

Decision Makers Guide

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Units of Measurement

| | |
|--------|----------------------|
| ° | degree (temperature) |
| deg | degree (angle) |
| deg/s | degrees per second |
| ft | feet |
| ft/min | feet per minute |
| ft/s | feet per second |
| hPa | hectoPascal |
| hr | hour |
| in | inch |
| inHg | inches of mercury |
| kt | knot |
| m | meter |
| mbar | millibar |
| mi | mile |
| min | minute |
| nm | nautical mile |
| sec | second |

Acronyms

| | | | |
|--------|---|----------|--|
| ADF | automatic direction finding | MEA | Minimum Enroute Altitude |
| AGL | above ground level | MIA | Minimum IFR Altitude |
| ASRS | Aviation Safety Reporting System | MOCA | Minimum Obstruction Clearance Altitude |
| ATC | air traffic control | MRA | Minimum Reception Altitude |
| ATCRBS | Air Traffic Control Radar Beacon System | MSA | Minimum Safe Altitude |
| ATIS | automatic terminal information service | MSAWS | Minimum Safe Altitude Warning System |
| CFIT | Controlled Flight Into Terrain | MSL | mean sea level |
| CRM | Crew Resource Management | MVA | Minimum Vectoring Altitude |
| DA/H | decision altitude/height | NOTAM | Notice To Airmen |
| EAS | Emergency Safe Altitude | PANS-OPS | Procedures for Air Navigation Services - Aircraft Operations |
| FAA | Federal Aviation Administration | PAPI | precision approach path indicator |
| FAF | final approach fix | PAR | precision approach radar |
| FMC | flight management computer | PT | procedure turn |
| FMS | flight management system | RVV | runway visibility point |
| GPS | Global Positioning System | SID | standard instrument departure |
| GPWS | Ground Proximity Warning System | SOP | standard operating procedure |
| HAA | Height Above Airport | STAR | standard terminal arrival |
| HAT | Height Above Touchdown | TCAS | Traffic Alert and Collision Avoidance System |
| IAF | initial approach fix | TCH | threshold crossing height |
| ICAO | International Civil Aviation Organization | TERPS | Terminal Instrument Procedures |
| IFR | instrument flight rules | VASI | Visual Approach Slope Indicator |
| ILS | Instrument Landing System | VDP | visual descent point |
| IMC | instrument meteorological conditions | VFR | visual flight rules |
| INS | Inertial Navigation System | VMC | visual meteorological conditions |
| MAP | Missed Approach Point | VOR | VHF Omnidirectional Radio Station |
| MCA | Minimum Crossing Altitude | VOR/DME | VOR Distance Measuring Equipment |
| MDA/H | minimum descent altitude/height | | |

CFIT Glossary

Certain definitions are needed to explain the concepts discussed in this training aid. Some of the definitions are from regulatory documents or other references, and some are defined in the aid. Not all of the defined words or phrases are used within the training aid; however, they are associated with the subject of CFIT and are included to provide a readily available source for the reader.

Altitude (USA)

The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).

1. MSL Altitude - Altitude expressed in feet measured from mean sea level.
2. AGL Altitude - Altitude expressed in feet measured above ground level.
3. Indicated Altitude - The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

Altitude (ICAO)

The vertical distance of a level, a point, or an object considered as a point, measured from mean sea level (MSL).

Appropriate Obstacle Clearance Minimum Altitude

Any of the following:

1. Minimum IFR Altitude (MIA)
2. Minimum Enroute Altitude (MEA)
3. Minimum Obstruction Clearance Altitude (MOCA)
4. Minimum Vectoring Altitude (MVA)

Appropriate Terrain Clearance Minimum Altitude

Any of the following:

1. Minimum IFR Altitude (MIA)
2. Minimum Enroute Altitude (MEA)
3. Minimum Obstruction Clearance Altitude (MOCA)
4. Minimum Vectoring Altitude (MVA)

Automatic Terminal Information Service (ATIS)

The provision of current, routine information to arriving and departing airplanes by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

Ceiling

The heights above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration," and not classified as "thin" or "partial."

CFIT (Controlled Flight Into Terrain)

An event where a mechanically normally functioning airplane is inadvertently flown into the ground, water, or an obstacle.

Controlled Airspace

An airspace of defined dimensions within which air traffic control service is provided to IFR flights and VFR flights in accordance with the airspace classification.

Decision Height (DH) (USA)

With respect to the operation of aircraft, means the height at which a decision must be made, during an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach.

Decision Altitude/Height (DA/H) (ICAO)

A specified altitude or height (A/H) in the precision approach at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

Note 1: Decision altitude (DA) is referenced to mean sea level (MSL) and decision height (DH) is referenced to the threshold elevation.

