100-HOUR INSPECTION — An inspection, identical in scope to an annual inspection. Conducted every 100 hours of flight on aircraft of under 12,500 pounds that are used to carry passengers for hire.

ABSOLUTE ALTITUDE—The vertical distance of an airplane above the terrain, or above ground level (AGL).

ACCELERATION—Force involved in overcoming inertia, and which may be defined as a change in velocity per unit of time.

ACCELERATION ERROR — Fluctuation of the magnetic compass during acceleration. In the Northern Hemisphere, the compass swings toward the north during acceleration.

ACCELERATE-GO DISTANCE — The distance required to accelerate to V_1 with all engines at takeoff power, experience an engine failure at V_1 and continue the takeoff on the remaining engine(s). The runway required includes the distance required to climb to 35 feet by which time V_2 speed must be attained.

ACCELERATE-STOP DISTANCE — The distance required to accelerate to V_1 with all engines at takeoff power, experience an engine failure at V_1, and abort the takeoff and bring the airplane to a stop using braking action only (use of thrust reversing is not considered).

ADF—See AUTOMATIC DIRECTION FINDER.

ADIABATIC COOLING — A process of cooling the air through expansion. For example, as air moves up slope it expands with the reduction of atmospheric pressure and cools as it expands.

ADIABATIC HEATING — A process of heating dry air through compression. For example, as air moves down a slope it is compressed, which results in an increase in temperature.

ADJUSTABLE-PITCH PROPELLER—A propeller with blades whose pitch can be adjusted on the ground with the engine not running, but which cannot be adjusted in flight. Also referred to as a ground adjustable propeller. Sometimes also used to refer to constant-speed propellers that are adjustable in flight.

ADJUSTABLE STABILIZER—A stabilizer that can be adjusted in flight to trim the airplane, thereby allowing the airplane to fly hands-off at any given airspeed.

ADVECTION FOG—Fog resulting from the movement of warm, humid air over a cold surface.

ADVERSE YAW—A condition of flight in which the nose of an airplane tends to yaw toward the outside of the turn. This is caused by the higher induced drag on the outside wing, which is also producing more lift. Induced drag is a by-product of the lift associated with the outside wing.

AERODYNAMICS—The science of the action of air on an object, and with the motion of air on other gases. Aerodynamics deals with the production of lift by the aircraft, the relative wind, and the atmosphere.

AERONAUTICAL CHART — A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports.

AERONAUTICAL DECISION MAKING (ADM)—A systematic approach to the mental process used by pilots to consistently determine the best course of action in response to a given set of circumstances.

AGONIC LINE—Line along which the variation between true and magnetic values is zero.

AILERONS—Primary flight control surfaces mounted on the trailing edge of an airplane wing, near the tip. Ailerons control roll about the longitudinal axis.

AIRCRAFT — A device that is used, or intended to be used, for flight.

AIRCRAFT ALTITUDE—The actual height above sea level at which the aircraft is flying.

AIRFOIL—Any surface, such as a wing, propeller, rudder, or even a trim tab, which provides aerodynamic force when it interacts with a moving stream of air.

AIR MASS—An extensive body of air having fairly uniform properties of temperature and moisture.

AIRMET—In-flight weather advisory concerning moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, and widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles.

AIRPLANE—An engine-driven, fixed-wing aircraft heavier than air that is supported in flight by the dynamic reaction of air against its wings.

AIRPLANE FLIGHT MANUAL (AFM)—A document developed by the airplane manufacturer and approved by the Federal Aviation Administration (FAA). It is specific to a particular make and model airplane by serial number and it contains operating procedures and limitations.

AIRPLANE OWNER/ INFORMATION MANUAL — A document developed by the airplane manufacturer containing general information about the make and model of an airplane. The airplane owner's manual is not FAA-approved and is not specific to a particular serial numbered airplane. This manual is not kept current, and therefore cannot be substituted for the AFM/POH.

AIRPORT ADVISORY AREA—An area within 10 statute miles (SM) of an airport where a control tower is not operating, but where a flight service station (FSS) is located. At these locations, the FSS provides advisory service to arriving and departing aircraft.

AIRPORT/FACILITY DIRECTORY — A publication designed primarily as a pilot's operational manual containing all airports, seaplane bases, and heliports open to the public including communications data, navigational facilities, and certain special notices and procedures. This publication is issued in seven volumes according to geographical area.

AIRSPEED—Rate of the aircraft's progress through the air.

AIRSPEED INDICATOR — An instrument that is a sensitive, differential pressure gauge which measures and shows promptly the difference between pitot or impact pressure, and static pressure, the undisturbed atmospheric pressure at level flight.

AIRWORTHINESS CERTIFICATE — A certificate issued by the FAA to all aircraft that have been proven to meet the minimum standards set down by the Code of Federal Regulations.

AIRWORTHINESS DIRECTIVE—A regulatory notice sent out by the FAA to the registered owner of an aircraft informing the owner of a condition that prevents the aircraft from continuing to meet its conditions for airworthiness. Airworthiness Directives (AD notes) are to be complied with within the required time limit, and the fact of compliance, the date of compliance, and the method of compliance are recorded in the aircraft's maintenance records.

ALERT AREAS—Areas depicted on aeronautical charts to advise pilots that a high volume of pilot training or unusual aerial activity is taking place.

ALTIMETER—A flight instrument that indicates altitude by sensing pressure changes.

ALTITUDE ENGINE—A reciprocating aircraft engine having a rated takeoff power that is producible from sea level to an established higher altitude.

AMBIENT PRESSURE—The pressure in the area immediately surrounding the aircraft.

AMBIENT TEMPERATURE—The temperature in the area immediately surrounding the aircraft.

ANEROID—A sealed flexible container that expands or contracts in relation to the surrounding air pressure. It is used in an altimeter or a barometer to measure the pressure of the air.

ANGLE OF ATTACK—The acute angle between the chord line of the airfoil and the direction of the relative wind. It is important in the production of lift.

ANGLE OF INCIDENCE—The angle formed by the chord line of the wing and a line parallel to the longitudinal axis of the airplane.

ANHEDRAL—A downward slant from root to tip of an aircraft's wing or horizontal tail surface.

ANNUAL INSPECTION—A complete inspection of an aircraft and engine, required by the Code of Federal Regulations, to be accomplished every 12 calendar months on all certificated aircraft. Only an A&P technician holding an Inspection Authorization can conduct an annual inspection.

ANTISERVO TAB—An adjustable tab attached to the trailing edge of a stabilator that moves in the same direction as the primary control. It is used to make the stabilator less sensitive.

AREA FORECAST (FA)—A report that gives a picture of clouds, general weather conditions, and visual meteorological conditions (VMC) expected over a large area encompassing several states.

AREA NAVIGATION (RNAV)—A system that provides enhanced navigational capability to the pilot. RNAV equipment can compute the airplane position, actual track and groundspeed and then provide meaningful information relative to a route of flight selected by the pilot. Typical equipment will provide the pilot with distance, time, bearing and crosstrack error relative to the selected "TO" or "active" waypoint and the selected route. Several distinctly different navigational systems with different navigational performance characteristics are capable of providing area navigational functions. Present day RNAV includes INS, LORAN, VOR/DME, and GPS systems.

ARM—The horizontal distance in inches from the reference datum line to the center of gravity of an item. The algebraic sign is plus (+) if measured aft of the datum, and minus (-) if measured forward of the datum.

ASPECT RATIO—Span of a wing divided by its average chord.

ASYMMETRIC THRUST—Also known as P-factor. A tendency for an aircraft to yaw to the left due to the descending propeller blade on the right producing more thrust than the

ascending blade on the left. This occurs when the aircraft's longitudinal axis is in a climbing attitude in relation to the relative wind. The P-factor would be to the right if the aircraft had a counterclockwise rotating propeller.

ATTITUDE—A personal motivational predisposition to respond to persons, situations, or events in a given manner that can, nevertheless, be changed or modified through training as sort of a mental shortcut to decision making.

ATTITUDE INDICATOR — An instrument that uses an artificial horizon and miniature airplane to depict the position of the airplane in relation to the true horizon. The attitude indicator senses roll as well as pitch, which is the up and down movement of the airplane's nose.

ATTITUDE MANAGEMENT—The ability to recognize hazardous attitudes in oneself and the willingness to modify them as necessary through the application of an appropriate antidote thought.

AUTOKINESIS—This is caused by staring at a single point of light against a dark background for more than a few seconds. After a few moments, the light appears to move on its own.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)—Weather reporting system which provides surface observations every minute via digitized voice broadcasts and printed reports.

