



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

# *AERONAUTICAL INFORMATION MANUAL*

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*Change 1  
March 29, 2018*

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**DO NOT DESTROY  
BASIC DATED  
OCTOBER 12, 2017**



# Aeronautical Information Manual

## Explanation of Changes

Effective: March 29, 2018

### **a. 1–1–13. User Reports Requested on NAVAID or Global Navigation Satellite System (GNSS) Performance or Interference**

To better capture failures during outages, this change creates a stronger emphasis on Global Positioning System (GPS) international interference reporting and collection of data.

### **b. 1–2–4. Pilots and Air Traffic Controllers Recognizing Interference or Spoofing**

This change provides information regarding Minimum Operational Network (MON) airports that are being added to the Chart Supplement U.S. in case of GPS interruptions.

#### **c. 3–1–1. General**

##### **3–4–1. General**

##### **3–4–3. Restricted Areas**

##### **3–4–5. Military Operations Areas**

##### **3–4–9. Obtaining Special Use Airspace Status**

##### **3–5–2. Military Training Routes**

These changes clarify that only permanent restricted areas and permanent military operations areas are charted.

### **d. 4–3–2. Airports With an Operating Control Tower**

This change removes the word “leg” from “departure leg.” Changing the term “departure leg” to “departure” will correctly correspond to FIG 4–3–1, Components of a Traffic Pattern, and align with current language in the Aeronautical Information Publication.

### **e. 4–3–3. Traffic Patterns**

This change restructures the paragraph and adds clarifying information needed to help pilots better understand their responsibilities regarding flying in and around airport traffic patterns. It also adds a reference to Advisory Circular (AC) 90–66, Recommended Standards Traffic Patterns for Aeronautical Operations at Airports without Operating

Control Towers, for flight at airports without operating control towers.

### **f. 4–7–1. Introduction and Background**

#### **4–7–2. Lateral Separation Minima applied**

#### **4–7–3. Operation on Routes on the Periphery of the Gulf of Mexico CTAs**

#### **4–7–4. Provisions for Non-RNP 10 Aircraft (Not Authorized RNP 10 or RNP 4)**

#### **4–7–5. Operator Action**

#### **4–7–6. RNP 10 or RNP 4 Authorization: Policy and Procedures for Aircraft and Operators**

#### **4–7–7. Flight Planning Requirements**

#### **4–7–8. Pilot and Dispatcher Procedures: Basic and In-flight Contingency Procedures**

This change significantly reorganizes and streamlines the content within this section. Instead of eight sub-sections, the new section will contain six. The key concepts from the old content have been retained throughout the new version. However, excess wording has been eliminated. No new policy information has been added.

### **g. 5–1–4. Flight Plan – VFR Flights**

#### **5–1–6. Flight Plan – Defense (DVFR) Flights**

The terms “coastal ADIZ,” “domestic ADIZ,” and “DEWIZ” are obsolete and are no longer a part of the Air Defense Identification Zone (ADIZ) definition, as published in 14 Code of Federal Regulations Part 99. Therefore, those terms are being removed.

### **h. 5–1–8. Flight Plan (FAA Form 7233–1) – Domestic IFR Flights**

#### **5–1–9. International Flight Plan (FAA Form 7233–4) IFR Flights**

This change updates references to various advisory circulars.

### **i. 5–1–9. International Flight Plan (FAA Form 7233–4) IFR Flights**

This change removes the “Reserved for RCP” description for the P-Code and includes the P-Code equipment definitions.

**j. 5-2-2. Automated Pre-Departure Clearance Procedures**

This change revises the logon procedure for automated pre-departure clearance procedures via Controller Pilot Data Link Communications-Departure Clearance (CPDLC-DCL).

