

ABCs of Aviation – Aviation Glossary

AFSS (Automated Flight Service Station) A (non-air traffic control) *FAA* facility providing pilots with weather briefing and flight-plan filing by radio, telephone and in person. Monitors flight plans for overdue aircraft and initiates search and rescue services. "Automated" refers to telephone call handling equipment and computer information systems aiding pilot briefers.

- **FSS (Flight Service Station)** *FAA* weather briefing and flight plan facility which once numbered 361 U.S. locations before most were consolidated into 61 AFSS. Usually on an airport to handle walk-in traffic. Some still provide AAS (Airport Advisory Services) to local air traffic where volume cannot justify a control tower.
- **XFSS (Auxiliary Flight Service Station)** A local-service FSS facility retained where special operational or weather conditions mandated an exception from consolidation. Provides only airport advisories and weather observations. Twenty of the 46 XFSSs are in Alaska.

AGL (Above Ground Level) Altitude expressed as feet above terrain or airport elevation (*see MSL*).

AILERONS An aircraft control surface hinged to the rear, outer section of the wing for banking ("tilting") the aircraft. A bank causes an aircraft to turn. Controlled by right or left movement of the control yoke or stick.

ALTIMETER A highly sensitive barometer which shows an aircraft's altitude above *mean sea level* by measuring atmospheric pressure.

ALTIMETER SETTING A value related to local barometric pressure, usually provided to pilots *by ATC*. Used as a reference setting so that the aircraft *altimeter* indicates an accurate altitude. Above 18,000 feet, all pilots use a standard setting of 29.92 inches of mercury.

APPROACH (DEPARTURE) CONTROL Radar-based *air traffic control*, associated with the control tower at larger airports. Provides traffic separation services from outside the immediate airport area to a distance of about 40 miles.

ARSA (*See CLASS C Airspace*)

ASOS (Automated Surface Observation System) The primary surface weather observing system in the U.S., supporting aviation operations and weather forecasting. Automated sensors record wind direction and speed, visibility, cloud ceiling, precipitation, etc. Data sent automatically to the National Weather Service. At many locations, a computer-generated voice broadcasts the minute-by-minute weather reports to pilots on a discrete radio frequency.

ATA (See *CLASS D Airspace*)

ATC (Air Traffic Control) The FAA service providing separation services to participating airborne traffic and clearances to land, take off or taxi at airports with a control tower.

ATIS (Automated Terminal Information System) A continuous broadcast on a separate *ATC* frequency of an airport's current weather (updated at least hourly). Eliminates controller requirement to read local weather data to each landing or departing aircraft.

ATP (Airline Transport Pilot) The most advanced of all pilot certificates, requiring the highest skill and experience levels. Required: a minimum of 1,500 hours flight experience, ATP written exam and flight test. Mandatory for captains of *Part 121* major scheduled airlines, regional carriers, *Part 125* scheduled commuter airlines, and some *Part 135* operations. A hiring requirement for many pilot positions in corporate and commercial general aviation flying.

AWOS (Automated Weather Observing System) Provides automated airport weather observations to pilots on a discrete radio frequency via a computer-generated voice. Less sophisticated than *ASOS*, usually installed using state funds.

BASE or Base Leg The leg perpendicular to *the final* leg of the *traffic pattern* to the landing runway.

CENTER One of 24 FAA Air Route Traffic Control Centers providing radar surveillance and traffic separation to participating en route traffic above and outside airspace handled by *Approach and Departure Control*.

CFI (Certificated Flight Instructor) A pilot holding a Commercial pilot certificate who, after passing two written tests and a practical flight exam, is FAA-rated to give flight instruction. The flight instructor rating is specific as to type of instruction authorized, e.g., single-engine airplane, multi-engine airplane, instrument flying (CFII), helicopter; etc.

CLASS A Airspace Airspace between 18,000 and 60,000 feet *MSL* over the conterminous United States. *IFR* clearances are required for all aircraft operating in CLASS A airspace. Formerly called the Positive Control Area.

CLASS B Airspace Airspace area around the busiest U.S. hub airports, typically to a radius of 20 *nautical miles* and up to 10,000 feet above ground level. Operations within CLASS B airspace require an ATC clearance and at least a Private pilot certificate (local waivers available), radio communication, and an altitude-reporting (Mode C) *transponder*. Formerly called TCA.

CLASS C Airspace Airspace area around busy U.S. airports (other than CLASS B). Radio contact with approach control is mandatory for all traffic. Typically includes an area from the surface to 1,200 feet *AGL* out to 5 miles and from 1,200 to 4,000 feet *AGL* to 10 miles from the airport. Formerly called Airport Radar Service Area (ARSA).