AUTOMATED WEATHER OBSERVING SYSTEM (AWOS) — Automated weather reporting system consisting of various sensors, a processor, a computer-generated voice subsystem, and a transmitter to broadcast weather data.

AUTOMATIC DIRECTION FINDER (ADF)—An aircraft radio navigation system which senses and indicates the direction to an L/MF nondirectional radio beacon (NDB) ground transmitter. Direction is indicated to the pilot as a magnetic bearing or as a relative bearing to the longitudinal axis of the aircraft depending on the type of indicator installed in the aircraft. In certain applications, such as military, ADF operations may be based on airborne and ground transmitters in the VHF/UHF frequency spectrum.

AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)—The continuous broadcast of recorded noncontrol information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information.

AUTOPILOT—An automatic flight control system which keeps an aircraft in level flight or on a set course. Automatic pilots can be directed by the pilot, or they may be coupled to a radio navigation signal.

AVIATION ROUTINE WEATHER REPORT (METAR)—Observation of current surface weather reported in a standard international format.

AXES OF AN AIRCRAFT—Three imaginary lines that pass through an aircraft's center of gravity. The axes can be considered as imaginary axles around which the aircraft turns. The three axes pass through the center of gravity at 90° angles to each other. The axis from nose to tail is the longitudinal axis, the axis that passes from wingtip to wingtip is the lateral axis and the axis that passes vertically through the center of gravity is the vertical axis.

AXIAL FLOW COMPRESSOR—A type of compressor used in a turbine engine in which the airflow through the compressor is essentially linear. An axial-flow compressor is made up of several stages of alternate rotors and stators. The compressor ratio is determined by the decrease in area of the succeeding stages.

BALANCE TAB—An auxiliary control mounted on a primary control surface, which automatically moves in the direction opposite the primary control to provide an aerodynamic assist in the movement of the control. Sometimes referred to as a servo tab.

BASIC EMPTY WEIGHT (GAMA)—Basic empty weight includes the standard empty weight plus optional and special equipment that has been installed.

BERNOULLI'S PRINCIPLE—A principle that explains how the pressure of a moving fluid varies with its speed of motion. An increase in the speed of movement causes a decrease in the fluid's pressure.

BIPLANES—Airplanes with two sets of wings.

BYPASS RATIO—The ratio of the mass airflow in pounds per second through the fan section of a turbofan engine to the mass airflow that passes through the gas generator portion of the engine.

CABIN ALTITUDE—Cabin pressure in terms of equivalent altitude above sea level.

CALIBRATED AIRSPEED (CAS)—Indicated airspeed corrected for installation error and instrument error. Although manufacturers attempt to keep airspeed errors to a minimum, it is not possible to eliminate all errors throughout the airspeed operating range. At certain airspeeds and with certain flap settings, the installation and instrument errors may total several knots. This error is generally greatest at low airspeeds. In the cruising and higher airspeed ranges, indicated airspeed and calibrated airspeed are approximately the same. Refer to the airspeed calibration chart to correct for possible airspeed errors.

CAMBER—The camber of an airfoil is the characteristic curve of its upper and lower surfaces. The upper camber is more pronounced, while the lower camber is comparatively flat. This causes the velocity of the airflow immediately above the wing to be much higher than that below the wing.

CANARD—A horizontal surface mounted ahead of the main wing to provide longitudinal stability and control. It may be a fixed, movable, or variable geometry surface, with or without control surfaces.

CANARD CONFIGURATION—A configuration in which the span of the forward wings is substantially less than that of the main wing.

CANTILEVER—A wing designed to carry the loads without external struts.

CEILING—The height above the earth's surface of the lowest layer of clouds, which is reported as broken or overcast, or the vertical visibility into an obscuration.

CENTER OF GRAVITY (CG)—The point at which an airplane would balance if it were possible to suspend it at that point. It is the mass center of the airplane, or the theoretical point at which the entire weight of the airplane is assumed to be concentrated. It may be expressed in inches from the reference datum, or in percent of mean aerodynamic chord (MAC). The location depends on the distribution of weight in the airplane.

CENTER-OF-GRAVITY LIMITS—The specified forward and aft points within which the CG must be located during flight. These limits are indicated on pertinent airplane specifications.

CENTER-OF-GRAVITY RANGE—The distance between the forward and aft CG limits indicated on pertinent airplane specifications.

CENTER OF PRESSURE—A point along the wing chord line where lift is considered to be concentrated. For this reason, the center of pressure is commonly referred to as the center of lift.

CENTRIFUGAL FLOW COMPRESSOR—An impeller shaped device that receives air at its center and slings the air outward at high velocity into a diffuser for increased pressure. Also referred to as a radial outflow compressor.

CENTRIFUGAL FORCE — An outward force, that opposes centripetal force, resulting from the effect of inertia during a turn.

CENTRIPETAL FORCE—A center-seeking force directed inward toward the center of rotation created by the horizontal component of lift in turning flight.

CHORD LINE—An imaginary straight line drawn through an airfoil from the leading edge to the trailing edge.

COEFFICIENT OF LIFT—The ratio between lift pressure and dynamic pressure.

COLD FRONT—The boundary between two air masses where cold air is replacing warm air.

COMPLEX AIRCRAFT—An aircraft with retractable landing gear, flaps, and a controllable-pitch propeller.

COMPRESSOR PRESSURE RATIO—The ratio of compressor discharge pressure to compressor inlet pressure.

COMPRESSOR STALL—In gas turbine engines, a condition in an axial-flow compressor in which one or more stages of rotor blades fail to pass air smoothly to the succeeding stages. A stall condition is caused by a pressure ratio that is incompatible with the engine r.p.m. Compressor stall will be indicated by a rise in exhaust temperature or r.p.m. fluctuation, and if allowed to continue, may result in flameout and physical damage to the engine.

CONDENSATION—A change of state of water from a gas (water vapor) to a liquid.

CONDENSATION NUCLEI—Small particles of solid matter in the air on which water vapor condenses.

CONFIGURATION—This is a general term, which normally refers to the position of the landing gear and flaps.

CONSTANT-SPEED PROPELLER—A controllable-pitch propeller whose pitch is automatically varied in flight by a governor to maintain a constant r.p.m. in spite of varying air loads.

CONTINUOUS FLOW OXYGEN SYSTEM—System that supplies a constant supply of pure oxygen to a rebreather bag that dilutes the pure oxygen with exhaled gases and thus supplies a healthy mix of oxygen and ambient air to the mask. Primarily used in passenger cabins of commercial airliners.

CONTROLLABILITY—A measure of the response of an aircraft relative to the pilot's flight control inputs.

CONTROLLED AIRPORT—An airport that has an operating control tower.

CONTROLLED AIRSPACE—A generic term that covers the different classifications of airspace and defined dimensions within which air traffic control service is provided in accordance with the airspace classification. Controlled airspace consists of Class A, B, C, D, and E airspace.

CONVECTIVE SIGMET—A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMETs are issued for tornadoes, lines of thunderstorms, thunderstorms over a wide area, embedded thunderstorms, wind gusts to 50 knots or greater, and/or hail 3/4 inch in diameter or greater.

CONVENTIONAL LANDING GEAR—Landing gear employing a third rear-mounted wheel. These airplanes are also sometimes referred to as tailwheel airplanes.

COUPLED AILERONS AND RUDDER—Rudder and ailerons are connected with interconnect springs in order to counteract adverse yaw. Can be overridden if it becomes necessary to slip the aircraft.

COURSE—The intended direction of flight in the horizontal plane measured in degrees from north.

COWL FLAPS — Shutter-like devices arranged around certain air-cooled engine cowlings, which may be opened or closed to regulate the flow of air around the engine.

CREW RESOURCE MANAGEMENT (CRM)—The application of team management concepts in the flight deck environment. It was initially known as cockpit resource management, but as CRM programs evolved to include cabin crews, maintenance personnel, and others, the phrase "crew resource management" was adopted. This includes single pilots, as in most general aviation aircraft. Pilots of small aircraft, as well as crews of larger aircraft, must make effective use of all available resources; human resources, hardware, and information. A current definition includes all groups routinely working with the cockpit crew who are involved in decisions required to operate a flight safely. These groups include, but are not limited to: pilots, dispatchers, cabin crewmembers, maintenance personnel, and air traffic controllers. CRM is one way of addressing the challenge of optimizing the human/machine interface and accompanying interpersonal activities.

CRITICAL ALTITUDE — The maximum altitude under standard atmospheric conditions at which a turbocharged engine can produce its rated horsepower.