Note 2: The required visual reference means that section of the visual aids or of the approach area that should have been in view for sufficient time for the pilot to have made an assessment of the airplane position and rate of change of position, in relation to the desired flight path.

Direct

Straight line flight between two navigational aids, fixes, points, or any combination thereof. When used by pilots in describing off airway routes, points defining direct route segments become compulsory reporting points, unless the airplane is under radar contact.

Distance Measuring Equipment (DME)

Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

Final Approach

The part of an instrument approach procedure that commences at the specified final approach fix, or point, or where such a fix or point is not specified.

1. At the end of the last procedure turn, base turn, or inbound turn of a racetrack procedure, if specified; or
2. At the point of interception of the last track specified in the approach procedure; ends at a point in the vicinity of an aerodrome from which:
 - a. A landing can be made; or
 - b. A missed approach procedure is initiated.

Final Approach Fix (FAF)

The fix from which the final approach (IFR) to an airport is executed and that identifies the beginning of the final approach segment.

Fix

A geographical position determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.

Flight Crew or Flight Crew Member

A pilot, flight engineer or flight navigator assigned to duty in an aircraft during flight time.

Flight Level

A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, Flight Level 250 represents a barometric altimeter indication of 25,000 ft; flight level 255, an indication of 25,500 ft.

Flight Management Systems (FMS)

A computer system that uses a large database to allow routes to be preprogrammed and fed into the system by means of a data loader. The system is constantly updated with respect to position accuracy by reference to conventional navigation aids. The sophisticated program and its associated data base ensures that the most appropriate aids are automatically selected during the information update cycle.

Flight Recorder

A general term applied to any instrument or device that records information about the performance of an aircraft in flight or about conditions encountered in flight.

Glide Slope

Provides vertical guidance for airplanes during approach and landing. The glide slope/glide path is based on the following:

1. Electronic components emitting signals that provide vertical guidance by reference to airborne instruments during instrument approaches, such as ILS/MLS, or
2. Visual ground aids, such as VASI, that provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.
3. Precision Approach Radar (PAR). Used by ATC to inform an airplane making a PAR approach of its vertical position (elevation) relative to the descent profile.

Glide Path (ICAO)

A descent profile determined for vertical guidance during a final approach.

Glide Slope Intercept Altitude

The minimum altitude to intercept the glide slope/glide path on a precision approach.

Global Positioning System (GPS)

A space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users.

Height Above Airport (HAA)

The height of the Minimum Descent Altitude above the published airport elevation. This is published in conjunction with circling minimums.

Height Above Touchdown (HAT)

The height of the Decision Height or Minimum Descent Altitude above the highest runway elevation in the touchdown zone (first 3,000 ft of the runway). HAT is published on instrument approach charts in conjunction with all straight-in minimums.

IFR (Instrument Flight Rules) Aircraft

An airplane conducting flight in accordance with instrument flight rules.

IFR Conditions

Weather conditions below the minimum for flight under visual flight rules.

ILS (Instrument Landing System) Categories

1. ILS Category I - An ILS approach procedure that provides for approach to a height above touchdown of not less than 200 ft and with runway visual range of not less than 1,800 ft.
2. ILS Category II - An ILS approach procedure that provides for approach to a height above touchdown of not less than 100 ft and with runway visual range of not less than 1,200 ft.
3. ILS Category III—
 - a. IIIA - An ILS approach procedure that provides for approach without a decision height minimum and with runway visual range of not less than 700 ft.
 - b. IIIB - An ILS approach procedure that provides for approach without a decision height minimum and with runway visual range of not less than 150 ft.
 - c. IIIC - An ILS approach procedure that provides for approach without a decision height minimum and without runway visual range minimum.

Inertial Navigation System (INS)

An RNAV system that is a form of self-contained navigation.

Initial Approach Fix (IAF)

The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).

Instrument Flight Rules (IFR)

Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate the type of flight plan.

Instrument Landing System (ILS)

A precision instrument approach system that normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide slope.
3. Outer marker.
4. Middle marker.
5. Approach lights.

Instrument Meteorological Conditions (IMC)

Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minimums specified for visual meteorological conditions.

International Civil Aviation Organization (ICAO)

A specialized agency of the United Nations whose objectives are to develop the principles and techniques of international air navigation and foster planning and development of international civil air transport.

Landing Minimums

The minimum visibility prescribed for landing a civil airplane while using an instrument approach procedure.

1. Straight-in landing minimums - A statement of MDA and visibility, or DH and visibility, required for a straight-in landing on a specified runway, or
2. Circling minimums - A statement of MDA and visibility required for the circle-to-land maneuver.

Descent below the established MDA or DH is not authorized during an approach unless the airplane is in a position from which a normal approach to the runway of intended landing can be made and adequate visual reference to required visual cues is maintained.