CLASS D Airspace Airspace around an airport with an operating control tower; typically to a radius of 5 miles from the surface to 2,500 feet *AGL*. Radio contact with the control tower required prior to entry. Formerly called Airport Traffic Area (ATA).

CLASS E Airspace General *controlled airspace* comprising control areas, transition areas, Victor airways, the Continental Control Area, etc.

CLASS F Airspace International airspace designation not used in the U.S.

CLASS G Airspace Uncontrolled airspace, generally the airspace from the surface up to 700 or 1,200 feet *AGL* in most of the U.S., but up to as high as 14,500 feet in some remote Western and sparsely populated areas.

CLEARANCE Formal instructions from air traffic control authorizing a specific route or action (climb or descend, entry into *controlled airspace*). Pilots may deviate from an ATC clearance in an emergency or when compliance would threaten safety of flight.

COMMERCIAL PILOT Holder of an FAA Commercial pilot certificate, requiring a minimum of 250 flight hours (and other sub-requirements), a Commercial written test and Commercial flight test. The pilot certificate to fly for compensation or hire, often in a wide variety of commercial general aviation operations including sight-seeing, aerial application, glider towing and flight instruction. It does not necessarily imply flying for a scheduled airline. (See *ATP*. FYI: More than 40% of general aviation pilots are licensed as Commercial or ATP pilots, whether they fly for a living or not.)

CONTROLLED AIRSPACE A generic term including all airspace classes in which *ATC* services are available. Does not imply that all flight is under ATC control. *VFR* aircraft may operate without ATC contact in most controlled airspace as long as weather conditions will permit them to see and avoid other aircraft.

CTAF (Common Traffic Advisory Frequency) The radio frequency, also called the *UNICOM* frequency, used by all traffic at an airport without an operating control tower to coordinate approaches and landings, takeoffs and departures. Pilots announce their positions, intentions and actions in the *traffic pattern* for the benefit of other traffic.

DOWNWIND The standard *traffic pattern* leg where traffic flies parallel to the landing runway in the direction opposite that of landing. Airplanes usually land into the wind. In this leg of the pattern, the aircraft has the wind behind it, thus the plane is flying "downwind."

DUATS (Direct User Access System) Permits pilots with a personal computer to obtain preflight weather data and *flight plans*. Toll-free service available to all pilots with a current *medical certificate*.

ELEVATOR An aircraft control surface hinged to the rear of the left and right horizontal stabilizer of the aircraft tail. Changes the aircraft pitch attitude nose-up or nose-down, as during climb or descent. Controlled by pushing or pulling on control yoke or stick.

ELT (Emergency Locator Transmitter) A radio transmitter activated automatically by the impact of an accident. Emits a warbling tone on the international emergency frequencies of 121.5 MHz, 243 MHz and (newer models) 406 MHz. ELT signals can be received by nearby FAA facilities, aircraft overhead, and search and rescue (SARSAT) satellites.

FAA (Federal Aviation Administration) The Department of Transportation's agency for aviation. In addition to regulating airports, aircraft manufacturing and parts certification, aircraft operation and pilot certification ("licensing"), the FAA operates *Air Traffic Control*, purchases and maintains navigation equipment, certifies airports and aids airport development, among other activities.

FAR (Federal Aviation Regulations) Commonly used term for the rules and regulations covering every aspect of aviation. Codified into *Parts*.

FBO (Fixed Base Operator) An airport-based business which parks, services, fuels and may repair aircraft; often rents aircraft and provides flight training. The term was coined to differentiate FBOs from businesses or individuals without an established place of business on the airport.

FINAL The last leg of the *traffic pattern* when the aircraft is aligned to fly straight in to the landing runway.

FLAPS Hinged surfaces on the inboard rear of wings, deployed to increase wing curvature (and thus, lift), primarily used to control angle of descent and to decrease landing touchdown speeds.

FLIGHT PLAN Filed by radio, telephone, computer, or in person with *Flight Service Stations*, a record of aircraft number; type and equipment, estimated time of departure and time en route, route and altitude to be flown, amount of fuel and number of persons aboard, home base and contact phone number; and other information.

- **VFR Flight Plan** Voluntary filing for cross-country flights under Visual Flight Rules. For search and rescue use only; it has no air traffic control role.
- **IFR Flight Plan** Mandatory filing (at least one-half hour) before a flight under Instrument Flight Rules. Based on flight plan information, ATC can issue (immediately before departure) an IFR clearance to enter clouds or low visibility conditions for instrument rather than visual flight.