CRITICAL ANGLE OF ATTACK—The angle of attack at which a wing stalls regardless of airspeed, flight attitude, or weight.

DATUM (REFERENCE DATUM)—An imaginary vertical plane or line from which all measurements of arm are taken. The datum is established by the manufacturer. Once the datum has been selected, all moment arms and the location of CG range are measured from this point.

DEAD RECKONING—Navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, and speed, groundspeed, and elapsed time.

DECELERATION ERROR—Fluctuation of the magnetic compass during acceleration. In the Northern Hemisphere, the compass swings toward the south during deceleration.

DELTA—A Greek letter expressed by the symbol Δ to indicate a change of values. As an example, ΔCG indicates a change (or movement) of the CG.

DENSITY ALTITUDE—This altitude is pressure altitude corrected for variations from standard temperature. When conditions are standard, pressure altitude and density altitude are the same. If the temperature is above standard, the density altitude is higher than pressure altitude. If the temperature is below standard, the density altitude is lower than pressure altitude. This is an important altitude because it is directly related to the airplane's performance.

DEPOSITION—The direct transformation of a gas to a solid state, in which the liquid state is bypassed. Some sources use sublimation to describe this process instead of deposition.

DETONATION — The sudden release of heat energy from fuel in an aircraft engine caused by the fuel-air mixture reaching its critical pressure and temperature. Detonation occurs as a violent explosion rather than a smooth burning process.

DEVIATION — A compass error caused by magnetic disturbances from electrical and metal components in the airplane. The correction for this error is displayed on a compass correction card placed near the magnetic compass in the airplane.

DEW—Moisture that has condensed from water vapor. Usually found on cooler objects near the ground, such as grass, as the near-surface layer of air cools faster than the layers of air above it.

DEWPOINT—The temperature at which air reaches a state where it can hold no more water.

DIFFERENTIAL AILERONS — Control surface rigged such that the aileron moving up moves a greater distance than the aileron moving down. The up aileron produces extra parasite drag to compensate for the additional induced drag caused by the down aileron. This balancing of the drag forces helps minimize adverse yaw.

DIFFERENTIAL PRESSURE—A difference between two pressures. The measurement of airspeed is an example of the use of differential pressure.

DIHEDRAL—The positive acute angle between the lateral axis of an airplane and a line through the center of a wing or horizontal stabilizer. Dihedral contributes to the lateral stability of an airplane.

DILUTER-DEMAND OXYGEN SYSTEM—An oxygen system that delivers oxygen mixed or diluted with air in order to maintain a constant oxygen partial pressure as the altitude changes.

DIRECT USER ACCESS TERMINAL SERVICE (DUATS)—A computer-based program providing NWS and FAA weather products that are normally used in pilot weather briefings.

DIRECTIONAL STABILITY—Stability about the vertical axis of an aircraft, whereby an aircraft tends to return, on its own, to flight aligned with the relative wind when disturbed from that equilibrium state. The vertical tail is the primary contributor to directional stability, causing an airplane in flight to align with the relative wind.

DISTANCE MEASURING EQUIPMENT (DME)—Equipment (airborne and ground) to measure, in nautical miles, the slant range distance of an aircraft from the DME navigation aid.

DRAG—An aerodynamic force on a body acting parallel and opposite to the relative wind. The resistance of the atmosphere to the relative motion of an aircraft. Drag opposes thrust and limits the speed of the airplane.

DRIFT ANGLE—Angle between heading and track.

DUATS — See DIRECT USER ACCESS TERMINAL SERVICE.

DUTCH ROLL—A combination of rolling and yawing oscillations that normally occurs when the dihedral effects of an aircraft are more powerful than the directional stability. Usually dynamically stable but objectionable in an airplane because of the oscillatory nature.

DYNAMIC HYDROPLANING—A condition that exists when landing on a surface with standing water deeper than the tread depth of the tires. When the brakes are applied, there is a possibility that the brake will lock up and the tire will ride on the surface of the water, much like a water ski. When the tires are hydroplaning, directional control and braking action are virtually impossible. An effective anti-skid system can minimize the effects of hydroplaning.

DYNAMIC STABILITY — The property of an aircraft that causes it, when disturbed from straight-and-level flight, to develop forces or moments that restore the original condition of straight and level.

EDDY CURRENT DAMPING—The decreased amplitude of oscillations by the interaction of magnetic fields. In the case of a vertical card magnetic compass, flux from the oscillating permanent magnet produces eddy currents in a damping disk or cup. The magnetic flux produced by the eddy currents opposes the flux from the permanent magnet and decreases the oscillations.

ELEVATOR—The horizontal, movable primary control surface in the tail section, or empennage, of an airplane. The elevator is hinged to the trailing edge of the fixed horizontal stabilizer.

EMPENNAGE—The section of the airplane that consists of the vertical stabilizer, the horizontal stabilizer, and the associated control surfaces.

EMPTY-FIELD MYOPIA—Induced nearsightedness that is associated with flying at night, in instrument meteorological conditions and/or reduced visibility. With nothing to focus on, the eyes automatically focus on a point just slightly ahead of the airplane.

ENGINE PRESSURE RATIO (EPR)—The ratio of turbine discharge pressure divided by compressor inlet pressure, which is used as an indication of the amount of thrust being developed by a turbine engine.

EN ROUTE FLIGHT ADVISORY SERVICE (EFAS)—A service specifically designed to provide, upon pilot request, timely weather information pertinent to the type of flight, intended route of flight and altitude. The FSSs providing this service are listed in the Airport/Facility Directory. Also known as Flight Watch.

EQUILIBRIUM—A condition that exists within a body when the sum of the moments of all of the forces acting on the body is equal to zero. In aerodynamics, equilibrium is when all opposing forces acting on an aircraft are balanced (steady, unaccelerated flight conditions).

EQUIVALENT AIRSPEED—The airspeed indicator reading corrected for position (or installation), or instrument error, and for adiabatic compressible flow for the particular altitude. (EAS is equal to CAS at sea level in standard atmosphere.)

EVAPORATION—The transformation of a liquid to a gaseous state, such as the change of water to water vapor.

EXHAUST GAS TEMPERATURE (EGT)—The temperature of the exhaust gases as they leave the cylinders of a reciprocating engine or the turbine section of a turbine engine.

EXPLOSIVE DECOMPRESSION—A change in cabin pressure faster than the lungs can decompress. Lung damage is possible.

FIXED-PITCH PROPELLERS—Propellers with fixed blade angles. Fixed-pitch propellers are designed as climb propellers, cruise propellers, or standard propellers.

FIXED SLOT—A fixed, nozzle-shaped opening near the leading edge of a wing that ducts air onto the top surface of the wing. Its purpose is to increase lift at higher angles of attack.

FLAMEOUT—A condition in the operation of a gas turbine engine in which the fire in the engine goes out due to either too much or too little fuel sprayed into the combustors.

FLAPS—Hinged portion of the trailing edge between the ailerons and fuselage. In some aircraft ailerons and flaps are interconnected to produce full-span "flaperons." In either case, flaps change the lift and drag on the wing.

FLOOR LOAD LIMIT—The maximum weight the floor can sustain per square inch/foot as provided by the manufacturer.

FOG—Cloud consisting of numerous minute water droplets and based at the surface; droplets are small enough to be suspended in the earth's atmosphere indefinitely. (Unlike drizzle, it does not fall to the surface; differs from cloud only in that a cloud is not based at the surface; distinguished from haze by its wetness and gray color.)

FORCE (F)—The energy applied to an object that attempts to cause the object to change its direction, speed, or motion. In aerodynamics, it is expressed as F, T (thrust), L (lift), W (weight), or D (drag), usually in pounds.

FOREIGN OBJECT DAMAGE (FOD)—Damage to a gas turbine engine caused by some object being sucked into the engine while it is running. Debris from runways or taxiways can cause foreign object damage during ground operations, and the ingestion of ice and birds can cause FOD in flight.

FRISE-TYPE AILERON—Aileron having the nose portion projecting ahead of the hinge line. When the

trailing edge of the aileron moves up, the nose projects below the wing's lower surface and produces some parasite drag, decreasing the amount of adverse yaw.

FRONT—The boundary between two different air masses.

FROST—Ice crystal deposits formed by sublimation when temperature and dewpoint are below freezing.

FUEL LOAD—The expendable part of the load of the airplane. It includes only usable fuel, not fuel required to fill the lines or that which remains trapped in the tank sumps.

FUSELAGE—The section of the airplane that consists of the cabin and/or cockpit, containing seats for the occupants and the controls for the airplane.

