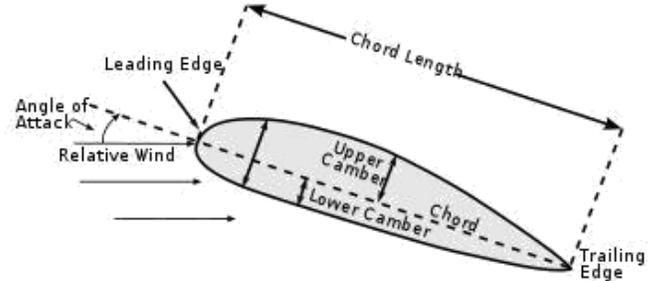
AILERONS - Control surfaces that are normally hinged on the rear spar and form part of the trailing edge of the wing. They control or affect the roll of an aircraft by working opposite one another—up-aileron on the right wing and down-aileron on the left wing.

AIRFIELD - Airfields are any assigned locations that meet MAAC's safety code.

AIRPORT – An aerodrome in respect of which a certificate is in force.

Air TRAFFIC – Air traffic on the maneuvering area of an airport and all aircraft flying in the vicinity of an airport.

AIRFOIL - The cross-section shape of a flying surface, but principally a wing, as seen in side-view (cross section). Airfoils can be flat-bottomed, semi-symmetrical or symmetrical, depending on the style of airplane and what it needs to do.



AIRSPACE CLASSIFICATION – The division of the Canadian Domestic Airspace (CDA) into seven classes, each identified by a single letter: A, B, C, D, E, F or G. The application of any classification to an airspace structure determines the operating rules, the level of ATC service provided within the structure and, in some instances, communications and equipment requirements. The horizontal and vertical limits of airspace are described in the *Designated Airspace Handbook* (DAH).

- a. **Class A - airspace** - Controlled high-level airspace within which only Instrument Flying Rules (IFR) flight is permitted and ATC separation is provided to all aircraft. The vertical dimensions of Class A high level controlled airspace are as follows:
 - 1) Southern Control Area (SCA): 18 000 ft ASL to FL 600 inclusive;
 - 2) Northern Control Area (NCA): FL 230 to FL 600 inclusive; and
 - 3) Arctic Control Area (ACA): FL 270 to FL 600 inclusive.
- b. **Class B - airspace** - Controlled low-level airspace within which both Instrument Flying Rules (IFR) and Visual Flying Rules (VFR) flights are permitted and ATC separation is provided to all aircraft. Class B low level controlled airspace is all airspace above 12 500 ft ASL, or at and above the minimum en-route altitude (MEA), whichever is higher, up to, but not including, 18 000 ft ASL. Terminal control areas (TCA) and associated primary control zones may also be classified as Class B airspace.
- c. **Class C - airspace** - Controlled airspace within which both IFR and VFR flights are permitted, but VFR flights require a clearance to enter. ATC separation is provided to all IFR aircraft and, as necessary to resolve possible conflicts, between IFR and VFR aircraft. TCAs and associated primary control zones may be classified as Class C airspace.
- d. **Class D - airspace** - Controlled airspace within which both IFR and VFR flights are permitted, but VFR flights must establish two-way communications with the appropriate ATC agency prior to entering the airspace. ATC separation is provided only to IFR aircraft. TCAs and associated primary control zones may be classified as Class D airspace.
- e. **Class E airspace** - Controlled airspace within which both IFR and VFR flights are permitted, but VFR flights do not have to establish two-way communications with the appropriate ATC agency prior to entering the airspace. ATC separation is provided only to IFR aircraft. All high level controlled airspace above FL 600 within the SCA, NCA and ACA is Class E airspace. Also, low level airways, low level fixed area navigation (RNAV) routes, control area extensions, transition areas, or control zones established without an operating control tower may be classified as Class E airspace.

- f. **Class F airspace** - Special-use airspace that may be a restricted area, an advisory area, military operations areas or danger areas and can be controlled airspace, uncontrolled airspace or a combination of both. It is described in terms of horizontal and vertical dimensions, effective for a specified period of time. Although both IFR and VFR flights are permitted in Class F airspace, restricted-airspace access is not authorized without the approval of the user/controlling agency, and advisory-area access is normally reserved for participating aircraft. Non-participating flights should avoid flight within advisory areas, and ATC will not clear non-participating IFR aircraft into an active advisory area. Rules for special-use airspace are as specified in the DAH, and, if not specified, or when the area is not active, the appropriate rules for the surrounding airspace apply.
- g. **Class G airspace** - Airspace within which IFR and VFR flights are not subject to control. Airspace shall be classified as Class G if it has not been designated as A, B, C, D, E or F.

ALTITUDE - The vertical distance between the airplane and the ground.

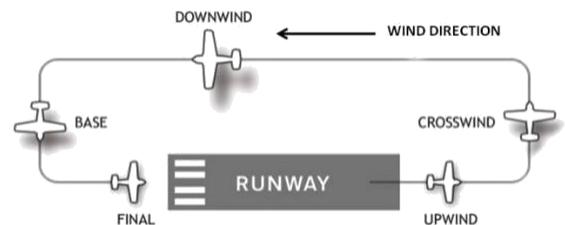
ANGLE OF ATTACK - The angle of the wing (when viewed from the end) in relation to the horizontal airflow when the airplane is flying. The acute angle at which a moving airfoil meets the airstream.

ANGLE OF INCIDENCE - The angle at which an airfoil is normally fixed in relation to the longitudinal axis of an aircraft. Said another way - The angle at which the wing, horizontal stabilizer, and engine are positioned on the blueprint or drawing by the designer. This angle is measured in relation to a reference or datum line.

ANHEDRAL - The downward angle of a wing in relation to a horizontal cross-section line; aka CATHEDRAL. See DIHEDRAL

AMPHIBIAN, AMPHIBIOUS - A seaplane/floatplane with retractable wheels for use on land.

APPROACH - This is the single most demanding phase of flight. A stabilized approach will result in a successful TOUCHDOWN or LANDING. It is a matter of controlling the aircraft speed and its rate of decent thru the downwind, base and final legs to arrive at the threshold of the runway. Not to fast so that the aircraft Over Shoots or rolls off end of the runway or bounces so hard on contact with the runway, that it launches back into the air. Not to slow that the aircraft Under Shoots and never makes the runway.



ARF / ARTF - ALMOST READY TO FLY. The fuselage and wings are prebuilt by the manufacturer. The builder has to supply and install the receiver, servos and motor.

ARM - In aircraft weight and balance, as well as load distribution, it is the distance from the CENTER OF GRAVITY (c/g) to some point. For computations, arms measured forward from the c/g are positive (+n) and those measured aft of the c/g are negative (-n).

ASPECT RATIO - The ratio of the span to the chord of an airfoil—a high-aspect ratio wing has wide span and narrow chord, and vice-versa for a low-aspect ratio.

ASCENDING - Increasing altitude.

ATTITUDE – The position of the aircraft relative to its center axis i.e. nose up, leftwing down, straight and level etc.

ATV - An adjustment on many transmitters that allows you to adjust the maximum throw of a servo. This is used to avoid binding.

AUTONOMOUS – In respect of an unmanned aircraft, **autonomous means the ability to execute processes or missions using onboard decision making capabilities. An Autonomous Unmanned Air Vehicle (UAV) system is not designed to permit crew member intervention.**

AUTOROTATION - A helicopter maneuver to land in the case of engine failure; the momentum of the rotor blades can be just enough to slow the helicopter down just before landing.

BACKLASH - Describes the play in the meshing of two gears. Too much backlash and the gears could slip or break the teeth, too little backlash could cause excess wear and tear.

BALANCED CONTROL SURFACE - A movable control surface, such as an aileron or rudder, which uses added physical extension or weights forward of the hinge-point to reduce forces which cause flutter.

BALL LINK - Connections that allow for adjusting controls using a ball on one end, and a link that "snaps" onto the ball on the other.

BARREL ROLL - An aerobatic maneuver that involves the airplane following the twist of a large imaginary corkscrew (horizontal) through the air.

BASE LOAD ANTENNA - A short "whip" antenna about 6 inches (15 cm.) long used instead of the long dangly antenna that comes with the receiver.

BATTERY BUNKER - The battery bunker is a container designed to contain the ignition and combustion of a lithium battery fire/mishap.

BATTERY TYPES - Lithium polymer, Lithium Ion, A123 (LIFE), Lithium Manganese, NICAD, and NIMH.

BEC – BATTERY ELIMINATING CIRCUITS - The purpose of the BEC which is built into the ESC is to power the radio and the servos.