FLIGHT WATCH or EFAS FSS priority handling of real-time weather information to airborne flights (rather than for preflight planning) on a single national radio frequency of 122.0 MHz (low altitude).

FLIGHT FOLLOWING ATC radar surveillance of VFR flights at pilot request over water or desolate areas. Facilitates search and rescue should it be needed. Service provided only if controller is not too busy with IFR traffic.

FUSELAGE The main body of the aircraft.

GENERAL AVIATION The 92% of U.S. aircraft and more than 65% of U.S. flight hours flown by other than major and regional airlines or the military. Often misunderstood as only small, propeller-driven aircraft. Even a large jet or cargo plane operated under FAR *Part 91* can be a general aviation aircraft.

GPS (Global Positioning System) Satellite-based navigation system operated by Department of Defense, providing extremely accurate position, time, and speed information to civilian and military users. Based on a "constellation" of 24 satellites, GPS will replace ground-based navigation systems (*VOR, ILS*) as the primary worldwide air navigation system in the 21st Century.

IFR (Instrument Flight Rules) Rules of the road for flights permitted to penetrate clouds and low visibility conditions by reference to cockpit. flight instruments and radio navigation. Aircraft must be equipped and pilots qualified and current for IFR flight. Flight plans and ATC clearances are required. Flights are monitored and traffic separated by Air Traffic Control, usually by radar.

ILS (Instrument Landing System) A precision instrument approach system utilizing radio transmitters at the runway ends which provide precise descent and course guidance to the runway permitting aircraft to land during periods of low ceilings or poor visibility.

KNOT (nautical mile per hour) Most common measure of aircraft speed. 100 knots equals 115 statute miles per hour. (For mph, multiply knots by 1.15.)

LAAS Local Area Augmentation System, an enhancement of the Global Positioning System (GPS) providing greater navigation accuracy and system integrity.

MEDICAL, THIRD CLASS Upon examination by an FAA-designated Aviation Medical Examiner (AME) for general health, eyesight and hearing, a Third Class Medical allows the pilot to exercise the privileges of a *Recreational* or *Private* pilot certificate. Not for flight "for compensation or hire." Valid for three years (pilots younger than 40) or two years (age 40+).

MEDICAL, SECOND CLASS Allows pilot to exercise the privileges of a *Commercial* pilot certificate "for compensation or hire" for one year then, if not renewed, reverts to Third Class medical.

MEDICAL, FIRST CLASS Allows pilot to exercise the privileges of the Airline Transport Pilot (*ATP*) certificate for six months. If not renewed, reverts to a Second Class medical, then to a Third Class medical.

MODE A The operating mode of onboard radar *transponders* that transmits a return radio signal to enhance an aircraft's radar return and identify it with one of 4,096 controller-assigned numerical codes.

MODE C The *transponder* operating mode that also reports aircraft altitude by transmitting data from an encoding *altimeter*

MOA (Military Operations Area) Airspace, depicted on navigational charts, in which military flight operations (training and practice combat) are conducted. May be transited by *VFR* civilian traffic, but special vigilance is recommended. (See also *Restricted Area*)

MSL (Mean Sea Level) Altitude expressed as feet above sea level, rather than above local terrain (*AGL*). To ignore varying terrain elevations, all navigational altitudes and barometric altimeters are based on height above mean sea level. Only radar altimeters, which measure the distance between the aircraft and the ground at low altitudes, indicate actual height above the ground.

NAUTICAL MILE Most common distance measurement in aviation, equivalent to 1.15 statute (standard U.S.) miles.

NONTOWERED AIRPORT An airport without a control tower - the majority of America's 13,000 airports. Only 680 airports have control towers. Nontowered airports are far from being "uncontrolled." Pilots follow *traffic pattern* procedures and self-announce positions and intentions using the *Common Traffic Advisory Frequency (CTAF)*, usually called the *UNICOM* frequency.

N-NUMBERS Federal Government aircraft registration numbers. U.S.-registered aircraft numbers begin with "N," Canadian numbers with "C" or "CF," German numbers with "D," United Kingdom numbers with "G," French numbers with "F", Japanese numbers with "JA," etc.

NMAC (Near Mid-Air Collision) Defined by FAA as a potential collision situation between aircraft within 500 feet of each other.

NTSB (National Transportation Safety Board) The independent federal agency charged with investigating and finding "probable cause" of transportation accidents.