GIMBAL RING—A type of support that allows an object, such as a gyroscope, to remain in an upright condition when its base is tilted.

GPS (GLOBAL POSITIONING SYSTEM)—A satellite-based radio positioning, navigation, and time-transfer system.

GROUND ADJUSTABLE TRIM TAB—Non-movable metal trim tab on a control surface. Bent in one direction or another while on the ground to apply trim forces to the control surface.

GROUND EFFECT—The condition of slightly increased air pressure below an airplane wing or helicopter rotor system that increases the amount of lift produced. It exists within approximately one wing span or one rotor diameter from the ground. It results from a reduction in upwash, downwash, and wingtip vortices, and provides a corresponding decrease in induced drag.

GROUNDSPEED (GS)—The actual speed of the airplane over the ground. It is true airspeed adjusted for wind. Groundspeed decreases with a headwind, and increases with a tailwind.

GYROSCOPIC PRECESSION—An inherent quality of rotating bodies, which causes an applied force to be manifested 90º in the direction of rotation from the point where the force is applied.

HAZARDOUS ATTITUDES—These can lead to poor decision making and actions that involve unnecessary risk. Pilots must examine decisions carefully to ensure they have not been influenced by hazardous attitudes.

HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS) — Continuous recorded hazardous inflight weather forecasts broadcasted to airborne pilots over selected VOR outlets defined as an HIWAS Broadcast Area.

HEADING—The direction in which the nose of the aircraft is pointing during flight.

HEADING INDICATOR — An instrument which senses airplane movement and displays heading based on a 360º azimuth, with the final zero omitted. The heading indicator, also called a directional gyro (DG), is fundamentally a mechanical instrument designed to facilitate the use of the magnetic compass. The heading indicator is not affected by the forces that make the magnetic compass difficult to interpret.

HEADWORK — Required to accomplish a conscious, rational thought process when making decisions. Good decision making involves risk identification and assessment, information processing, and problem solving.

HIGH PERFORMANCE AIRCRAFT—An aircraft with an engine of more than 200 horsepower.

HISTOTOXIC HYPOXIA — The inability of the cells to effectively use oxygen. Plenty of oxygen is being transported to the cells that need it, but they are unable to make use of it.

HORSEPOWER—The term, originated by inventor James Watt, means the amount of work a horse could do in one second. One horsepower equals 550 foot-pounds per second, or 33,000 foot-pounds per minute.

HOT START—In gas turbine engines, a start which occurs with normal engine rotation, but exhaust temperature exceeds prescribed limits. This is usually caused by an excessively rich mixture in the combustor. The fuel to the engine must be terminated immediately to prevent engine damage.

HUMAN FACTORS—The study of how people interact with their environments. In the case of general aviation, it is the study of how pilot performance is influenced by such issues as the design of cockpits, the function of the organs of the body, the effects of emotions, and the interaction and communication with the other participants of the aviation community, such as other crewmembers and air traffic control personnel.

HUNG START— In gas turbine engines, a condition of normal light off but with r.p.m. remaining at some low value rather than increasing to the normal idle r.p.m. This is often the result of insufficient power to the engine from the starter. In the event of a hung start, the engine should be shut down.

HYDROPLANING—A condition that exists when landing on a surface with standing water deeper than the tread depth of the tires. When the brakes are applied, there is a possibility that the brake will lock up and the tire will ride on the surface of the water, much like a water ski. When the tires are hydroplaning, directional control and braking action are virtually impossible. An effective anti-skid system can minimize the effects of hydroplaning.

HYPEMIC HYPOXIA—A type of hypoxia that is a result of oxygen deficiency in the blood, rather than a lack of inhaled oxygen. It can be caused by a variety of factors. Hypemic means "not enough blood."

HYPERVENTILATION—Occurs when an individual is experiencing emotional stress, fright, or pain, and the breathing rate and depth increase, although the carbon dioxide level in the blood is already at a reduced level. The result is an excessive loss of carbon dioxide from the body, which can lead to unconsciousness due to the respiratory system's overriding mechanism to regain control of breathing.

HYPOXIA—Hypoxia means "reduced oxygen" or "not enough oxygen." Hypoxia can be caused by several factors including an insufficient supply of oxygen, inadequate transportation of oxygen, or the inability of the body tissues to use oxygen.

HYPOXIC HYPOXIA—This type of hypoxia is a result of insufficient oxygen available to the lungs. A decrease of oxygen molecules at sufficient pressure can lead to hypoxic hypoxia.

IFR (INSTRUMENT FLIGHT RULES)—Rules that govern the procedure for conducting flight in weather conditions below VFR weather minimums. The term IFR also is used to define weather conditions and the type of flight plan under which an aircraft is operating.

ILS (INSTRUMENT LANDING SYSTEM)—A precision instrument approach system, which normally consists of the following electronic components and visual aids—localizer, glide slope, outer marker, and approach lights.

INCLINOMETER—An instrument consisting of a curved glass tube, housing a glass ball, and damped with a fluid similar to kerosene. It may be used to indicate inclination, as a level, or, as used in the turn indicators, to show the relationship between gravity and centrifugal force in a turn.

INDICATED AIRSPEED (IAS)—The direct instrument reading obtained from the airspeed indicator, uncorrected for variations in atmospheric density, installation error, or instrument error. Manufacturers use this airspeed as the basis for determining airplane performance. Takeoff, landing, and stall speeds listed in the AFM or POH are indicated airspeeds and do not normally vary with altitude or temperature.

INDICATED ALTITUDE — The altitude read directly from the altimeter (uncorrected) when it is set to the current altimeter setting.

INDUCED DRAG—That part of total drag which is created by the production of lift. Induced drag increases with a decrease in airspeed.

INTERCOOLER—A device used to reduce the temperatures of the compressed air before it enters the fuel metering device. The resulting cooler air has a higher density, which permits the engine to be operated with a higher power setting.

INTERPOLATION—The estimation of an intermediate value of a quantity that falls between marked values in a series. Example: In a measurement of length, with a rule that is marked in 1/8's of an inch, the value falls between 3/8 inch and 1/2 inch. The estimated (interpolated) value might then be said to be 7/16 inch.

INVERSION—An increase in temperature with altitude.

ISA (INTERNATIONAL STANDARD ATMOSPHERE)—Standard atmospheric conditions consisting of a temperature of 59°F (15°C), and a barometric pressure of 29.92 in. Hg. (1013.2 mb) at sea level. ISA values can be calculated for various altitudes using a standard lapse rate of approximately 2ºC per 1,000 feet.

ISOBARS—Lines which connect points of equal barometric pressure.

ISOGONIC LINES—Lines on charts that connect points of equal magnetic variation.

JETSTREAM—A narrow band of wind with speeds of 100 to 200 m.p.h. usually co-located with the tropopause.

JUDGMENT—The mental process of recognizing and analyzing all pertinent information in a particular situation, a rational evaluation of alternative actions in response to it, and a timely decision on which action to take.

LAND BREEZE—A coastal breeze flowing from land to sea caused by temperature differences when the sea surface is warmer than the adjacent land. The land breeze usually occurs at night and alternates with the sea breeze that blows in the opposite direction by day.

LATERAL AXIS—An imaginary line passing through the center of gravity of an airplane and extending across the airplane from wingtip to wingtip.

LATERAL STABILITY (ROLLING)—The stability about the longitudinal axis of an aircraft. Rolling stability or the ability of an airplane to return to level flight due to a disturbance that causes one of the wings to drop.

LATITUDE—Measurement north or south of the equator in degrees, minutes, and seconds. Lines of latitude are also referred to as parallels.

LEADING EDGE—The part of an airfoil that meets the airflow first.

LEADING EDGE DEVICES — High lift devices which are found on the leading edge of the airfoil. The most common types are fixed slots, movable slats, and leading edge flaps.

LEADING EDGE FLAP—A portion of the leading edge of an airplane wing that folds downward to increase the camber, lift, and drag of the wing. The leading-edge flaps are extended for takeoffs and landings to increase the amount of aerodynamic lift that is produced at any given airspeed.

LICENSED EMPTY WEIGHT—The empty weight that consists of the airframe, engine(s), unusable fuel, and undrainable oil plus standard and optional equipment as specified in the equipment list. Some manufacturers used this term prior to GAMA standardization.

LIFT—One of the four main forces acting on an aircraft. On a fixed-wing aircraft, an upward force created by the effect of airflow as it passes over and under the wing.

LIMIT LOAD FACTOR—Amount of stress, or load factor, that an aircraft can withstand before structural damage or failure occurs.