**k. 5-4-13. ILS Approaches to Parallel Runways**

**5-4-14. Parallel ILS Approaches (Dependent)**

**5-4-15. Simultaneous (Parallel) Independent ILS/RNAV/GLS Approaches**

**5-4-16. Simultaneous Close Parallel ILS PRM/RNAV PRM/GLS PRM Approaches and Simultaneous Offset Instrument Approaches (SOIA)**

This change incorporates updates to the design of simultaneous approaches that have been instituted, including revising the No Transgression Zone relative to simultaneous close parallel approaches. In addition, the use of different types of approaches for simultaneous operations has been made more inclusive. The PRM pilot training video has been

replaced with a new slide presentation which contains numerous items not presently addressed in the AIM, including a reformatted Attention All Users Page.

**l. 7-1-14. ATC Inflight Weather Avoidance Assistance**

After testing and evaluation, the Weather and Radar Processor (WARP) Program Office, AJM-33, in conjunction with the Weather Engineering Team, AJW-176, discovered that 26 dBZ is the optimum Moderate threshold for the Selectable Mosaic Generator (SMG), as opposed to 30 dBZ. Therefore, this change adjusts the threshold for "LIGHT" to (<26 dBZ) and "MODERATE" to (26 to 40 dBZ) to comply with those findings.

**m. 7-5-13. Flying in Flat Light and White Out Conditions**

This change adds Brown Out conditions to the AIM to align with other published guidance.

**n. Entire publication.**

Editorial/format changes were made where necessary. Revision bars were not used when changes are insignificant in nature.

**AIM Change 1**  
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### 1-1-11. NAVAID Identifier Removal During Maintenance

During periods of routine or emergency maintenance, coded identification (or code and voice, where applicable) is removed from certain FAA NAVAIDs. Removal of identification serves as a warning to pilots that the facility is officially off the air for tune-up or repair and may be unreliable even though intermittent or constant signals are received.

**NOTE-**

*During periods of maintenance VHF ranges may radiate a T-E-S-T code (- ● ● ● ● -).*

**NOTE-**

*DO NOT attempt to fly a procedure that is NOTAMed out of service even if the identification is present. In certain cases, the identification may be transmitted for short periods as part of the testing.*

### 1-1-12. NAVAIDs with Voice

a. Voice equipped en route radio navigational aids are under the operational control of either a Flight Service Station (FSS) or an approach control facility. The voice communication is available on some facilities. Hazardous Inflight Weather Advisory Service (HIWAS) broadcast capability is available on selected VOR sites throughout the conterminous U.S. and does not provide two-way voice communication. The availability of two-way voice communication and HIWAS is indicated in the Chart Supplement U.S. and aeronautical charts.

b. Unless otherwise noted on the chart, all radio navigation aids operate continuously except during shutdowns for maintenance. Hours of operation of facilities not operating continuously are annotated on charts and in the Chart Supplement U.S.

### 1-1-13. User Reports Requested on NAVAID or Global Navigation Satellite System (GNSS) Performance or Interference

a. Users of the National Airspace System (NAS) can render valuable assistance in the early correction of NAVAID malfunctions or GNSS problems and are encouraged to report their observations of undesirable avionics performance. Although NAVAIDs are monitored by electronic detectors, adverse effects of electronic interference, new obstructions, or changes in terrain near the NAVAID can exist without

detection by the ground monitors. Some of the characteristics of malfunction or deteriorating performance which should be reported are: erratic course or bearing indications; intermittent, or full, flag alarm; garbled, missing or obviously improper coded identification; poor quality communications reception; or, in the case of frequency interference, an audible hum or tone accompanying radio communications or NAVAID identification. GNSS problems are often characterized by navigation degradation or service loss indications. For instance, pilots conducting operations in areas where there is GNSS interference may be unable to use GPS for navigation, and ADS-B may be unavailable for surveillance. Radio frequency interference may affect both navigation for the pilot and surveillance by the air traffic controller. Depending on the equipment and integration, either an advisory light or message may alert the pilot. Air traffic controllers monitoring ADS-B reports may stop receiving ADS-B position messages and associated aircraft tracks.