BELLCRANK - the primary component of a two-wire control system, **CONTROL LINES** - one, two, or three lines of stranded wire or solid stainless steel that are connected between the Control Handle and a Control Line model.

BELL & HILLER - A control system commonly used for r/c helicopters that allow the pitch of the blades to change depending on where they are in their rotation with the aid of paddles to take a substantial load off the control system. Bell is the control system that involves the swash plate and linkages to adjust the pitch and Hiller is the part that uses a fly bar or paddle to make the cyclic more responsive.

BIND-N-FLY (BNF) - a trademark name for a range of *Horizon Hobby* distributed aircraft (namely ParkZone and E-flite) whereby the model is sold in RTF form but lacks the transmitter.

BINDING, (Electronically) - Connecting a 2.4 GHZ transmitter to a 2.4 GHZ receiver.

BINDING, (Mechanical) - When a servo motor or control rod is stalled or moves poorly due to mechanical tensions.

BOOM STRIKE - A devastating event when a landing is hard enough that the momentum of the rotor blades bends them down to the point that one of them makes contact with the boom. This generally destroys the blade, boom, control wire, and tail drive system.

BOOTLOADER - Special code stored in non-volatile memory in a microprocessor that can interface with a PC to download a user's program.

BRUSHLESS MOTOR - A type of electric motor used in R/C electric aircraft. Brushless motors are much more powerful than traditional brushed motors, and are fast becoming the norm. They can be in-runner or out-runner motors.

BUDDY BOX – A system of learning to fly where the instructors transmitter is wired to the students transmitter via a trainer cord. A dual control system where the instructor can take control if the student gets into difficulties.

BUILT-UP AREA - A populated or developed area of a locality, including a city, a town, a village or a hamlet.

BUNGEE LAUNCH – A method of launching a model aircraft with a stretched elastic cord.

BUMPED COWLING - An engine FAIRING, generally circular, with welts or compound shapes in its surface to accommodate cylinder heads.

CA GLUE - Cyanoacrylate - A form of "super glue" commonly used in model building.

CABANE STRUT - Wing strut attached to the fuselage.

CAMBER - The convex or concave curvature of an airfoil.

CANARD - An arrangement in which the horizontal stabilizer and elevators of an aircraft are mounted in front of the main wing(s).

CANADIAN AVIATION REGULATIONS (CARs) - The rules, enacted under the Aeronautics Act, that govern civil aviation (including model aircraft) in Canada.

CANADIAN AVIATION REGULATION ADVISORY COUNCIL (CARAC) - Its prime objective is to assess and recommend potential regulatory changes through cooperative rulemaking activities. CARAC is a joint undertaking of government and the aviation community, with participation from a large number of organizations outside Transport Canada representing the overall viewpoint of the aviation community. These include management and labour organizations, representing operators and manufacturers, and professional associations.

CCPM - Cyclic-Collective-Pitch-Mixing, CCPM mounts the servo's pushrods directly to the swash plate at 120 degree increments, like an equilateral triangle. With these three servo's the swash plate can be tilted in any direction, and when they all move in the same direction the swash plate can be

raised and lowered. All the mixing is done electronically by the transmitter, which means you must have a CCPM compatible transmitter.

CENTER OF GRAVITY / CG - The point through which the total weight of the aircraft is considered to act as the balance point. The airplane's point of fore-aft balance.

CENTRIFUGAL FORCE - The imaginary pulling force applies to the propellers and helicopter blades while they're spinning.

CHANNELS -The number of servos that can be operated independently by a given receiver transmitter combination.

CHANNEL MIXING - When two or more channels are made to operate together with one transmitter stick movement e.g. rudder can be mixed with aileron, so that the rudder automatically deflects when the ailerons are moved.

CHANNEL NUMBER - Refers to the radio frequency and crystal number that is being used in a 72 MHz system.

CHARGING RELATED STUFF - When charging Lithium type batteries use a Charging bag or a Battery Bunker. West Mountain radio equipment has a Computer Battery Analyzer that will chart your available and useful capacity of all batteries used in R.C. It is a good idea to load test your on-board radio receiver battery before the first and every third flight to ensure an adequate capacity to safely operate the radio receiver and the servos.

CHICKEN STICK - A wooden/plastic stick with a rubber coating on one half that is used to flick over the prop.

CHORD - The width of the wing measured in a straight line from the leading edge to the trailing edge.

CIAM – Commission Internationale Aeromodelling, is the FAI's Aeromodelling commission which conducts the FAI's aeromodelling and space modelling activities.

CIRCUIT – Another name for traffic pattern.

CLASS A MEMBER - There are 2 class of MAAC members. A Class A member in an individual MAAC member. These members have voting rights and the term of membership is annual and can be renewed. This category includes, Open, Spouses, Life, Honorary and Leader members. (See [MAAC bylaws](#), page 4)

CLASS B AFFILIATE MEMBER - Chartered Clubs are Class B Affiliate Members. There are 2 class of MAAC members. Class B members have no voting rights. Clubs implement the MAAC safety code and the policies or directives of the organization at any model operation sites. All members of the club with the exception of social members must be current members of the MAAC or the Academy of Model Aeronautics in accordance with any reciprocal agreement between the two organizations. Clubs have the right to collect membership fees on behalf of the Corporation.

Club affiliate membership (charter club membership) May be granted by the appropriate zone director. (See [MAAC bylaws](#), page 4)

CLEVIS – Used to attach pushrods to control horns.

CLUB FLYING FIELD – An outdoor flying site, of any size intended for use by a recognized MAAC club, MAAC members and authorized guests. This includes both infield area and flying area.

CLUNK - A weighted fuel pick-up used in a fuel tank to assure the intake line is always in fuel.

CLUTCH - R/C helicopters use a clutch so that the engine can idle without the rotor blades spinning. Usually they use clutch shoes which when spinning spread out and rub against the clutch drum causing it to rotate and spin the gears.

CONTROLLED AIRSPACE – Airspace of defined dimensions within which Air Traffic Control (ATC) service is provided.

CONTROL HANDLE - the handle that connects the Control lines to the flyers hand. The design for this item varies greatly, and is usually made to be adjustable to allow for model trimming, and the precise adjustment of the controls.

CONTROL LINE CIRCLE - a paved or grass flying area designed particularly for Control Line flying.

CONTROL LINE RACING - usually these are multi-airplane events, with more than one model flying at a time. The course is predetermined by a given number of laps. Mandatory pit stops are required, and the competitor posting the fastest time is the winner. A separate crew member called a "pit man" is required to refuel and restart the engine.

CONTROL SURFACE - the term used to describe the moving part of any flying surface *i.e. rudder, ailerons, elevator or flaps.*

CONTROL SURFACE BALANCE - There are two types of control surface balance: aerodynamic and static. See definitions.

CONTROL SURFACE MIXING - When two control surface operations are performed by one pair of surfaces *e.g.* when aileron and elevator movement is combined into elevons.

COAMING - A padded, protective rim around an open cockpit.

COLLECTIVE VARIABLE PITCH - Describes the control which adjusts the pitch of the rotor blades; causing the helicopter to ascend or descend without the need to change the rotor RPMs. This is usually the up and down movement of the left stick on the transmitter.

COLLECTOR RING - A circular duct on a radial engine into which exhaust gases from its cylinders are safely discharged.

CONTROL HANDLE - the handle that connects the Control lines to the flyers hand. The design for this item varies greatly, and is usually made to be adjustable to allow for model trimming, and the precise adjustment of the controls.

CONTROL LINE CIRCLE - a paved or grass flying area designed particularly for Control Line flying.

CONTROLLED AIRSPACE - All airspace of defined dimensions within which Control Zone and security regulations are in force, special visual flight rules (VFR) flight only is permitted and Air Traffic Control (ATC) service is provided.

CONTROL RACING - usually these are multi-airplane events, with more than one model flying at a time. The course is predetermined by a given number of laps. Mandatory pit stops are required; and the competitor posting the fastest time is the winner. A separate crew member called a "pit man" is required to refuel and restart the engine.

COWL, COWLING - A removable FAIRING around an aircraft engine for the purposes of streaming or cooling.

COWL FLAP - A controllable louvre to regulating airflow through an engine's cowling.

CRAB - A rudder-controlled yawing motion to compensate for a crosswind in maintaining a desired flight path, as in a landing approach.

CROSSWIND - When the wind perpendicular to the motion of the aircraft. The crosswind leg is also one of the many words describing the approach segments. When the wind is not directly along the runway centerline, the crosswind is the component of the wind that is blowing at right angle from the centerline.