LOAD FACTOR—The ratio of the load supported by the airplane's wings to the actual weight of the aircraft and its contents. Also referred to as G-loading.

LONGITUDE—Measurement east or west of the Prime Meridian in degrees, minutes, and seconds. The Prime Meridian is 0° longitude and runs through Greenwich, England. Lines of longitude are also referred to as meridians.

LONGITUDINAL AXIS—An imaginary line through an aircraft from nose to tail, passing through its center of gravity. The longitudinal axis is also called the roll axis of the aircraft. Movement of the ailerons rotates an airplane about its longitudinal axis.

LONGITUDINAL STABILITY (PITCHING)—Stability about the lateral axis. A desirable characteristic of an airplane whereby it tends to return to its trimmed angle of attack after displacement.

LORAN-C—A radio navigation system that utilizes master and slave stations transmitting timed pulses. The time difference in reception of pulses from several stations establishes a hyperbolic line of position, which can be identified on a LORAN chart. A fix in position is obtained by utilizing signals from two or more stations.

MAGNETIC BEARING—The magnetic course to go direct to an NDB station.

MAGNETIC COMPASS—A device for determining direction measured from magnetic north.

MAGNETIC DIP—A vertical attraction between a compass needle and the magnetic poles. The closer the aircraft is to the pole, the more severe the effect. In the Northern Hemisphere, a weight is placed on the south-facing end of the compass needle; in the Southern Hemisphere, a weight is placed on the north-facing end of the compass needle to somewhat compensate for this effect.

MAGNETO—A self-contained, engine-driven unit that supplies electrical current to the spark plugs; completely independent of the airplane's electrical system. Normally there are two magnetos per engine.

MAGNUS EFFECT—Lifting force produced when a rotating cylinder produces a pressure differential. This is the same effect that makes a baseball curve or a golf ball slice.

MANEUVERABILITY—Ability of an aircraft to change directions along a flightpath and withstand the stresses imposed upon it.

MANEUVERING SPEED (V_A) — The maximum speed where full, abrupt control movement can be used without overstressing the airframe.

MANIFOLD ABSOLUTE PRESSURE (MAP)—The absolute pressure of the fuel/air mixture within the intake manifold, usually indicated in inches of mercury.

MASS—The amount of matter in a body.

MAXIMUM LANDING WEIGHT—The greatest weight that an airplane normally is allowed to have at landing.

MAXIMUM RAMP WEIGHT—The total weight of a loaded aircraft, including all fuel. It is greater than the takeoff weight due to the fuel that will be burned during the taxi and runup operations. Ramp weight may also be referred to as taxi weight.

MAXIMUM TAKEOFF WEIGHT—The maximum allowable weight for takeoff.

MAXIMUM WEIGHT—The maximum authorized weight of the aircraft and all of its equipment as specified in the Type Certificate Data Sheets (TCDS) for the aircraft.

MAXIMUM ZERO FUEL WEIGHT (GAMA)—The maximum weight, exclusive of usable fuel.

MEAN AERODYNAMIC CHORD (MAC)—The average distance from the leading edge to the trailing edge of the wing.

MERIDIANS—Lines of longitude.

MESOSPHERE—A layer of the atmosphere directly above the stratosphere.

METAR—See AVIATION ROUTINE WEATHER REPORT.

MICROBURST—A strong downdraft which normally occurs over horizontal distances of 1 NM or less and vertical distances of less than 1,000 feet. In spite of its small horizontal scale, an intense microburst could induce windspeeds greater than 100 knots and downdrafts as strong as 6,000 feet per minute.

MILITARY OPERATION AREAS (MOA)—Airspace that consists of defined vertical and lateral limits established for the purpose of separating certain military training activity from IFR traffic. These are depicted on aeronautical charts.

MILITARY TRAINING ROUTES (MTR)—Routes developed to allow the military to conduct low-altitude, high-speed training. These routes are identified on sectional charts.

MINIMUM DRAG—The point on the total drag curve where the lift-to-drag ratio is the greatest. At this speed, total drag is minimized.

MINIMUM EQUIPMENT LIST (MEL)—A list developed for larger aircraft that outlines equipment that can be inoperative for various types of flight including IFR and icing conditions. This list is based on the master minimum equipment list (MMEL) developed by the FAA and must be approved by the FAA for use. It is specific to an individual aircraft make and model.

MOMENT—The product of the weight of an item multiplied by its arm. Moments are expressed in pound-inches (lb-in). Total moment is the weight of the airplane multiplied by the distance between the datum and the CG.

MOMENT ARM—The distance from a datum to the applied force.

MOMENT INDEX (OR INDEX)—A moment divided by a constant such as 100, 1,000, or 10,000. The purpose of using a moment index is to simplify weight and balance computations of airplanes where heavy items and long arms result in large, unmanageable numbers.

MONOCOQUE—A shell-like fuselage design in which the stressed outer skin is used to support the majority of imposed stresses. Monocoque fuselage design may include bulkheads but not stringers.

MONOPLANES—Airplanes with a single set of wings.

MOVABLE SLAT—A movable auxiliary airfoil on the leading edge of a wing. It is closed in normal flight but extends at high angles of attack. This allows air to continue flowing over the top of the wing and delays airflow separation.

N_1—Rotational speed of the low pressure compressor in a turbine engine.

N_2—Rotational speed of the high pressure compressor in a turbine engine.

NACELLE—A streamlined enclosure on an aircraft in which an engine is mounted. On multiengine propeller-driven airplanes, the nacelle is normally mounted on the leading edge of the wing.

NATIONAL SECURITY AREAS—Airspace that consists of defined vertical and lateral dimensions established at locations where there is a requirement for increased security and safety of ground facilities.

NDB—See NONDIRECTIONAL RADIO BEACON.

NEGATIVE STATIC STABILITY—The initial tendency of an aircraft to continue away from the original state of equilibrium after being disturbed.

NEUTRAL STATIC STABILITY—The initial tendency of an aircraft to remain in a new condition after its equilibrium has been disturbed.

NONDIRECTIONAL RADIO BEACON (NDB)—An L/MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine the bearing to or from the radio beacon and "home" on or track to or from the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NOTICES TO AIRMEN (NOTAM)—A notice containing time-critical information that is either of a temporary nature or is not known far enough in advance to permit publication on aeronautical charts or other operation publications. This can include the establishment, condition, or change in any facility, service, procedure, or hazard in the National Airspace System.

OBSTRUCTION LIGHTS—Lights that can be found both on and off an airport to identify obstructions.

OCCLUDED FRONT—A frontal occlusion occurs when a fast-moving cold front catches up with a slow-moving warm front. The difference in temperature within each frontal system is a major factor in determining whether a cold or warm front occlusion occurs.

OUTSIDE AIR TEMPERATURE (OAT)—The measured or indicated air temperature (IAT) corrected for compression and friction heating. Also referred to as true air temperature.

OVERBOOST—A condition in which a reciprocating engine has exceeded the maximum manifold pressure allowed by the manufacturer. Can cause damage to engine components.

PARALLELS—Lines of latitude.

PARASITE DRAG—That part of total drag created by the form or shape of airplane parts. Parasite drag increases with an increase in airspeed.

PAYLOAD (GAMA)—The weight of occupants, cargo, and baggage.

PERSONALITY—The embodiment of personal traits and characteristics of an individual that are set at a very early age and extremely resistant to change.

P-FACTOR—A tendency for an aircraft to yaw to the left due to the descending propeller blade on the right producing more thrust than the ascending blade on the left. This occurs when the aircraft's longitudinal axis is in a climbing attitude in relation to the relative wind. The P-factor would be to the right if the aircraft had a counterclockwise rotating propeller.

PHUGOID OSCILLATIONS—Long-period oscillations of an aircraft around its lateral axis. It is a slow change in pitch accompanied by equally slow changes in airspeed. Angle of attack remains constant, and the pilot often corrects for phugoid oscillations without even being aware of them.

PILOTAGE—Navigation by visual reference to landmarks.

PILOT'S OPERATING HANDBOOK (POH)—A document developed by the airplane manufacturer and contains the FAA-approved Airplane Flight Manual (AFM) information.

PILOT WEATHER REPORT (PIREP)—A report, generated by pilots, concerning meteorological phenomena encountered in flight.

PLANFORM—The shape or form of a wing as viewed from above. It may be long and tapered, short and rectangular, or various other shapes.

PNEUMATIC—Operation by the use of compressed air.