PART 91, 121, 125, 135 The parts of Federal Aviation Regulations (*FARs*) covering non-commercial operations (Part 91), major scheduled air carriers (*Part 121*), commuters (*Part 125*), non-scheduled carriers and air taxis (*Part 135*).

PART 61, 141, 142 The parts of *FARs* covering pilot certification and flight school operations: the pilot certification and standard flight school (Part 61), the integrated curriculum type school (Part 141) requiring slightly fewer flying hours, and a new Part 142 program allowing replacement of more flight time with advanced flight simulators.

PIREP (Pilot Weather Report) Voluntary pilot observation of inflight weather conditions radioed to *ATC* or *FSS*. Information used by other pilots to avoid adverse weather and by National Weather Service to amend or update forecasts.

POSITIVE CONTROL AREA (See *CLASS A Airspace*)

PRIVATE PILOT The Private pilot certificate allows flying passengers for personal transportation and business. Requires the pilot to be at least 17 years old, have a minimum of 40 hours of flight experience and training (35 hours under *Part 141*), and pass at least a *Third Class Medical* exam, a written exam and flight test. May not "fly for hire or compensation" but may share expenses equally with passengers.

PROHIBITED AREA An airspace area where flight is prohibited except by prior arrangement with the controlling agency. An example is the P-56 area over downtown Washington, D.C., prohibiting flight over the White House.

RECREATIONAL PILOT A pilot certificate requiring less training than a Private certificate. Privileges limited accordingly to flight within 50 nautical miles of base, carrying no more than one passenger; using non-tower airports and flying during daylight hours only unless restrictions are removed through further training. May not share expenses. Few new pilots currently choose the recreational certificate.

RESTRICTED AREA Airspace which (when "Active" or "Hot") usually excludes civilian aircraft. Examples: airspace for rocket flights, practice air-to-air combat or ground-based artillery practice. Temporary restricted areas are established for events such as forest fires, natural disasters or major news stories. Flight through a restricted area may be authorized by the "controlling agency" or by *FAA*.

RUDDER Aircraft control surface attached to the rear of the vertical stabilizer (fin) of the aircraft tail. Forces the tail left or right, correspondingly "yawing" the aircraft right or left. Rudder movement "coordinates" with the banking of wings to balance a turn. Controlled by left and right rudder (foot) pedals.

SEE-AND-AVOID The *FAA* requirement that all pilots are ultimately responsible for separation from other aircraft when visual conditions permit spotting traffic. Even *IFR* flights when operating in visual weather conditions or *VFR* flights being issued radar advisories are responsible for visual scanning to see-and-avoid other traffic.

SOLO After typically 12-20 hours of initial flight training, qualified student pilots are permitted to undertake some flights to build experience and confidence without a flight instructor on board. Requires the written endorsement of the student's flight instructor and a *Third Class Medical* certificate. First solo, a major event for any pilot, is traditionally three takeoffs and landings at the student's home airport.

SLIP An aircraft control technique with wings banked one way and rudder deployed for the opposite turn. Aircraft flies slightly sideways, increasing drag to make it descend faster without increasing forward speed. Also one of two control configurations used for crosswind landings when the rudder must counteract the turning effect of banking into a crosswind to neutralize the wind's effect.

SPECIAL USE AIRSPACE (SUA) All airspace in which restrictions or prohibitions to flight are imposed for military or government needs (See *MOA, Restricted Area, Prohibited Area*).

SPIN An aerodynamic condition in which the wings have lost lift and the aircraft follows a descending corkscrew flight pattern in autorotation. Aircraft must be stalled for a spin to occur; this is usually the result of "crossed" flight controls (uncoordinated rudder) causing residual lift on one wing during the stall.

SQUAWK (NOUN) The radio transmission of the radar *transponder* onboard an aircraft. (VERB) Also the *ATC* instruction to the pilot to set one of 4,096 possible codes to identify the aircraft on controller radar. All *VFR* flights squawk code 1200 except when receiving radar advisories or when instructed otherwise by *ATC*.

STALL Purely an aerodynamic condition - nothing to do with engine operation. Occurs when lift-producing airflow over the wings is disrupted or lost because angle of wings to airflow (angle of attack) is too high. Most commonly occurs when a pilot doesn't maintain sufficient airspeed in a climb or turn. Student pilots are trained in stall prevention, recognition and recovery.

STUDENT PILOT A pilot who is training for a *Private Pilot* certificate, either before or after the first solo. A student must obtain a *Third Class Medical* certificate through an examination by an FAA-designated Aviation Medical Examiner before being allowed to fly solo in a powered aircraft. The medical certificate for a student pilot has a student "license" printed on the back.