CRYSTAL - The small component that determines which frequency (ie channel number) the radio system operates on when using the 27 MHZ or 72 MHZ non frequency synthesized systems. Both the transmitter and the receiver must have an identically matching crystal for the radio set to function. 2.4GHz spread spectrum sets don't require crystals.

CYCLIC - Describes the controls which adjust the horizontal attitude of the helicopter, as in roll left-right and pitch forward and backward. Both of these movements are controlled by the right stick.

DEAD STICK - A term that describes an emergency landing due to a power loss when the engine quits.

DELTA-WING - A triangularly-shaped aircraft wing having a low aspect ratio, a sharply-tapered leading edge, a straight trailing edge, and a pointed tip.

DESCENDING - Decreasing altitude.

DIALED IN - The term used to describe when the helicopter's power / cyclic / tail rotor mixing is set up just right.

DIFFERENTIAL AILERON - When the ailerons are set up to move upwards more than downwards, to counteract any adverse yaw during a turn caused by extra drag on the outer wing from the down aileron.

DIHEDRAL - The upward angle of the wings when viewed from the front. An airplane with dihedral is more stable in the air than one without.



DIRIGIBLE - A lighter-than-air craft capable of being propelled and steered for controlled flight.

DISSYMMETRY OF LIFT (helicopter) - Describes how the advancing side of the rotor disk is moving faster and thus produces more lift than the retreating side. This causes the helicopter to bank in forward flight and is dampened by flapping blades.

DISORIENTATION - Occurs when the pilot loses sight or orientation of their R/C airplane either because it's too far away to see properly or because you've just flown it directly over your head and momentarily lost all visual reference to everything.

DOPE - Preservative and/or pigmented coloring for fabric aircraft covering and paints, generally Butyrate lacquer but generically used to denote all early shellac and coal-tar mixtures on up to present-day acrylics.

DORSAL FIN - A lateral fin/rudder extension on the top of a fuselage. Opposite of VENTRAL FIN.

DOWNWASH - The air deflected perpendicular to the direction of movement of an airfoil.

DRAG - The resisting force exerted on an aircraft in its line of flight opposite in direction to its motion, the force that resists the movement of the airplane through the air, on the air immediately surrounding the plane. High drag means that the model has to work harder to cut through the air.

DRAG WIRE - A wire designed to resist DRAG forces, usually running from a forward inboard point to an outboard aft point.

DRIFT - The angle between the heading of an aircraft and its Track [flight path] over the ground as affected by winds.

DRONE – Within Transport Canada regulations, remotely piloted aircraft systems are referred to as Unmanned Air Vehicle (UAV). Each nation state has adapted their own variation of this, for example the United States uses the term Unmanned Aerial System (UAS). The reasoning behind TC's use of the term "drone" in various media platforms is due to the fact that this is one of the most common and clear terms that the general public identifies and understands.

DSM / DSM2 / DSMX - Spektrum, an RC equipment maker, refer to their proprietary technology as "Digital Spectrum Modulation." Each transmitter has a globally unique identifier (GUID), to which receivers can be bound, ensuring that no transmitter will interfere with other nearby Spektrum DSM systems. DSM uses Direct-Sequence Spread Spectrum (DSSS) technology.

DUAL RATES - A feature of many R/C systems, whereby the control surface deflection can be reduced while still maintaining full movement of the transmitter sticks. With dual rates enabled, the airplane is less sensitive to control inputs.

ELECTRIC STARTER - A 12 volt electric motor with a special end cup that you place against the spinner to turn the motor over until it starts.

ELEVON - A hinged device on the rear portion of an aircraft wing combining the functions of an elevator and an aileron. Usually found on delta-wing aircraft, it can be moved in the same direction on either side of the aircraft to obtain longitudinal control, or differentially to obtain lateral control. Also see FLAPERON.

ELEVATOR - The movable part of a horizontal airfoil which controls the pitch of an aircraft, the fixed part being the STABILIZER. ELEVATORS are moveable control surfaces hinged on the

trailing edge of the horizontal stabilizer. While the stabilizer provides longitudinal STABILITY, the elevator provides longitudinal CONTROL, such as control in the pitching plane.

ELEVONS - When elevator and aileron control is made by the same control surface, this surface is called an elevon(s).

EMPENNAGE - An aircraft's tail group includes rudder and fin, and stabilizer and elevator.

ENGINE OFFSET - the offset often built into a Control Line model that allows the engine thrust to pull the model to the outside of the flying circle, to maintain line tension.

ESC, (Electronic Speed Controller) - Device to control the motor in an electric aircraft; serves as the connection between the main battery and the R/C receiver by delivering the appropriate amount of power from the motor battery pack to the electric motor, depending on your input at the transmitter. Usually includes a BEC, or Battery Elimination Circuit (BEC), which provides power for the R/C system and other onboard electronics, such as an autopilot.

EXPONENTIAL - A feature of some transmitters that allows the programming in different control sensitivities depending on the position of the stick. Usually, this means the further the stick movement, the faster the controls. This allows the middle area of the controls to be less sensitive, but also allows full servo travel on the outer limits of the controls.

FAI – also see **CIAM** – Acronym for Federation Aeronautique Internationale - The governing body for all the world's air sports flying regardless of the aircraft size.

FAIRING - An added streamlining structure or auxiliary member, most often of light metal, whose only purpose is to reduce drag. Fairings are non-load-bearing and, therefore, are not meant to carry any principal air loads placed on the airplane structure.

FAILSAFE - A feature found on transmitters and that support PCM. Failsafe is used so that the servo's go to a predefined position if the signal is lost. In an airplane this can be to go to a low idle while putting the plane in a gentle turn.

FASST - Futaba's answer to Spektrum's DSM technology. Acronym for Futaba Advanced Spread Spectrum Technology. It uses frequency hopping to ensure no breakdown of signal.

FEATHERING SHAFT - A rod which helps support the rotor blades and give them more ridged strength. A flapping head has two feathering shafts (one for each blade) and a sea-saw head has one feathering shaft (running the span of the head).

FFF- An Acronym for Fast Forward Flight; usually in excess of 50 MPH, or near the maximum speed of the helicopter.

FIELD BOX – A box that contains all your flying accessories and tools. Also called a *flight box*.

FIELD EQUIPMENT - Accessories and equipment that you take to the field in your field box.

FIN - Also called the vertical stabilizer, it's the vertical surface at the rear of the airplane used to stabilize the plane in flight.- The fixed part of a vertical airfoil that controls the yaw of an aircraft.

FIREWALL - A fire-resistant bulkhead that isolates the engine from other parts of an airplane's structure.

FIRST PERSON VIEW (FPV) - The method of using a wireless video system comprised of a video camera and transmitter onboard the aircraft and a ground based receiver and monitor or head display used by the pilot to visualize the aircraft's perspective in real time. A traditional RC link is used to provide inputs to the aircraft.

FIXED PITCH – A term that describes a helicopter with no collective adjustment. The height is strictly controlled with the rpm's of the rotor blades.

FLAPS - A movable, usually hinged AIRFOIL set in the trailing edge of the wing, usually found between the ailerons and fuselage. Used to create more lift and drag at slower flying speeds and also to slow the plane on landing approach, flaps are usually only found on R/C airplanes with 5 or more channels.

FLAPPING - A type of rotor head where the two rotor blades are not connected directly through the feathering shaft (a thick wire), each blade can move somewhat independently of the other resulting in smoother control of the helicopter.

FLAPERON - A single control surface on the trailing edge of each wing that does the job of flaps and ailerons. An R/C system with control mixing capability is needed to have flaperons.

FLIGHT ENVELOPE - An aircraft's performance limits, specifically the curves of speed plotted against other variables to indicate the limits of speed, altitude, and acceleration that a particular aircraft cannot safely exceed.

FLIGHT LINE - a notional line, or lines running parallel to the runway, or runways, which separates a flying site into two distinct sections - flying side and no-flying side. The flight line may be the nearest edge of the runway(s) but must not be the centerline of the runway(s).

FLARE - The action taken in the last few seconds of the approach, to reduce the approach angle and slow the rate of descent.

FLOATPLANE - A water-based aircraft with one or more mounted pontoons, as differentiated from a hulled SEAPLANE [Flying Boat], but often used generically.

FLUTTER – Is the un-dampened oscillation of control surfaces which leads to hinge damage, stripped servo gears and failed surfaces. See definition – mass balance, static balance.

FLY-AWAY – An interruption or loss of the command and control link where the pilot is unable to affect control of the model airplane and the aircraft is no longer operating in a predictable or planned manner.