POOR JUDGMENT CHAIN—A series of mistakes that may lead to an accident or incident. Two basic principles generally associated with the creation of a poor judgment chain are: (1) One bad decision often leads to another; and (2) as a string of bad decisions grows, it reduces the number of subsequent alternatives for continued safe flight. ADM is intended to break the poor judgment chain before it can cause an accident or incident.

POSITIVE STATIC STABILITY—The initial tendency to return to a state of equilibrium when disturbed from that state.

POWER—Implies work rate or units of work per unit of time, and as such, it is a function of the speed at which the force is developed. The term, power required, is generally associated with reciprocating engines.

POWERPLANT—A complete engine and propeller combination with accessories.

PRECESSION—The tilting or turning of a gyro in response to deflective forces causing slow drifting and erroneous indications in gyroscopic instruments.

PRECIPITATION—Any or all forms of water particles (rain, sleet, hail, or snow), that fall from the atmosphere and reach the surface.

PREIGNITION—Ignition occurring in the cylinder before the time of normal ignition. Preignition is often caused by a local hot spot in the combustion chamber igniting the fuel-air mixture.

PRESSURE ALTITUDE—The altitude indicated when the altimeter setting window (barometric scale) is adjusted to 29.92. This is the altitude above the standard datum plane, which is a theoretical plane where air pressure (corrected to 15ºC) equals 29.92 in. Hg. Pressure altitude is used to compute density altitude, true altitude, true airspeed, and other performance data.

PRESSURE DEMAND OXYGEN SYSTEM—A demand oxygen system that supplies 100 percent oxygen at sufficient pressure above the altitude where normal breathing is adequate. Also referred to as a pressure breathing system.

PREVENTIVE MAINTENANCE—Simple or minor preservative operations and the replacement of small standard parts not involving complex assembly operation as listed in Appendix A of 14 CFR part 43. Certificated pilots may perform preventive maintenance on any aircraft that is owned or operated by them provided that the aircraft is not used in air carrier service.

PROHIBITED AREAS—Areas that are established for security or other reasons associated with the national welfare.

PROPELLER—A device for propelling an aircraft that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation. It includes the control components normally supplied by its manufacturer.

RADAR SERVICES—Radar is a method whereby radio waves are transmitted into the air and are then received when they have been reflected by an object in the path of the beam. Range is determined by measuring the time it takes (at the speed of light) for the radio wave to go out to the object and then return to the receiving antenna. The direction of a detected object from a radar site is determined by the position of the rotating antenna when the reflected portion of the radio wave is received.

RADAR SUMMARY CHART—A weather product derived from the national radar network that graphically displays a summary of radar weather reports.

RADAR WEATHER REPORT (SD)—A report issued by radar stations at 35 minutes after the hour, and special reports as needed. Provides information on the type, intensity, and location of the echo tops of the precipitation.

RADIOSONDE—A weather instrument that observes and reports meteorological conditions from the upper atmosphere. This instrument is typically carried into the atmosphere by some form of weather balloon.

RAM RECOVERY—The increase in thrust as a result of ram air pressures and density on the front of the engine caused by air velocity.

RAPID DECOMPRESSION—The almost instantaneous loss of cabin pressure in aircraft with a pressurized cockpit or cabin.

REGION OF REVERSE COMMAND—Flight regime in which flight at a higher airspeed requires a lower power setting and a lower airspeed requires a higher power setting in order to maintain altitude.

RELATIVE BEARING—An angular relationship between two objects measured in degrees clockwise from the twelve o'clock position of the first object.

RELATIVE HUMIDITY — The ratio of the existing amount of water vapor in the air at a given temperature to the maximum amount that could exist at that temperature; usually expressed in percent.

RELATIVE WIND—The direction of the airflow with respect to the wing. If a wing moves forward horizontally, the relative wind moves backward horizontally. Relative wind is parallel to and opposite the flightpath of the airplane.

RESTRICTED AREAS—Areas that denote the existence of unusual, often invisible hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. An aircraft may not enter a restricted area unless permission has been obtained from the controlling agency.

RIGGING—The final adjustment and alignment of an aircraft and its flight control system that provides the proper aerodynamic characteristics.

RIGIDITY IN SPACE—The principle that a wheel with a heavily weighted rim spun rapidly will remain in a fixed position in the plane in which it is spinning.

RISK ELEMENTS—There are four fundamental risk elements: the pilot, the aircraft, the environment, and the type of operation that comprise any given aviation situation.

RISK MANAGEMENT—The part of the decision making process which relies on situational awareness, problem recognition, and good judgment to reduce risks associated with each flight.

RNAV—See AREA NAVIGATION.

RUDDER—The movable primary control surface mounted on the trailing edge of the vertical fin of an airplane. Movement of the rudder rotates the airplane about its vertical axis.

RUDDERVATOR—A pair of control surfaces on the tail of an aircraft arranged in the form of a V. These surfaces, when moved together by the control wheel, serve as elevators, and when moved differentially by the rudder pedals, serve as a rudder.

RUNWAY CENTERLINE LIGHTS—Runway lighting which consists of flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold.

RUNWAY EDGE LIGHTS—A component of the runway lighting system that is used to outline the edges of runways at night or during low visibility conditions. These lights are classified according to the intensity they are capable of producing.

RUNWAY END IDENTIFIER LIGHTS (REIL)—One component of the runway lighting system. These lights are installed at many airfields to provide rapid and positive identification of the approach end of a particular runway.

SEA BREEZE—A coastal breeze blowing from sea to land caused by the temperature difference when the land surface is warmer than the sea surface. The sea breeze usually occurs during the day and alternates with the land breeze that blows in the opposite direction at night.

SEA-LEVEL ENGINE—A reciprocating aircraft engine having a rated takeoff power that is producible only at sea level.

SECTIONAL AERONAUTICAL CHARTS (1:500,000)—Designed for visual navigation of slow or medium speed aircraft. Topographic information on these charts features the portrayal of relief, and a judicious selection of visual check points for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions and related data.

SEMI-MONOCOQUE—A fuselage design that includes a substructure of bulkheads and/or formers, along with stringers, to support flight loads and stresses imposed on the fuselage.

SERVICE CEILING—The maximum density altitude where the best rate-of-climb airspeed will produce a 100 feet-per-minute climb at maximum weight while in a clean configuration with maximum continuous power.

SERVO—A motor or other form of actuator which receives a small signal from the control device and exerts a large force to accomplish the desired work.

SERVO TAB—An auxiliary control mounted on a primary control surface, which automatically moves in the direction opposite the primary control to provide an aerodynamic assist in the movement of the control.

SIGMET—An in-flight weather advisory that is considered significant to all aircraft. SIGMET criteria include severe icing, severe and extreme turbulence, duststorms, sandstorms, volcanic eruptions, and volcanic ash that lower visibility to less than 3 miles.

SIGNIFICANT WEATHER PROGNOSTIC CHART—Presents four panels showing forecast significant weather and forecast surface weather.

SITUATIONAL AWARENESS—The accurate perception and understanding of all the factors and conditions within the four fundamental risk elements that affect safety before, during, and after the flight.

SKILLS AND PROCEDURES—The procedural, psychomotor, and perceptual skills used to control a specific aircraft or its systems. They are the airmanship abilities that are gained through conventional training, are perfected, and become almost automatic through experience.

SPATIAL DISORIENTATION—Specifically refers to the lack of orientation with regard to the position, attitude, or movement of the airplane in space.

SPECIAL FLIGHT PERMIT—A flight permit issued to an aircraft that does not meet airworthiness requirements but is capable of safe flight. A special flight permit can be issued to move an aircraft for the purposes of maintenance or repair, buyer delivery, manufacturer flight tests, evacuation from danger, or customer demonstration. Also referred to as a ferry permit.

SPECIAL USE AIRSPACE—Airspace that exists where activities must be confined because of their nature.

SPECIFIC FUEL CONSUMPTION—The amount of fuel in pounds per hour consumed or required by an engine per brake horsepower or per pound of thrust.

SPEED—The distance traveled in a given time.

SPIN—An aggravated stall that results in an airplane descending in a helical, or corkscrew path.

SPIRAL INSTABILITY—A condition that exists when the static directional stability of the airplane is very strong as compared to the effect of its dihedral in maintaining lateral equilibrium.

SPIRALING SLIPSTREAM—The slipstream of a propeller-driven airplane rotates around the airplane. This slipstream strikes the left side of the vertical fin, causing the aircraft to yaw slightly. Rudder offset is sometimes used by aircraft designers to counteract this tendency.