Localizer

The component of an ILS that provides course guidance to the runway.

MCA (Minimum Crossing Altitude)

The lowest altitude at certain fixes at which an airplane must cross when proceeding in the direction of a higher minimum enroute IFR altitude (MEA).

MDA (Minimum Descent Altitude)

The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glideslope is provided.

MEA (Minimum Enroute IFR Altitude)

The lowest published altitude between radio fixes that ensures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes.

MOCA (Minimum Obstruction Clearance Altitude)

The lowest published altitude in effect between radio fixes on VOR airways, off airway routes, or route segments that meets obstacle clearance requirements for the entire route segment and that ensures acceptable navigational signal coverage only within 25 statute (22 nautical) miles of a VOR.

MRA (Minimum Reception Altitude)

The lowest altitude at which an intersection can be determined.

MSA (Minimum Safe Altitude)

1. The minimum altitude specified in FAR Part 91 for various aircraft operations.
2. Altitudes depicted on approach charts that provide at least 1,000 ft of obstacle clearance for emergency use within a specified distance from the navigation facility upon which a procedure is predicated. These altitudes will be identified as Minimum Sector Altitudes or Emergency Safe Altitudes and are established as follows:
 - a. Minimum Sector Altitudes - Altitudes depicted on approach charts that provide at least 1,000 ft of obstacle clearance within a 25-mi radius of the navigation facility upon which the procedure is predicated. Sectors depicted on approach charts must be at least 90 deg in scope. These altitudes are for emergency use only and do not necessarily ensure acceptable navigational signal coverage.
 - b. Emergency Safe Altitudes - Altitudes depicted on approach charts that provide at least 1,000 ft of obstacle clearance in nonmountainous areas and 2,000 ft of obstacle clearance in designated mountainous areas within a 100-mi radius of the navigation facility upon which the procedure is predicated and normally used only in military procedures. These altitudes are identified on published procedures as "Emergency Safe Altitudes."

Minimums

Weather condition requirements established for a particular operation or type of operation.

MVA - (Minimum Vectoring Altitude)

The lowest MSL altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures, and missed approaches. The altitude meets IFR obstacle clearance criteria.

Missed Approach

1. A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP. The pilot may climb immediately to the altitude specified in the missed approach procedure.
2. A term used by the pilot to inform ATC that he is executing the missed approach.
3. At locations where ATC radar service is

provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

MAP (Missed Approach Point)

A point prescribed in each instrument approach procedure at which a missed approach procedure shall be executed if the required visual reference does not exist.

Night

The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

Nonprecision Approach Procedure

A standard instrument approach procedure in which no electronic glide slope is provided.

NOTAM - Notice To Airmen

A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System), the timely knowledge of which is essential to personnel concerned with flight operations.

Obstacle

An existing object, object of natural growth, or terrain at a fixed geographical location or that may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation.

Off Course

A term used to describe a situation in which an airplane has reported a position fix or is observed on radar at a point not on the ATC approved route of flight.

Off Route Vector

A vector by ATC that takes an aircraft off a previously assigned route. Altitudes assigned by ATC during such vectors provide required obstacle clearance.

Operators

The people who are involved in all operations functions required for the flight of commercial airplanes that carry at least 10 passengers, including airplanes involved in cargo operations. This includes such functions as air traffic systems, flight crew, flight dispatch, flight scheduling, flight training, and other supporting flight operations functions.

Precision Approach Path Indicator (PAPI)

An airport lighting facility providing vertical visual approach slope guidance to airplanes during approach to landing by radiating a directional pattern of high-intensity red and white focused light beams. Four PAPI units located on one side or on both sides of the runway adjacent to the glide slope origin indicate to the pilot that he or she is (1) "on path" if he or she sees (from each set of units) two reds and two whites, (2) marginally below or marginally above if he or she sees three reds and one white or three whites and one red (respectively), or (3) below or above if he or she sees four reds or four whites (respectively).

Precision Approach Procedure

A standard instrument approach procedure in which an electronic glide slope/glide path is provided.

Procedure Turn (PT)

The maneuver prescribed when it is necessary to reverse direction to establish an airplane on the intermediate approach segment or final approach course. The outbound course, direction of turn, distance within which the turn must be completed, and minimum altitude are specified in the procedure.

Procedure Turn Inbound

That point of a procedure turn maneuver where course reversal has been completed and an airplane is established inbound on the intermediate approach segment or final approach course. A report of “procedure turn inbound” is normally used by ATC as a position report for separation purposes.

QNE

The barometric pressure used for the standard altimeter setting (29.92 inches of mercury or 1013.2 hectoPascals).

QNH

The barometric pressure as reported by a particular station.

Radar Approach

An instrument approach procedure that utilizes Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR).