FLYING AREA – the 3-dimensional area on the flying side of the flight line, where model aircraft are normally expected to be flown in. This normally extends well beyond the club or individuals' "infield area" but does not include extra space for fly-away etc.

FLYING FIELD - A field with a graded portion for the taking off and landing of airplanes and sometimes with buildings for their shelter and maintenance.

FLYING WIRES – Inter-plane bracing wires that help support wing loads when the plane is in flight. Direction of travel is upward and outward from the fuselage to the inter-plane struts. Also known as LIFT WIRES, the opposite of LANDING WIRES.

FLYBAR – Stabilizes the main rotor disk of a helicopter.

FORMER - A former is a structural member of an aircraft fuselage which establishes the shape of the fuselage.

FOWLER FLAP - Trademark name of a split-flap attached to a wing's trailing edge with a system of tracks and rollers to roll the FLAP backward and downward, increasing the wing area.

FREQUENCY - The part of the radio spectrum used by a given transmitter.

FUEL LOCK (HYDRAULIC LOCK) – When your glow/gas engine gets flooded and the excess fuel inside the engine prevents you from being able to flick over the prop.

FUSELAGE - An aircraft's main body structure to which the wings, tail and, in most single-engine airplanes, engine are attached.

GAIN - Usually a term associated with gyros, it describes the sensitivity of the gyro. Too much gain causes the tail to wag back and forth, while too little gain won't hold the tail steady.

GASSER - The slang term for aircraft motors which run on gasoline.

GLIDER – An aircraft with no power source or self means of lift. It descends after it is released unless it is in rising air.

GLOW FUEL - The fuel that 2 and 4 stroke glow engines use. It consists of methanol, nitro methane, lubricants and other chemicals.

GLOW DRIVER - A device you connect to the glow plug on an engine which heats the coil element so that the fuel can ignite and the engine can start.

GLOW PLUG - A plug that looks like a small spark plug, but has a wire coil in it which stays hot enough once the engine is running to ignite the next combustion cycle, and keep the motor running.

GO AROUND – Is the maneuver to abort a landing if the approach is too long or an obstacle is on the runway. The pilot decides to abort their landing approach, apply power and “go around the circuit again for another attempt at landing.

GROUND CONTROL STATION (GCS) - Software running on a computer on the ground that receives telemetry information from an airborne Unmanned Air Vehicle (UAV) AV 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.

GROUND EFFECT - Increased lift generated by the interaction between a lift system and the ground when an aircraft is within a wingspan distance above the ground. It affects a low-winged aircraft more than a mid- or high-winged aircraft because its wings are closer to the ground; aka GROUND CUSHION.

- GROUNDSPEED** - The actual speed that an aircraft travels over the ground—its "shadow speed"; it combines the aircraft's AIRSPEED and the wind's speed relative to the aircraft's direction of flight.
- GROUND RESONANCE** – This describes the phenomena that can make a helicopter shake itself to bits on the ground, even when it is perfectly balanced in the air. This is more common in seesaw type heads which aren't as dampened as flapping heads, and is also more common on pavement or hard surfaces which don't absorb vibrations.
- GULL-WING** - Descriptive of wing in frontal view bent as the wing of a seagull; a distinctive shallow, inverted "V" shape.
- GOVERNOR** - A device used to automatically hold the rotor RPM constant. Used in conjunction with idle-up modes. This device is not needed, but aids when flying 3D.
- GROUND EFFECT** - The ground effect condition is when the model is so close to the ground that the disturbance flowing down through the main rotor disk or under a wing creates a cushion of air under the model.
- GRAVITY** - The force that pulls the aircraft down.
- GUIDELINE** - A rule or instruction that shows or tells how something should be done.
- GYRO** - A device used to help stabilize the yaw of a helicopter.
- HAND LAUNCH** – A method of launching a model that doesn't have landing gear by launching it with a hand toss or overhand throw.
- HEADER TANK** - A small fuel tank connected between the main tank and the engine. Its purpose is to capture air bubbles / foam that would otherwise be going into the carburetor. This extra fuel tank is mostly used by 3D helicopter fliers due to the nature of their flights. This small tank can also be used to see when you're about to run out of gas, if you can't see your main fuel tank while the canopy is on.
- HEADING HOLD (HH) OR HEADING LOCK** - A feature mode of some gyros that stands out by its property to hold the heading of a helicopter and resist the tendency to weathervane.
- HELICOPTER TRANSMITTER** - A transmitter with special features for flying helicopters, the most important of which is mixing.
- HELIPAD** - A designated area, usually with a prepared surface, used for the takeoff, landing, or parking of helicopters.
- HELIPORT** - An aerodrome used or intended to be used for the arrival, landing, takeoff or departure of vertical takeoff and landing aircraft (VTOL).
- HELPER** - The duties of a helper are generally associated with the preparation of a model for flight, starting and ground handling from the pit area to the flight line or hand launching and the retrieval of the model after it has landed. Helper(s) may also act as Spotter.
- HOT START** - The ability of a hot engine to start without the benefit of a glow driver if you turn the propeller shaft. A very dangerous and surprising situation.

HORIZONTAL STABILIZER - Also called the tail-plane. The horizontal surface at the back of the fuselage, to which the elevators are attached.

HOVERING - A maneuver to keep the aircraft or helicopter stationary relative to the ground.

INFIELD AREA – the surface area on both sides of the flight line, that is considered club/personal flying field “property” or otherwise associated with flying activities (i.e. grass flying area(s), runways, denoted water runways, pilot stations, pit areas, run up areas, spectator areas, parking etc.)

INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA (ISED) - (formerly INDUSTRY CANADA (IC)) - Canadian law requires that all commercially available radio control systems used in Canada and which transmit on the license-free bands must be approved by ISED.

IFR (Instrument Flying Rules) - a set of regulations that dictate how aircraft are to be operated when the pilot is unable to navigate using visual references under visual *flight rules*.

IDLE UP - A feature on most transmitters that will not allow the throttle to fall below a minimum setting. This is useful on a helicopter because the vertical portion of the left stick simultaneously controls throttle and collective.

INITIAL POSITION - (helicopters). The position and location of the model before take-off. Usually, when training, the initial position is with the model's nose into the wind and the tail pointed towards the pilot. The distance from the pilot and the initial position should be approximately 7 meters.

IN-RUNNER - A type of brushless motor where the wound rotor and motor shaft rotates within the fixed stator where the permanent magnets are located, as in a normal brushed motor. In-runners don't provide a lot of torque so usually need to be geared.

JESUS BOLT/NUT - Most helicopters have two of these very important bolts/nuts. These components hold the main mast to the frame, and the head to the main mast. If you lose either one of these bolts or nuts, the entire rotor-head will separate from your helicopter.

KNOT - A unit of speed equal to one nautical mile (about 1.15 statute miles (6,080' per hour; e.g.: 125kts = 143.9mph).

LAMINAR-FLOW AIRFOIL - A low-drag airfoil designed to maintain laminar (smooth, continuous) flow over a high percentage of the CHORD about itself. Often relatively thin, especially along the leading edge, with most of its bulk near the center of the chord.

LANDING - The action of bringing your model safely back down to earth.

LANDING GEAR - Also called the undercarriage. Refers to all wheels and associated bits. Landing gear can be fixed or retractable up into the underside of the wing or fuselage (called 'retracts', usually only found on models with 5 channels or more).

LANDING WIRES – Inter-plane bracing wires that help support wing-loads when the plane is on the ground. Direction of travel is downward and outward from the fuselage. Opposite of FLYING WIRES.

LEAN OR TOO LEAN - This means that fuel to air ratio is too low, and the engine will run hot. This can rapidly damage the engine. Richen the engine by turning the needle valve counter clockwise which adds more fuel to the same quantity of air.

LEADING EDGE - The front edge of the wing, tail-plane or rudder.

LiFe BATTERY - LiFe batteries (LiFePO₄ - Lithium Iron Phosphate) have several advantages over LiPo (Lithium Polymer) batteries. Most importantly, LiFe batteries are much safer, have a much longer cycle and calendar life, and consist of iron and phosphate which have a much lower environmental impact than the cobalt used in LiPo batteries. A fully charged LiFe cell is 3.6 volts.

LIFT - The force exerted on the top of a moving airfoil as a low-pressure area [vacuum] that causes a wing-form to rise. Air pressure over the wing is less than the pressure below the wing and so the wing, along with the rest of the model, is pushed upwards.

LIFT-DRAG RATIO - The lift coefficient of a wing divided by the drag coefficient, as the primary measure of the efficiency of an aircraft; aka L/D Ratio.