SPOILERS—High-drag devices that can be raised into the air flowing over an airfoil, reducing lift and increasing drag. Spoilers are used for roll control on some aircraft. Deploying spoilers on both wings at the same time allows the aircraft to descend without gaining speed. Spoilers are also used to shorten the ground roll after landing.

STABILATOR—A single-piece horizontal tail surface on an airplane that pivots around a central hinge point. A stabilator serves the purposes of both the horizontal stabilizer and the elevators.

STABILITY—The inherent quality of an airplane to correct for conditions that may disturb its equilibrium, and to return or to continue on the original flightpath. It is primarily an airplane design characteristic.

STAGNANT HYPOXIA—A type of hypoxia that results when the oxygen-rich blood in the lungs isn't moving, for one reason or another, to the tissues that need it.

STALL—A rapid decrease in lift caused by the separation of airflow from the wing's surface brought on by exceeding the critical angle of attack. A stall can occur at any pitch attitude or airspeed.

STANDARD ATMOSPHERE—At sea level, the standard atmosphere consists of a barometric pressure of 29.92 inches of mercury (in. Hg.) or 1013.2 millibars, and a temperature of 15°C (59°F). Pressure and temperature normally decrease as altitude increases. The standard lapse rate in the lower atmosphere for each 1,000 feet of altitude is approximately 1 in. Hg. and 2°C (3.5°F). For example, the standard pressure and temperature at 3,000 feet mean sea level (MSL) is 26.92 in. Hg. (29.92 - 3) and 9°C (15°C - 6°C).

STANDARD EMPTY WEIGHT (GAMA)—This weight consists of the airframe, engines, and all items of operating equipment that have fixed locations and are permanently installed in the airplane; including fixed ballast, hydraulic fluid, unusable fuel, and full engine oil.

STANDARD-RATE-TURN—A turn at the rate of 3º per second which enables the airplane to complete a 360º turn in 2 minutes.

STANDARD WEIGHTS—These have been established for numerous items involved in weight and balance computations. These weights should not be used if actual weights are available.

STATIC STABILITY—The initial tendency an aircraft displays when disturbed from a state of equilibrium.

STATION—A location in the airplane that is identified by a number designating its distance in inches from the datum. The datum is, therefore, identified as station zero. An item located at station +50 would have an arm of 50 inches.

STATIONARY FRONT—A front that is moving at a speed of less than 5 knots.

STRATOSPHERE—A layer of the atmosphere above the tropopause extending to a height of approximately 160,000 feet.

STRESS MANAGEMENT—The personal analysis of the kinds of stress experienced while flying, the application of appropriate stress assessment tools, and other coping mechanisms.

SUBLIMATION—Process by which a solid is changed to a gas without going through the liquid state.

SUPERCHARGER—An engine- or exhaust-driven air compressor used to provide additional pressure to the induction air so the engine can produce additional power.

SUPERCOOLED WATER DROPLETS—Water droplets that have been cooled below the freezing point, but are still in a liquid state.

SURFACE ANALYSIS CHART—A report that depicts an analysis of the current surface weather. Shows the areas of high and low pressure, fronts, temperatures, dewpoints, wind directions and speeds, local weather, and visual obstructions.

TAKEOFF DISTANCE — The distance required to complete an all-engines operative takeoff to the 35-foot height. It must be at least 15 percent less than the distance required for a one-engine inoperative engine takeoff. This distance is not normally a limiting factor as it is usually less than the one-engine inoperative takeoff distance.

TAXIWAY LIGHTS—Omnidirectional lights that outline the edges of the taxiway and are blue in color.

TAXIWAY TURNOFF LIGHTS—Flush lights which emit a steady green color.

TELEPHONE INFORMATION BRIEFING SERVICE (TIBS)—Telephone recording of area and/or route meteorological briefings, airspace procedures, and special aviation-oriented announcements.

TERMINAL AERODROME FORECAST (TAF)—A report established for the 5 statute mile radius around an airport. Utilizes the same descriptors and abbreviations as the METAR report.

TERMINAL RADAR SERVICE AREAS (TRSA)—Areas where participating pilots can receive additional radar services. The purpose of the service is to provide separation between all IFR operations and participating VFR aircraft.

THERMOSPHERE—The last layer of the atmosphere that begins above the mesosphere and gradually fades away into space.

THRUST—The force which imparts a change in the velocity of a mass. This force is measured in pounds but has no element of time or rate. The term, thrust required, is generally associated with jet engines. A forward force which propels the airplane through the air.

THRUST LINE—An imaginary line passing through the center of the propeller hub, perpendicular to the plane of the propeller rotation.

TORQUE—**1.** A resistance to turning or twisting. **2.** Forces that produce a twisting or rotating motion. **3.** In an airplane, the tendency of the aircraft to turn (roll) in the opposite direction of rotation of the engine and propeller. **4.** In helicopters with a single, main rotor system, the tendency of the helicopter to turn in the opposite direction of the main rotor rotation.

TORQUEMETER—An instrument used with some of the larger reciprocating engines and turboprop or turboshaft engines to measure the reaction between the propeller reduction gears and the engine case.

TOTAL DRAG—The sum of the parasite and induced drag.

TOUCHDOWN ZONE LIGHTS—Two rows of transverse light bars disposed symmetrically about the runway centerline in the runway touchdown zone.

TRACK—The actual path made over the ground in flight.

TRAILING EDGE—The portion of the airfoil where the airflow over the upper surface rejoins the lower surface airflow.

TRANSCRIBED WEATHER BROADCAST (TWEB)—A continuous recording of weather and aeronautical information broadcast over selected NDB or VOR stations.

TRANSPONDER—The airborne portion of the secondary surveillance radar system.

TRICYCLE GEAR—Landing gear employing a third wheel located on the nose of the aircraft.

TRIM TAB—A small auxiliary hinged portion of a movable control surface that can be adjusted during flight to a position resulting in a balance of control forces.

TROPOPAUSE—The boundary layer between the troposphere and the mesosphere which acts as a lid to confine most of the water vapor, and the associated weather, to the troposphere.

TROPOSPHERE—The layer of the atmosphere extending from the surface to a height of 20,000 to 60,000 feet depending on latitude.

TRUE AIRSPEED (TAS)—Calibrated airspeed corrected for altitude and nonstandard temperature. Because air density decreases with an increase in altitude, an airplane has to be flown faster at higher altitudes to cause the same pressure difference between pitot impact pressure and static pressure. Therefore, for a given calibrated airspeed, true airspeed increases as altitude increases; or for a given true airspeed, calibrated airspeed decreases as altitude increases.

TRUE ALTITUDE—The vertical distance of the airplane above sea level—the actual altitude. It is often expressed as feet above mean sea level (MSL). Airport, terrain, and obstacle elevations on aeronautical charts are true altitudes.

TRUSS—A fuselage design made up of supporting structural members that resist deformation by applied loads. The truss-type fuselage is constructed of steel or aluminum tubing. Strength and rigidity is achieved by welding the tubing together into a series of triangular shapes, called trusses.

T-TAIL—An aircraft with the horizontal stabilizer mounted on the top of the vertical stabilizer, forming a T.

TURBINE DISCHARGE PRESSURE—The total pressure at the discharge of the low-pressure turbine in a dual-turbine axial-flow engine.

TURBINE ENGINE—An aircraft engine which consists of an air compressor, a combustion section, and a turbine. Thrust is produced by increasing the velocity of the air flowing through the engine.

TURBOCHARGER—An air compressor driven by exhaust gases, which increases the pressure of the air going into the engine through the carburetor or fuel injection system.

TURBOFAN ENGINE—A fanlike turbojet engine designed to create additional thrust by diverting a secondary airflow around the combustion chamber.

TURBOJET ENGINE—A turbine engine which produces its thrust entirely by accelerating the air through the engine.

TURBOPROP ENGINE—A turbine engine which drives a propeller through a reduction gearing arrangement. Most of the energy in the

exhaust gases is converted into torque, rather than using its acceleration to drive the aircraft.

TURBOSHAFT ENGINE—A gas turbine engine that delivers power through a shaft to operate something other than a propeller.

TURN-AND-SLIP INDICATOR—A flight instrument consisting of a rate gyro to indicate the rate of yaw and a curved glass inclinometer to indicate the relationship between gravity and centrifugal force. The turn-and-slip indicator indicates the relationship between angle of bank and rate of yaw. Also called a turn-and-bank indicator.

TURN COORDINATOR—A rate gyro that senses both roll and yaw due to the gimbal being canted. Has largely replaced the turn-and-slip indicator in modern aircraft.