In addition, malfunctioning, faulty, inappropriately installed, operated, or modified GPS re-radiator systems, intended to be used for aircraft maintenance activities, have resulted in unintentional disruption of aviation GNSS receivers. This type of disruption could result in un-flagged, erroneous position information output to primary flight displays/indicators and to other aircraft and air traffic control systems. Since receiver autonomous integrity monitoring (RAIM) is only partially effective against this type of disruption (effectively a “signal spoofing”), the pilot may not be aware of any erroneous navigation indications; ATC may be the only means available for identification of these disruptions and detect unexpected aircraft position while monitoring aircraft for IFR separation.

b. Pilots reporting potential interference should identify the NAVAID (for example, VOR) malfunction or GNSS problem, location of the aircraft (that is, latitude, longitude or bearing/distance from a reference NAVAID), magnetic heading, altitude, date and time of the observation, type of aircraft (make/model/call sign), and description of the condition observed, and the type of receivers in use (that is, make/model/software revision). Reports should be made in any of the following ways:

1. Immediately, by voice radio communication to the controlling ATC facility or FSS.

2. By telephone to the nearest ATC facility controlling the airspace where the disruption was experienced.

3. Additionally, GNSS problems should be reported by Internet via the GPS Anomaly Reporting Form at [http://www.faa.gov/air\\_traffic/nas/gps\\_reports/](http://www.faa.gov/air_traffic/nas/gps_reports/).

c. In aircraft equipped with more than one avionics receiver, there are many combinations of potential interference between units that could cause erroneous navigation indications, or complete or partial blanking out of the display.

**NOTE–**

*GPS interference or outages associated with known testing NOTAMs should not be reported to ATC.*

### 1–1–14. LORAN

**NOTE–**

*In accordance with the 2010 DHS Appropriations Act, the U.S. Coast Guard (USCG) terminated the transmission of all U.S. LORAN–C signals on 08 Feb 2010. The USCG also terminated the transmission of the Russian American signals on 01 Aug 2010, and the Canadian LORAN–C signals on 03 Aug 2010. For more information, visit <http://www.navcen.uscg.gov>. Operators should also note that TSO–C60b, AIRBORNE AREA NAVIGATION EQUIPMENT USING LORAN–C INPUTS, has been canceled by the FAA.*

### 1–1–15. Inertial Reference Unit (IRU), Inertial Navigation System (INS), and Attitude Heading Reference System (AHRS)

a. IRUs are self-contained systems comprised of gyros and accelerometers that provide aircraft attitude (pitch, roll, and heading), position, and velocity information in response to signals resulting from inertial effects on system components. Once aligned with a known position, IRUs continuously calculate position and velocity. IRU position accuracy decays with time. This degradation is known as “drift.”

b. INSs combine the components of an IRU with an internal navigation computer. By programming a series of waypoints, these systems will navigate along a predetermined track.

c. AHRSs are electronic devices that provide attitude information to aircraft systems such as

weather radar and autopilot, but do not directly compute position information.

d. Aircraft equipped with slaved compass systems may be susceptible to heading errors caused by exposure to magnetic field disturbances (flux fields) found in materials that are commonly located on the surface or buried under taxiways and ramps. These materials generate a magnetic flux field that can be sensed by the aircraft’s compass system flux detector or “gate”, which can cause the aircraft’s system to align with the material’s magnetic field rather than the earth’s natural magnetic field. The system’s erroneous heading may not self-correct. Prior to take off pilots should be aware that a heading misalignment may have occurred during taxi. Pilots are encouraged to follow the manufacturer’s or other appropriate procedures to correct possible heading misalignment before take off is commenced.

### 1–1–16. Doppler Radar

Doppler Radar is a semiautomatic self-contained dead reckoning navigation system (radar sensor plus computer) which is not continuously dependent on information derived from ground based or external aids. The system employs radar signals to detect and measure ground speed and drift angle, using the aircraft compass system as its directional reference. Doppler is less accurate than INS, however, and the use of an external reference is required for periodic updates if acceptable position accuracy is to be achieved on long range flights.