LIFT WIRES – Inter-plane bracing wires that help support wing-loads when the plane is in flight. Direction of travel is upward from the bottom of the fuselage to the top of the inter-plane struts. Also known as FLYING WIRES, the opposite of LANDING WIRES.

LINE OF SIGHT (LOS) / Visual Line-of-Sight or VLOS means unaided visual contact with an aircraft that is sufficient to be able to maintain control of the aircraft, know its location, and be able to scan the airspace in which it is operating to decisively see and avoid other aircraft or objects. (See **visual line-of-sight or VLOS**).

LITHIUM ION POLYMER (LiPo) - These are the most modern kind of battery pack being used in electric aircraft. They provide enormous amounts of power for their size, especially when used in conjunction with a brushless motor. Variants include Lithium Ion (Li-Ion) battery. This battery chemistry offers more power and lighter weight than NiMh and NiCad batteries. A LiPo cell has a nominal voltage of 3.7 volts.

LOAD FACTOR (g) - The proportion between lift and weight commonly seen as **g** (sometimes capitalized)—a unit of force equal to the force of gravity times one.

LOCTITE® (Red / Blue) - A glue for holding metal to metal screws in their sockets so they don't come loose in a strong vibration environment. Loctite® is color coded by strength, red being the strongest and blue being medium. Most people use blue Loctite® because if red is used the screws may never come out again.

LOOP - An aerobatic maneuver whereby the airplane flies a vertical circle in the air.

MAAC ADVISORY PUBLICATION (MAP) – A MAAC document that contain information and suggestions that while not mandatory, are never-the-less important advice for all MAAC members.

MAAC ADVISORY TUTORIAL (MAT) – A document supporting Advisory Publications that provides additional in-depth material for those not familiar with the topic or aviation systems.

MAAC SAFETY DOCUMENT (MSD) – The MAAC Safety Documents are made up of a collection of MSD documents that provide a wide range of information on regulatory issues, insurance coverage and recommended best practices related to the operation of a model aircraft. By using the Document Retrieval Key presented in MSD 2, members can determine, select and print those documents and only those documents which are applicable to the category or categories of aeromodelling in which they participate. As such these documents individually and collectively define the **MAAC Safety Code**.

MAAC POLICY PROCEDURES DOCUMENT (MPPD) - MAAC MPPD documents provide a wide range of information on regulatory issues, insurance coverage and recommended best practices related to the operation of a model aircraft. All members are encouraged to read, understand and comply with those recommendations that are applicable and appropriate to their flying activities.

MAC – Model Aviation Canada Magazine.

MAIN ROTOR – A large rotor in the horizontal plane of a helicopter that provides the lift.

MASS BALANCE - (See flutter) Balancing weights added to a control surface which make the centre of gravity and hinge line coincident to avoid flutter. These weights may be in the nose of the surface, or lighter masses attached further ahead of the hinge externally.

MAY – Verb (subjective); used in the MAAC Safety Code to express a polite suggestion or expectation.

MEAN AERODYNAMIC CHORD (MAC) - The average chord of the wing span or the total distance from one wing tip to the other.

MID-AIR - The term used to describe the unfortunate incident of two or more aircraft making physical contact with each other while in flight.

MIXING - The ability to combine two different R/C functions into one on the transmitter.

MIXTURE - As in "Fuel / Air" mixture. The balance of fuel and air is what determines the effectiveness of the engine, as well as how fast the engine runs. The mixture is set with the needle valves.

MODE 1 - Refers to the set-up of the transmitter whereby the left stick operates the elevator and rudder, and the right stick operates the throttle and ailerons. Common in the UK and Europe.

MODE 2 - Refers to the set-up of the transmitter whereby the left stick operates the throttle and rudder, and the right stick operates the elevator and ailerons. Common in North America and much of the world.

MODEL AERONAUTICS ASSOCIATION OF CANADA (MAAC).

MODEL AIRCRAFT - An aircraft, including an unmanned aircraft commonly known as a drone, the total weight of which does not exceed 35 kg (77.2 pounds), that is mechanically driven or launched into flight for recreational purposes and that is not designed to carry persons or other living creatures. This term has since been replaced by Transport Canada in its latest CARS documents to "Unmanned Aerial Systems (UAS), see UAS definition.

MODEL AIRFIELD – an airfield used by models instead of full size aircraft.

MODEL ROCKET – A rocket that is equipped with model rocket motors that will not generate a total impulse exceeding 160 N.s, has a gross weight, including motors, not exceeding 1500 grams (3.3 pounds), and is equipped with a parachute or other device capable of retarding its descent.

MONOLINE - the control system developed by Victor Stanzel requiring only a single line for control. Usually, this system is only fitted to Speed models, where the rules permit it.

MONOCOQUE - Type of fuselage design with little or no internal bracing other than bulkheads, where the outer skin bears the main stresses; usually round or oval in cross-section. Additional classifications are (1) Semi-Monocoque, where the skin is reinforced by longerons or bulkheads, but with no diagonal web members, and (2) Reinforced Shell, in which the skin is supported by a complete framework or structural members.

MUST – Verb (objective); used in the MAAC Safety Code to express members required action or compliance.

NICD - Abbreviation for nickel cadmium, a type of metal used in rechargeable battery cell production. Also written as 'NiCad', they are a form of rechargeable battery cell used in radio control gear as well as motor battery packs.

NIMH - Abbreviation for nickel metal hydride, the other type of material used in rechargeable batteries.

NITRO - Short for nitro methane. It's a principle ingredient of glow fuel

NON-SCALE - Any model that is *not* modeled from a real-life airplane, helicopter or whatever.

NOTAM - A notice (transmitted or printed) to airmen concerning the establishment or condition of, or change in, any aeronautical facility, service or procedure, or any hazard affecting aviation safety, the knowledge of which is essential to personnel engaged in flight operations.

MSL - MEAN SEA LEVEL - The average height of the surface of the sea for all stages of tide; used as a reference for elevations, and differentiated from AGL.

NACELLE - A streamlined enclosure or housing to protect something such as the crew, engine, or landing gear.

NEEDLE VALVES – Are adjustable screws on the carburetor used to change the fuel/air mixture going into the combustion chamber. Some carburetors have two needle valves, one for high rpm and one for low. The low RPM also controls how smooth the transition is from low to high speed throttle settings.

NOSE-IN - A term that describes hovering or maneuvering with the nose of the helicopter pointed at the person controlling it. This is an advanced step in the learning stages of flying a helicopter because both roll and yaw are backwards in relation to the pilot.

OBJECTIVE - Based on facts rather than feelings or opinions.

OEM - Original equipment manufacturer.

OUGHT TO - Verb; used in the MAAC Safety Code to express natural expectation, obligation to carry out an action in compliance with the Safety code.

OUT-RUNNER - The other type of brushless motor, where the outer casing, or 'can', of the motor rotates with the shaft and permanent magnets, which are attached to the inside of the can. Out-runners produce more torque, so they are more powerful than in-runners and are rarely geared.

OVERSHOOT - To land beyond a runway or planned spot. Opposite of **UNDERSHOOT**.

PANTS - A popular word for streamlined, non-load bearing fairings to cover landing wheels. Also sometimes called Spats or, when fully enclosing the wheel struts, Skirts.

PATTERN - The path of aircraft traffic around an airfield, at an established height and direction. Also called the Circuit.

PARK FLYER - The general name given to any electric R/C airplane that can be safely flown in a public park / school yard / parking lot / sports field etc.

PADDLES - The shorter stubby blades on the end of the two rods opposite the rotor blades. They aid in pitching the main rotor blades for quicker responses and less servo stress.

PADDLE TIMING - A term to describe how far off the rotation cycle the paddles rotation should be.

PCM / PPM - PCM is Pulse Code Modulation which means that the receiver can tell the difference between the transmitter signal and rf noise. Most PCM receivers can be set for a "default" so that when transmission is lost, the controls go to a predefined position (failsafe).

PEAK CHARGER - A peak charger automatically shuts off when your battery is fully charged.

PEG BOARD - The most common form of frequency control used at R/C flying clubs.

PERSONAL FLYING FIELD – An outdoor flying site, of any size intended for use by a singular MAAC member. This includes both infield area and flying area.

PILOT ERROR - Any mistake, particularly one that ends in a crash, made by the pilot for whatever reason(s).

PITCH METER - A measuring device used to check the varying pitch settings of rotor blades and paddles. The pitch of the corresponding blades must be very close or they will not track evenly.

PIROUETTE - A maneuver described as a high yaw rate of a helicopter, when the tail spins around the canopy one or more times.