TURNING ERROR—One of the errors inherent in a magnetic compass caused by the dip compensating weight. It shows up only on turns to or from northerly headings in the Northern Hemisphere and southerly headings in the Southern Hemisphere. Turning error causes the compass to lead turns to the north or south and lag turns away from the north or south.

ULTIMATE LOAD FACTOR—In stress analysis, the load that causes physical breakdown in an aircraft or aircraft component during a strength test, or the load that according to computations, should cause such a breakdown.

UNCONTROLLED AIRPORT—An airport that does not have an operating control tower. Two-way radio communications are not required at uncontrolled airports, although it is good operating practice for pilots to transmit their intentions on the specified frequency.

UNCONTROLLED AIRSPACE—Class G airspace that has not been designated as Class A, B, C, D, or E. It is airspace in which air traffic control has no authority or responsibility to control air traffic; however, pilots should remember there are VFR minimums which apply to this airspace.

USEFUL LOAD—The weight of the pilot, copilot, passengers, baggage, usable fuel, and drainable oil. It is the basic empty weight subtracted from the maximum allowable gross weight. This term applies to general aviation aircraft only.

V_A—The design maneuvering speed. This is the "rough air" speed and the maximum speed for abrupt maneuvers. If during flight, rough air or severe turbulence is encountered, reduce the airspeed to maneuvering speed or less to minimize stress on the airplane structure. It is important to consider weight when referencing this speed. For example, V_A may be 100 knots when an airplane is heavily loaded, but only 90 knots when the load is light.

VAPOR LOCK—A condition in which air enters the fuel system and it may be difficult, or impossible, to restart the engine. Vapor lock may occur as a result of running a fuel tank completely dry, allowing air to enter the fuel system. On fuel-injected engines, the fuel may become so hot it vaporizes in the fuel line, not allowing fuel to reach the cylinders.

VARIATION—The angular difference between the true, or geographic, poles and the magnetic poles at a given point. The compass magnet is aligned with the magnetic poles, while aeronautical charts are oriented to the geographic poles. This variation must be taken into consideration when determining an aircraft's actual geographic location. Indicated on charts by isogonic lines, it is not affected by the airplane's heading.

VECTOR—A force vector is a graphic representation of a force and shows both the magnitude and direction of the force.

VELOCITY—The speed or rate of movement in a certain direction.

VERTICAL AXIS—An imaginary line passing vertically through the center of gravity of an aircraft. The vertical axis is called the z-axis or the yaw axis.

VERTICAL CARD COMPASS—A magnetic compass that consists of an azimuth on a vertical card, resembling a heading indicator with a fixed miniature airplane to accurately present the heading of the aircraft. The design uses eddy current damping to minimize lead and lag during turns.

VERTICAL SPEED INDICATOR—An instrument that uses static pressure to display a rate of climb or descent in feet per minute. The VSI can also sometimes be called a vertical velocity indicator (VVI).

VERTICAL STABILITY—Stability about an aircraft's vertical axis. Also called yawing or directional stability.

VERY HIGH FREQUENCY (VHF) OMNIDIRECTIONAL RANGE (VOR)—A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and can have an additional voice identification feature. Voice features can be used by ATC or FSS for transmitting instructions/ information to pilots.

V_{FE}—The maximum speed with the flaps extended. The upper limit of the white arc.

VFR TERMINAL AREA CHARTS (1:250,000)—Depict Class B airspace which provides for the control or segregation of all the aircraft within the Class B airspace. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.

V-G DIAGRAM—A chart that relates velocity to load factor. It is valid only for a specific weight, configuration and altitude and shows the maximum amount of positive or

negative lift the airplane is capable of generating at a given speed. Also shows the safe load factor limits and the load factor that the aircraft can sustain at various speeds.

VISUAL APPROACH SLOPE INDICATOR (VASI)—The most common visual glidepath system in use. The VASI provides obstruction clearance within 10° of the extended runway centerline, and to 4 nautical miles (NM) from the runway threshold.

V_{LE}—Landing gear extended speed. The maximum speed at which an airplane can be safely flown with the landing gear extended.

V_{LO}—Landing gear operating speed. The maximum speed for extending or retracting the landing gear if using an airplane equipped with retractable landing gear.

V_{MC}—Minimum control airspeed. This is the minimum flight speed at which a light, twin-engine airplane can be satisfactorily controlled when an engine suddenly becomes inoperative and the remaining engine is at takeoff power.

V_{NE}—The never-exceed speed. Operating above this speed is prohibited since it may result in damage or structural failure. The red line on the airspeed indicator.

V_{NO}—The maximum structural cruising speed. Do not exceed this speed except in smooth air. The upper limit of the green arc.

VOR—See VERY HIGH FREQUENCY (VHF) OMNIDIRECTIONAL RANGE.

V_{S0}—The stalling speed or the minimum steady flight speed in the landing configuration. In small airplanes, this is the power-off stall speed at the maximum landing weight in the landing configuration (gear and flaps down). The lower limit of the white arc.

V_{S1}—The stalling speed or the minimum steady flight speed obtained in a specified configuration. For most airplanes, this is the power-off stall speed at the maximum takeoff weight in the clean configuration (gear up, if retractable, and flaps up). The lower limit of the green arc.

V-TAIL—A design which utilizes two slanted tail surfaces to perform the same functions as the surfaces of a conventional elevator and rudder configuration. The fixed surfaces act as both horizontal and vertical stabilizers.

V_X—Best angle-of-climb speed. The airspeed at which an airplane gains the greatest amount of altitude in a given distance. It is used during a short-field takeoff to clear an obstacle.

V_Y—Best rate-of-climb speed. This airspeed provides the most altitude gain in a given period of time.

V_{YSE}—Best rate of climb speed with one engine inoperative. This airspeed provides the most altitude gain in a given period of time in a light, twin-engine airplane following an engine failure.

WAKE TURBULENCE—Wingtip vortices that are created when an airplane generates lift. When an airplane generates lift, air spills over the wingtips from the high pressure areas below the wings to the low pressure areas above them. This flow causes rapidly rotating whirlpools of air called wingtip vortices or wake turbulence.

WARM FRONT— The boundary area formed when a warm air mass contacts and flows over a colder air mass. Warm fronts cause low ceilings and rain.

WARNING AREAS—Areas that may contain hazards to nonparticipating aircraft in international airspace. These areas are depicted on aeronautical charts.

WASTE GATE—A controllable valve in the tailpipe of an aircraft reciprocating engine equipped with a turbocharger. The valve is controlled to vary the amount of exhaust gases forced through the turbocharger turbine.

WEATHER DEPICTION CHART—Details surface conditions as derived from METAR and other surface observations.

WEIGHT—A measure of the heaviness of an object. The force by which a body is attracted toward the center of the Earth (or another celestial body) by gravity. Weight is equal to the mass of the body times the local value of gravitational acceleration. One of the four main forces acting on an aircraft. Equivalent to the actual weight of the aircraft. It acts downward through the aircraft's center of gravity toward the center of the Earth. Weight opposes lift.

WIND CORRECTION ANGLE—Correction applied to the course to establish a heading so that track will coincide with course.

WIND DIRECTION INDICATORS—Indicators that include a wind sock, wind tee, or tetrahedron. Visual reference will determine wind direction and runway in use.

WIND SHEAR—A sudden, drastic shift in windspeed, direction, or both that may occur in the horizontal or vertical plane.

WINDS AND TEMPERATURE ALOFT FORECAST (FD)—A twice daily forecast that provides wind and temperature forecasts for specific locations in the contiguous United States.

WING AREA—The total surface of the wing (square feet), which includes control surfaces and may include wing area covered by the fuselage (main body of the airplane), and engine nacelles.

WINGS—Airfoils attached to each side of the fuselage and are the main lifting surfaces that support the airplane in flight.

WING SPAN—The maximum distance from wingtip to wingtip.

WINGTIP VORTICES—The rapidly rotating air that spills over an airplane's wings during flight. The intensity of the turbulence depends on the airplane's weight, speed, and configuration. Also referred to as wake turbulence. Vortices from heavy aircraft may be extremely hazardous to small aircraft.

WING TWIST—A design feature incorporated into some wings to improve aileron control effectiveness at high angles of attack during an approach to a stall.

WORK—The product of force and the distance through which the force acts. Usually expressed in foot-pounds.

WORLD AERONAUTICAL CHARTS (WAC) (1:1,000,000)—Provide a standard series of aeronautical charts covering land areas of the world at a size and scale convenient for navigation by moderate speed aircraft. Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions and other pertinent data.

ZULU TIME—A term used in aviation for coordinated universal time (UTC) which places the entire world on one time standard.