TCA (Terminal Control Area) (See *CLASS B Airspace*.)

TCAD A proprietary low cost anti-collision system detecting and alerting pilots to nearby transponders but not providing evasive instructions or coordination with other aircraft.

TCAS (Traffic Alert and Collision Avoidance System) A cockpit system to detect other transponder-equipped aircraft, alert pilots, and command/coordinate evasive action between aircraft.

TRANSPONDER A special onboard 1090 MHz radio transmitter to enhance and code an aircraft's radar return. When interrogated by ground radar, it transmits a return signal which controllers can use to identify and tag the flight on their computerized video display radar screen. Paired with an altitude encoder, "Mode C" transponders also transmit the aircraft's altitude. All aircraft flying in *Class B* airspace or higher than 10,000' are required to have *Mode C* transponders.

TRAFFIC PATTERN A standard rectangular flight pattern around the landing runway at an airport. Includes 45-degree or crosswind entry to the rectangle, with downwind, base and final legs as sides of the rectangle. Standard are 90-degree left turns around the rectangle (non-standard right-hand traffic pattern is noted in Airport Facility Directories) with downwind flown at a specified altitude, usually 1,000 or 1,500 feet above the airport elevation. At airports with a control tower; the pattern may be modified or short-cut according to *ATC* instructions.

TRSA (Terminal Radar Service Area) Radar service that assists with traffic sequencing in some *Class D* airspace. Pilot participation is voluntary.

TURBOPROP An airplane using a turboprop engine, a jet rather than piston engine connected to a propeller. Such aircraft can be single- or multi-engine. Turboprop engines are increasingly used when more horsepower is needed for speed or payload than the 300-400 horsepower available from current light-aircraft piston engines.

UNCONTROLLED AIRPORT (*see NONTOWERED AIRPORT*)

UNICOM A common, multi-purpose radio frequency used at most *nontowered airports* as the *Common Traffic Advisory Frequency*. AOPA coined the term (derived from the words "universal communications") in the 1950s. UNICOM is also used by a *Fixed Base Operator* for general administrative uses, including fuel orders, parking instructions, etc. Originally 122.8 MHz universally, now includes 122.7, 123.0 and other frequencies.

VFR (Visual Flight Rules) A defined set of FAA regulations and "rules of the road" covering operation of aircraft primarily by visual reference to the horizon (for aircraft control) and see-and-avoid procedures (for traffic separation). VFR is used by more than 70% of all flights; it is not, by definition, uncontrolled or out of control!

VFR weather minimums for *controlled airspace* require at least a 1,000-foot ceiling and three miles visibility except for "Special VFR" clearances to operate "clear of clouds." Navigation may be by pilotage (reference to ground landmarks), dead reckoning (courses calculated from map plots), radio navigation, or more commonly, a combination of all three.

- **MARGINAL VFR** Weather of less than 3,000-foot ceiling and five miles visibility but above the required "1,000 and three."

VOR (VHF Omnidirectional Range) Ground- based radio navigation aid. More than 1,000 VORs electronically define Victor Airways and Jet Airways, "highways in the sky." Most IFR and many VFR flights follow airway routes.

WAAS (Wide Area Augmentation System) An enhancement to the *GPS* system providing greater navigation accuracy and system integrity and permitting GPS to be used for precision instrument approaches to most airports.

WAKE TURBULENCE Turbulent air condition caused by small, tornado-like horizontal whirlwinds trailing an aircraft's wingtips (wingtip vortices). Wake turbulence associated with larger aircraft flying at slow speeds (as on take-off or landing approach) is the most severe and can cause loss of control for smaller aircraft following close behind. Controllers use defined separation standards to avoid the problem for take-off, landing, approach and departure operations.

WIND SHEAR Large changes in either wind speed or direction at different altitudes which can cause sudden gain or loss of airspeed. Especially hazardous when aircraft airspeeds are low on take-off or landing.

Alphabet – Radiotelephony Guide

A - Alfa	N – November
B - Bravo	O - Oscar
C - Charlie	P - Papa
D - Delta	Q - Quebec
E - Echo	R - Romeo
F - Foxtrot	S - Sierra
G - Golf	T - Tango
H - Hotel	U - Uniform
I - India	V - Victor
J - Juliett	W - Whiskey
K - Kilo	X - X-ray
L - Lima	Y - Yankee
M - Mike	Z - Zulu
<i>Source: ICAO Annex 10, Volume II</i>	