PITCH ATTITUDE - The upward or downward angle of the airplane in relation to the horizontal, when viewed from the side. Pitch is controlled by the elevators.

PITCH - The angle of a wing, propeller blade or helicopter rotor in relation to the airflow over it. The pitch angle of a *moving* wing or blade is known as the *Angle of Attack*.

PLUG-N-PLAY (PNP) - Ready to Fly models that are missing the transmitter and receiver, allowing the pilot to use their own.

POLICY - A high-level overall plan embracing the general goals and acceptable procedures.

POWER PANEL – A small central control box for all your electrical field equipment items, typically powered by a 12V battery.

PRE-FLIGHT CHECKS - Essential checks that you need to carry out immediately before every flight.

PRIMING - The action of introducing fuel in to the engine prior to starting it.

PROCEDURES - A series of actions that are done in a certain way or order; an established or accepted way of doing something.

PROPELLER - A Propeller is a type of fan like device which transmits power by converting rotation into thrust.

PROP - Abbreviation for propeller.

PROP - TRACTOR – The engine is mounted with the propeller shaft facing in the direction the aircraft will be flying. The propeller pulls the aircraft forward in the air – hence tractor.

PROP PUSHER – The engine is mounted backwards on the aircraft with a reversed propeller which pushes the aircraft forward.

PUSH/PULL - A method of connecting servos to the control points with two connections, one on either end of the servo connection / control connection. This allows the servo to push a rigid pushrod on one side and pull on the other side. This is used to fight slop and use the servo power more effectively by "balancing" the pivot point.

PUSH RODS – A rigid rod that transfers motion between the end of a servo arm and a control surface.

PULL PULL SYSTEMS – Two cables under tension, in parallel are used between the servo arm and the control surface.

RADIO EQUIPMENT LIST (ROE) - An Innovation, Science and Economic Development Canada (ISED), listing radio equipment which has been certified for use in Canada.

RADIO FAILURE – Radios can fail for any number of reasons. Common failure items are the failure of 72 MHZ users failing to extend the transmitter antenna. The receiver or transmitter could have a bad battery and or an electronic failure.

RADIO INTERFERENCE – Occurs when two (or more) identical, or close, frequencies are being used at the same time and one frequency interferes with the other. Loss of control of both aircraft can occur.

RADIO SIGNALS - The invisible messages that pass from transmitter to receiver, telling the model what to do.

RANGE CHECK - An essential pre-flight check to test the operation of your R/C electronics' systems. The transmitter is set with reduced power, and moved away from the receiver 30 paces (or as specified in radio manual) to ensure that there is adequate power reaching the on-board radio

receiver. Manufacturer's instructions should be followed for range checking. This should be done with all radio control vehicles before your first flight or vehicle use of the day.

RAMJET - An aerodynamic duct in which fuel is burned to produce a high-velocity propulsive jet. It needs to be accelerated to high speed before it can become operative.

RPAS (REMOTELY PILOTED AIRCRAFT SYSTEMS)- any remotely piloted flying object..Transport Canada's latest terminology for UAV's or in terms of our hobby, Model Aircraft.

RC or R/C - Abbreviation for Radio Control. Often you'll see 'remote control', but 'radio control' is the technically correct term.

RC FLIGHT SIMULATOR - A home computer based training aid that lets you practice flying radio control from the safety and comfort of your house.

RECEIVER - Part of the radio control gear inside the model which receives the pilot's instructions sent by their transmitter and relays it to the servos (or any other piece of equipment that can understand the servo protocol, such as an electronic speed controller or gyro).

RELATIVE WIND - The direction the wind is hitting the rotor blades taking into consideration flapping and retreating blades.

REMOTELY PILOTED AIRCRAFT - An unmanned aircraft which is piloted from a remote pilot station. (See **unmanned air vehicle (UAV)**)

REMOTELY PILOTED AIRCRAFT SYSTEM (RPAS). (See UAS).

REQUEST – Verb; used in the MAAC Safety Code to ask a member's compliance and/or for the member to carry out an action in a polite or formal manner.

RESONANCE FREQUENCY - Every rotating or shaking thing has a resonance frequency. When something is at its resonance frequency, every imbalance adds to itself at every cycle. This leads to a force which mathematically goes to infinity and no helicopter can handle those stresses for long. Using large training gear usually change the resonance frequency to right around that point the helicopter likes to hover. This can result in violent shaking even if the blades are balanced.

RESTRICTED AIRSPACE - Airspace of fixed dimensions that is so specified in the *Designated Airspace Handbook* and within which the flight of an aircraft is restricted in accordance with conditions specified in that Handbook, or airspace that is restricted under Section 5.1 of the Aeronautics Act.

RETREATING BLADE STALL - A dangerous situation when in fast flight where the blade that is flying towards the helicopters tail loses enough airspeed to generate lift. This can result in losing control of the helicopter.

RETRACTS - Abbreviation for 'retractable undercarriage', which is an undercarriage that folds up into the airplane's wings or fuselage after takeoff.

REVOLUTION MIXING - A mixing function on a transmitter which lets you program a throttle to rudder mix, so that as power is added, the transmitter automatically adds more rudder to

compensate for the increase in torque. This function should be inhibited if you're using a heading hold gyro.

RIBS - The airfoil sections that separate the upper and lower surfaces of the wings and give them their unique shape are called WING RIBS.

RICH OR TOO RICH - This occurs when there is too much fuel in the fuel to air ratio. The combustion chamber will flood. This does not damage the engine, but it does drastically reduce the power output. Turning the needle valve screw counter-clockwise makes the carburetor run richer.

ROLL - The rotational movement of an airplane about its longitudinal axis. Also an aerobatic maneuver whereby the airplane is rolled about its longitudinal axis through 360 degrees, while trying to keep the thing in a straight line.

ROTARY WING PLATFORM - Term which describes the main rotor blades of a helicopter.

ROTATIONAL VELOCITIES- Describes how the airspeed over the tips of the blades is different than that over the other parts of the blade.

RPM - Revolutions per Minute.

RTF - Abbreviation for Ready to Fly. RTF models are ready to go right out of the box. No building required.

RUDDER - The movable part of a vertical airfoil which controls the YAW of an aircraft; the fixed part being the FIN.

RUDDER OFFSET – A helicopter transmitter function that allows the user to specify a additional amount of rudder trim for idle-up modes which usually have a higher RPM or different blade pitch curve and thus different amounts of torque to compensate for. This function should be inhibited if you're using a heading hold gyro.

RUDDER OFFSET – on control line - this is much the same as engine offset, except that in this case the rudder is permanently offset to turn the model to the outside of the flying circle.

RULE - A MAAC prescribed guide for conduct or action, a regulation or bylaw governing procedure or controlling conduct.

RUNWAY – A defined rectangular area on a land aerodrome, prepared for the landing and take-off run of aircraft along its length.

RWY - Abbreviation for runway.

RX - Abbreviation for receiver.

SAFETY THONG - A strong piece of cord which is attached to the Control Handle and looped around the flyer's wrist so that the handle cannot be released inadvertently. This item is mandatory for all Control Line flying.

SAILPLANE - An unpowered, soaring aircraft capable of maintaining level flight for long periods of time after release from tow and of gaining altitude using wind currents.

SCALE - Any model that has been modeled from a real aircraft, such as a Piper Cub or P-51 Mustang for example.

SECONDARY STALL - Any stall resulting from pulling back too soon and too hard while recovering from any other stall. Usually a HIGH-SPEED or ACCELERATED STALL.

SEE-SAW HEAD - A form of rotor head where the two rotor blades are "connected" through a feathering shaft (thick wire). When one pitches up the other pitches down. This makes for a more stable helicopter and a simpler design, but does not handle as well as a flapping head type.

SETTLING WITH POWER - A dangerous condition when descending from a hover where the helicopter's rotor blades enter their own down-wash.

SEMI-SCALE - Any model that is loosely based on a real aircraft, with maybe a few details left out or proportions changed.

SERVO – A small electric motor operated by the receiver that converts the radio signal into movement of pushrods etc.

SERVO ARM – A lever arm that fits to the motor shaft coming out of the servo.

SERVO REVERSE - A feature on R/C systems whereby the direction of the servo horn movement can be reversed.

SERVO THROW OR SERVO TRAVEL – The distance an arm can travel in an arc from its centered or neutral position on the servo.

SHALL – Verb, (objective); used in the MAAC Safety Code to express what is required, mandatory compliance by members.

SHORT HOPS - When the model ascends for a short period of time then descends and lands. This technique allows a beginner pilot to get used to pitch and throttle inputs of the model.