Radar Contact

Used by ATC to inform an airplane that it is identified on the radar display and that radar flight following will be provided until radar identification is terminated. Radar service may also be provided within the limits of necessity and capability. When a pilot is informed of “radar contact,” he automatically discontinues reporting over compulsory reporting points.

Radar Vectoring

Provision of navigational guidance to airplanes in the form of specific headings, based on the use of radar.

Radio Altimeter

Airplane equipment that makes use of the reflection of radio waves from the ground to determine the height of the airplane above the surface.

RNAV Approach

An instrument approach procedure that relies on airplane area navigation equipment for navigational guidance.

Runway Profile Descent

An instrument flight rules (IFR) air traffic control arrival procedure to a runway published for pilot use in graphic and/or textual form and may be associated with a STAR. Runway Profile Descents provide routing and may depict crossing altitudes, speed restrictions, and headings to be flown from the enroute structure to the point where the pilot will receive clearance for and execute an instrument approach procedure. A Runway Profile Descent may apply to more than one runway if so stated on the chart.

Special VFR Conditions

Meteorological conditions that are less than those required for basic VFR flight in Class B, C, D, or E surface areas and in which some airplanes are permitted flight under visual flight rules.

Standard Instrument Departure (SID)

A preplanned instrument flight rule (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SIDs provide transition from the terminal to the appropriate enroute structure.

Standard Terminal Arrival (STAR)

A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form. STARs provide transition from the enroute structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

Threshold

The beginning of that portion of the runway usable for landing.

Threshold Crossing Height (TCH)

The theoretical height above the runway threshold at which the airplane's glide slope antenna would be if the airplane maintains the trajectory established by the mean ILS glide slope or MLS glide path.

Touchdown Zone

The first 3,000 ft of the runway beginning at the threshold.

Traffic Alert and Collision Avoidance System (TCAS)

An airborne collision avoidance system based on radar beacon signals that operates independent of ground-based equipment. TCAS-I generates traffic advisories only. TCAS-II generates traffic advisories and resolution (collision avoidance) advisories in the vertical plane.

Transponder

The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) that automatically receives radio signals from interrogators on the ground and selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond.

Turbojet Aircraft

Airplanes having a jet engine in which the energy of the jet operates a turbine that in turn operates the air compressor.

Turboprop Aircraft

Airplanes having a jet engine in which the energy of the jet operates a turbine that drives the propeller.

Visual Approach Slope Indicator (VASI)

An airport lighting facility providing vertical visual approach slope guidance to airplanes during approach to landing by radiating a directional

pattern of high intensity red and white focused light beams that indicate to the pilot that he is "on path" if he sees red/white, "above path" if whiter/white, and "below path" if red/red. Some airports serving large airplanes have three-bar VASIs that provide two visual glidepaths to the same runway.

Visual Descent Point (VDP)

A defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided the approach threshold of that runway, or approach lights, or other markings identifiable with the approach end of that runway are clearly visible to the pilot.

Vector

A heading issued to an airplane to provide navigational guidance by radar.

Visibility

The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

1. Flight Visibility - The average forward horizontal distance from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.
2. Ground Visibility - Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.
3. Prevailing Visibility - The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.
4. Runway Visibility Value (RVV) - The visibility determined for a particular runway by a transmissometer. A meter provides a continuous indication of the visibility (reported in miles or fractions of miles) for the runway. RVV is used in lieu of prevailing visibility in determining minimums for a particular runway.
5. Runway Visual Range (RVR) - An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a

pilot will see down the runway from the approach end. It is based on the sighting of either high-intensity runway lights or on the visual contrast of other targets, whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal visual range, not slant visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR is used in lieu of RVV and/or prevailing visibility in determining minimums for a particular runway.

- a. Touchdown RVR - The RVR visibility readout values obtained from RVR equipment serving the runway touchdown zone.
- b. Mid-RVR - The RVR readout values obtained from RVR equipment located midfield of the runway.
- c. Rollout RVR - The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

Visual Approach

An approach conducted on an instrument flight rules (IFR) flight plan that authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot must, at all times, have either the airport or the preceding aircraft in sight. This approach must be authorized and under the control of the appropriate air traffic control facility. Reported weather at the airport must be ceiling at or above 1,000 ft and visibility of 3 mi or greater.

Visual Flight Rules (VFR)

Rules that govern the procedures for conducting flight under visual conditions.

Visual Meteorological Conditions (VMC)

Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minimums.

VHF Omnidirectional Range Stations (VOR)

A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 deg 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 it may have an additional voice identification feature.

Waypoint

A predetermined geographical position used for route/instrument approach definition, or progress reporting purposes, that is defined relative to a VORTAC station or in terms of latitude/longitude coordinates.