SHOT DOWN – When a second user turns on a 27 Mhz, Amateur band or 72 MHZ transmitter that is on the same frequency as one already in use. The pilot of the first aircraft loses transmitter response and his aircraft goes down. All R.C. users should be aware that Interference issues causing momentary or full loss of control can happen for any number of reasons in any frequency band. In the 27 MHZ, the Amateur Bands and the 72 MHZ band, interference can come from poor installation, electromagnetic from AC power sources, intermodulation from transmitter frequencies mixing, etc. In the 2.4 GHZ band, interference and possible shoot down scenarios can occur from Bluetooth or Wi-Fi Devices.

SHOULD – Verb, (subjective) is used in the MAAC Safety Code to express what is probable or expected from MAAC members, used to express a request in a polite manner or to soften direct compliance.

SHOULDER-WING - A mid-wing monoplane with its wing mounted directly to the top of the fuselage without use of CABANE STRUTs.

SIDESLIP - A maneuver of an aircraft in which a relative flow of air moves along the lateral axis, resulting in a sideways movement from a projected flight path, especially a downward slip toward the inside of a banked turn.

SINK, SINKING SPEED - The speed at which an aircraft loses altitude, especially in a glide in still air under given conditions of equilibrium.

SKID - Too shallow a bank in a turn, causing an aircraft to slide outward from its ideal turning path.

SLATS - Movable vanes or auxiliary airfoils, usually set along the leading edge of a wing but able to be lifted away at certain angles of attack.

SLIP - Too steep a bank in a turn, causing an aircraft to slide inward from its ideal turning path.

SLIPSTREAM - The flow of air driven backward by a propeller or downward by a rotor. Compare DOWNWASH.

SLOPE SOARING – Using the lift generated by prevailing winds on cliff faces to fly sailplanes

SLOP - Describes the imprecision of a control system were the controls can be "wiggled" without the servo's moving.

SLOT - A long, narrow, span wise gap in a wing, usually near the leading edge, to improve airflow at high angles of attack for slower landing speeds.

SLOTTED FLAP - A flap that, when depressed, exposes a SLOT and increases airflow between itself and the rear edge of the wing.

SPAR - The main members in any wing are the SPARS. These are beams that run the full length of the wing and are responsible not only for carrying the bulk of the load, but for providing stiffness to the wing to prevent twisting or distortion.

SPECIAL FLIGHT OPERATIONS CERTIFICATE (SFOC) – A Canadian aviation document required for operating an unmanned air vehicle (UAV) system.

SPEED MODEL - a particular type of Control Line model that has been designed for timed pure speed events.

SPIN - The aircraft is made to yaw around the yaw axis with one wing stalled and one wing flying.

SPINNER – A metal or plastic cone-shaped piece that covers the center of the propeller.

SPIRAL - An aerobatic maneuver whereby the airplane is flown vertically down towards the ground, while being made to roll.

SPLIT FLAP - A FLAP built into the underside of a wing, as opposed to a Full Flap wherein a whole portion of the trailing edge is used.

SPOILER - A long, movable, narrow plate along the upper surface of an airplane wing used to reduce lift and increase drag by breaking or spoiling the smoothness of the airflow.

SPONSON - A short, wing like protuberance on each side of a seaplane fuselage to increase lateral stability when on the water.

SPORT AIRPLANES - A general term for model airplanes that can be used for training on but are also capable of aerobatic maneuvers, whether intentional or not.

SPOTTER - Visual Observer who keeps the model airplane within unaided visual line-of-sight (VLOS), (see VLOS); and who assists the pilot in the duties associated with collision avoidance and complying with the applicable rules of flight. Such tasks would normally include things like advising the pilot of the position of other aircraft and any potential for collision; assist the pilot during a maiden flight by adjusting trim settings as instructed; communicating the pilot's intentions to other pilots flying at the same time, taking off or landing, and/or advise the pilot of any potential hazards that could impede flight and public safety.

SPREAD SPECTRUM - The latest technology for radio control systems. Based on the 2.4GHz frequency band, spread spectrum radio systems use a modulation scheme where all users share the same band while being virtually interference-proof.

STALL – A stall occurs when the flying speed gets too low and the necessary amount of lift needed to hold the model in the air is lost. Sudden loss of lift when the angle of attack increases to a point where the flow of air breaks away from a wing or airfoil, causing it to drop.

STALL TURN - An aerobatic maneuver whereby the airplane is put into a vertical climb, power is reduced and full rudder is applied. The airplane should stop in mid-air and turn through 180 degrees, thus facing the ground, in the direction that the rudder was applied.

STABILIZERS - The horizontal and vertical stabilizers are the fixed parts of the tail plane of an aircraft.

STAGGER - The relative longitudinal position of the wings on a biplane. Positive Stagger is when the upper wing's leading edge is in advance of that of the lower wing, and vice versa for Negative Stagger.

STRAIGHT AND LEVEL - Flying in a straight line, with no fluctuation in altitude. A well-trimmed, balanced airplane should fly straight and level with the TX sticks in their central positions.

STARTING TABLE – A table to support; setup and start the aircraft.

STATIC BALANCE - means that the weight of the surface in front of the hinge offsets the weight that's behind the hinge line. The distance the counterweight is from the hinge line also contributes to the balancing act. Statically balanced controls are much less apt to flutter, since the servo doesn't hold up the full weight of the control surface.

STOL - Short Take-Off and Landing.

STOVL - Short Take-Off and Vertical Landing.

STRUTS WING- One end of each strut is normally attached to a bracket on the lower part of the fuselage while the other end is attached to the wing at approximately the mid-point. The purpose of wing struts is to prevent the wings from folding during flight by transferring part of the wing load back to the fuselage.

STRUTS INTER-PLANE - Used on bi-planes are used to join the upper and lower wings, usually in the outer area of the wings.

STRUTS – CABANE - Used on biplanes to support the upper wing above the fuselage.

STUNT MODEL - A Control Line model designed for Precision Aerobatic events. The model characterized by interconnected elevator and flaps, with a large wing area to provide light wing loadings for maximum manoeuvrability.

SUBJECTIVE – Action based on feelings or opinions rather than facts.

SUGGEST – Verb; used in the MAAC Safety Code to recommend or imply a possibility, a desirable or alternate course of action.

SWASH PLATE - A device that the control arms spin around on so that the pitch of the blades is changed depending on their relative position to the helicopter.

SWEEPBACK - A backward inclination of an airfoil from root to tip in a way that causes the leading edge and often the trailing edge to meet relative wind obliquely, as wing-forms that are swept back.

TAIL BOOM – A horizontal portion of the helicopter that holds the tail surfaces and tail rotor.

TAIL DRAGGER - An airplane that has 2 main wheels and a small tail wheel.

TAIL-IN - The orientation of the model relative to the pilot is when the model's tail is facing towards the pilot.

TAIL PLANE - see horizontal stabilizer.

TAIL ROTOR – A small rotor at the tail of the helicopter to counteract the torque of the main rotor and provide yaw control.

TAIL WIND - When the wind is blowing in the same direction as your plane is flying, taking off or landing. Flying with a tail wind increases the plane's ground speed.

TAKE OFF - The action of accelerating your airplane along the ground until flying speed is reached, and the thing gets airborne. Only suitable for models with an undercarriage, otherwise you're limited to hand launching.

TERMINAL CONTROL AREA - A controlled airspace that is established in the vicinity of a major aerodrome and within which an air traffic control service is provided based on the airspace classification.

THRUST - The force that is generated by the spinning propeller or fan/turbine of the airplane, and pushes/pulls the model through the air.

TIP STALL - The condition that occurs when one or both wing tips stall before the rest of the wing. Such a stall is dangerous in that it usually results in a wing drop.

TRAILING EDGE - The rear edge of the wing, tail plane or rudder.

THROTTLE CURVE / PITCH CURVE / PROGRAMMABLE POINTS - On helicopters - Somewhat like exponential in that you change the way the servos move as you move the stick. Usually you would have a different curve setting for each idle up mode. In idle up one you might have the throttle at 100% when the left stick is full down, at 50% when it's in the middle, and back to 100% when the left stick is full up. This way you can fly upside down. Some radios have more curve points than others, which means you could have parts of the stick less sensitive than others, so you could make it easier to hover gracefully on a machine with a very sensitive collective.

THROTTLE HOLD - A feature that comes with many transmitter models. The opposite of Idle-Up, as in, this switch will keep the throttle at idle so that you can increase the collective without gaining high RPMs /power. This switch can be used as a "safety" switch when the helicopter is carried to the flight line. It is more commonly used to practice auto-rotations or if tail rotor control is lost causing the helicopter to pirouette rapidly opposite rotor blade direction.

THRUST - The driving force of a propeller in the line of its shaft or the forward force produced in reaction to the gases expelled rearward from a jet or rocket engine. Opposite of DRAG.

TORQUE - The force generated by the turning propeller or helicopter blades, which tends to turn the aircraft in the opposite direction.

TOUCH-AND-GO - Landing practice in which an aircraft does not make a full stop after a landing, but proceeds immediately to another take-off.

TOTAL AERODYNAMIC FORCE - The net force vector applied by the various forces of lift.

TR OR T/R - SHORT FOR TAIL ROTOR - Used to counter the torque then engine puts on the rotor blades which left unbalanced would make cause the helicopter to spin around its main rotor axis.

TRACTOR - A propeller mounted in front of its engine, pulling an aircraft through the air, as opposed to a PUSHER configuration.

TRACKING - If the pitch of both rotor blades is not exact, one rotor blade will be slightly off axis of the other blade, it will look like one blade is higher than the other. Viewed from the side with blades at eye level rotor blades would look like this: >< Ideally, you want perfect tracking, so that the blades appear to be perfectly flat and look from the side like this: --

TRAILING EDGE - The rearmost edge of an airfoil.

TRAINER – An R/C airplane that has been designed for learning to fly on. Usually trainers are high wing, with plenty of dihedral.

TRAINING GEAR (helicopters) - Larger landing gear so that landing at a angle is less dangerous. Beginners use these while learning to hover and they typically are made of two crossing sticks with whiffle balls on the ends.

TRANSLATIONAL LIFT - When in forward flight, the spinning rotor disc produces more lift than in a hover.

TRANSLATING TENDENCY - When holding a heading with a helicopter hovering level the force the tail rotor puts on the helicopter to keep it aligned causes the entire helicopter to move the opposite direction of the tail thrust.

TRANSMITTER – The transmitter is the part of the radio control system that the pilot holds in his or her hands. Manipulating the control sticks and switches causes the transmitter to send radio signals to the receiver in the model, which are then translated into control signals. Often just referred to as 'the radio'; often abbreviated in writing to 'Tx'.

TRANSPORT CANADA (TC) – A Canadian government agency responsible for Transportation policies, programs and enforcement. It promotes safe, secure, efficient and environmentally responsible transportation; including model aircraft.

TRANSVERSE FLOW EFFECT (helicopters) - When in a slow forward flight, wind in the rear part of the disk enters at a lower angle of attack due to the leading edge of the disk pulling air down, which results in vibrations.

TRIMMING - The action of getting a model to fly straight and level, with the transmitter sticks in their neutral positions.

TRICYCLE UNDERCARRIAGE - A fixed undercarriage that consists of 2 main wheels and a nose wheel. Often abbreviated to 'trike'.

TURBOJET - An aircraft having a jet engine in which the energy of the jet operates a turbine that in turn operates the air compressor.

TURBOPROP - An aircraft having a jet engine in which the energy of the jet operates a turbine that drives the propeller.

TX - Abbreviation for transmitter.

UNDERCARRIAGE (UC) - see landing gear.

UNDERSHOOT – Land short of the runway.

UNMANNED AIRCRAFT (UA) – Designed to be flown without a pilot on board, by remote control using an external device such as a remote control station, tablet, laptop, smart phone, etc. UAs are known in popular culture under various names; examples of such names include unmanned aircraft vehicle (UAV), drone, and remote control (RC) aircraft (RC aircraft, RC plane or RC models).

UNMANNED AIR VEHICLE (UAV) – A power-driven aircraft, other than a model aircraft, that is designed to fly without a human operator onboard. The intended non-recreational use of the unmanned aircraft is primarily what differentiates a UAV from a model aircraft.

UNMANNED AIRCRAFT SYSTEMS (UAS) - An unmanned aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the national airspace system.

In the military, UAVs 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. Ground-based autonomous robots are called Unmanned Ground Vehicles (UGVs) and robot submersibles are called

Autonomous Underwater Vehicles (AUVs). Robot boats are called Unmanned Surface Vehicles (USVs). Under new 2017 Transport Canada regulations, the term “model aircraft” and “UAVs” will be replaced in the CARS as unmanned aircraft systems.

V1 - decision speed, up to which it should be possible to abort a take-off and stop safely within the remaining runway length. After reaching V1 the take-off must be continued.

VA: design manoeuvring speed. The speed below which abrupt and extreme control movements are possible (though not advised) without exceeding the airframe’s limiting load factors.

VFE: maximum flap extension speed.

VMCA: minimum control speed (air). The minimum speed at which control of a twin-engine aircraft can be maintained after failure of one engine.

VMO: maximum operating speed; also Mmo.

VNE: never-exceed speed, ‘redline speed’.

VNO: normal operating speed. The maximum structural cruising speed allowable for normal operating conditions.

VR: rotation speed, at which to raise the nose for take-off.

Vso: stalling speed at MTWA, in landing configuration with flaps and landing gear down, at sea level, ISA conditions.

Vx: best angle of climb speed on all engines.

VxSE: best engine-out angle of climb speed.

Vy: best rate of climb speed on all engines.

VySE: best engine-out rate of climb speed.

VENTRAL FIN - A fin/rudder extension on the bottom of a fuselage. Opposite of DORSAL FIN.

VERTICAL STABILIZER - see fin.

VFR (Visual Flying Rules)

VISUAL LINE-OF-SIGHT (VLOS) – means unaided (corrective lenses and/or sunglasses exempted) visual contact with the Model Airplane or unmanned air vehicle (UAV) sufficient to maintain operational control of the aircraft, know its location, and be able to scan the airspace to decisively see and avoid traffic.

V/STOL - Vertical and Short Take-Off and Landing.

VTOL - Vertical Take-Off and Landing.

WASH-IN, WASH-OUT - A method of increasing lift by increasing (Wash-In) or decreasing (Wash-Out) the ANGLE OF INCIDENCE on the outer part of an airplane wing to counteract the effects of engine TORQUE. Wash out is usually used to prevent tip stalling.

WINGLET - A small, stabilizing, rudder like addition to the tips of a wing to increase efficiency by reducing tip losses

WING LOADING - The maximum take-off gross weight of an aircraft divided by its wing area.

WING ROOT - The inboard section of the wing which is the section closest to the fuselage.

YAW - Of the three axes in flight, this specifies the side-to-side movement of an aircraft on its vertical axis, as in skewing. Compare PITCH and ROLL.

WEATHERVANE - The property of an aircraft to turn into the wind like a windsock.

WILL – Verb (objective); used in the MAAC Safety Code to express direction and members compliance to MAAC rules, codes and/or guidelines.

WINCH - This consist of a motor driven windlass that pull a glider up to flying speed and then released or launched into flight.

WINDSHEAR - Localized change in wind speed and/or direction over a short distance, resulting in a tearing or shearing effect, usually at low altitude, that can cause a sudden loss of airspeed with occasionally disastrous results if encountered when taking-off or landing.

WINDSOCK - A funnel shaped tube of fabric, mounted on a tall pole at the flying field. It indicates the direction and strength of the wind.

WING –A flying surface with an airfoil cross section producing a certain amount of lift and drag thus allowing an aircraft to remain airborne under sufficient power to overcome the drag of the wing.

WING FENCE –A narrow vertical blade extending over most of the chord, placed on the top of a wing between the flap and aileron to prevent span wise flow of air.

WING LOADING – A calculation that is useful when determining certain flight performance characteristics of a plane, the figure is obtained by dividing the flying weight of the airplane by the total wing area. A plane with large wings relative to its weight will have a lower wing loading, which means better lifting capacity but not so great high speed performance, and vice versa. Wing loading values are given in oz/sq. ft. (ounces per square foot).

WINGSPAN - The overall length of the wing, from tip to tip. Wingspan is the primary measurement when referring to an airplane's size and it's usually stated in inches (").

WING RIBS - See Ribs

WOOF AND POOF (helicopters) - Named after the sound it makes when the rotor blades go wildly out of track, 4 inches (10 centimeters) or more vertical separation.

YAW - The rotational movement of an aircraft about its vertical axis, controlled by the rudder or the rotation of the model around the main rotor shaft, i.e.: tail rotor inputs.

YAW RATE (helicopter) - A term that describes the control input of a heading hold type gyro. Instead of the rudder control adjusting strictly the tail pitch, as it does with another gyro, a yaw rate gyro will uniformly control the rate at which the helicopter yaws.

Z-BEND - A simple Z-shaped bend in the wire end of a pushrod, which is used to attach the pushrod to a servo output arm.