### 1–1–17. Global Positioning System (GPS)

#### a. System Overview

1. System Description. The Global Positioning System is a space-based radio navigation system used to determine precise position anywhere in the world. The 24 satellite constellation is designed to ensure at least five satellites are always visible to a user worldwide. A minimum of four satellites is necessary for receivers to establish an accurate three-dimensional position. The receiver uses data from satellites above the mask angle (the lowest angle above the horizon at which a receiver can use a satellite). The Department of Defense (DOD) is responsible for operating the GPS satellite constellation and monitors the GPS satellites to ensure proper operation. Each satellite’s orbital parameters (ephemeris data) are sent to each satellite for broadcast as

support LNAV minima. LNAV/VNAV incorporates LNAV lateral with vertical path guidance for systems and operators capable of either barometric or WAAS vertical. Pilots are required to use WAAS to fly to the LPV or LP minima. RNP APCH has a lateral accuracy value of 1 in the terminal and missed approach segments and essentially scales to RNP 0.3 in the final approach. (See paragraph 1–1–18.)

**(2) RNP AR APCH.** RNP AR APCH procedures are titled RNAV (RNP). RNP AR APCH vertical navigation performance is based upon barometric VNAV or WAAS. RNP AR is intended to provide specific benefits at specific locations. It is not intended for every operator or aircraft. RNP AR capability requires specific aircraft performance, design, operational processes, training, and specific procedure design criteria to achieve the required target level of safety. RNP AR APCH has lateral accuracy values that can range below 1 in the terminal and missed approach segments and essentially scale to RNP 0.3 or lower in the final approach. Operators conducting these approaches should refer to AC 90-101A, Approval Guidance for RNP Procedures with AR. (See paragraph 5–4–18.)

**(3) Advanced RNP (A-RNP).** Advanced RNP includes a lateral accuracy value of 2 for oceanic and remote operations but not planned for U.S. implementation and may have a 2 or 1 lateral accuracy value for domestic en route segments. Except for the final approach, A-RNP allows for scalable RNP lateral navigation accuracies. Its applications in the U.S. are still in use.

**(4) RNP 1.** RNP 1 requires a lateral accuracy value of 1 for arrival and departure in the terminal area and the initial and intermediate approach phase.

**(5) RNP 2.** RNP 2 will apply to both domestic and oceanic/remote operations with a lateral accuracy value of 2.

**(6) RNP 4.** RNP 4 will apply to oceanic and remote operations only with a lateral accuracy value of 4.

**(7) RNP 0.3.** RNP 0.3 will apply to rotorcraft only. This Nav Spec requires a lateral accuracy value of 0.3 for all phases of flight except for oceanic and remote and the final approach segment.

**(b) Application of Standard Lateral Accuracy Values.** U.S. standard lateral accuracy values typically used for various routes and procedures supporting RNAV operations may be based on use of a specific navigational system or sensor such as GPS, or on multi-sensor RNAV systems having suitable performance.

**(c) Depiction of Lateral Accuracy Values.** The applicable lateral accuracy values will be depicted on affected charts and procedures.

**c. Other RNP Applications Outside the U.S.** The FAA and ICAO member states have led initiatives in implementing the RNP concept to oceanic operations. For example, RNP-10 routes have been established in the northern Pacific (NOPAC) which has increased capacity and efficiency by reducing the distance between tracks to 50 NM. (See paragraph 4–7–1.)

**d. Aircraft and Airborne Equipment Eligibility for RNP Operations.** Aircraft meeting RNP criteria will have an appropriate entry including special conditions and limitations in its Aircraft Flight Manual (AFM), or supplement. Operators of aircraft not having specific AFM-RNP certification may be issued operational approval including special conditions and limitations for specific RNP lateral accuracy values.

**NOTE–**

*Some airborne systems use Estimated Position Uncertainty (EPU) as a measure of the current estimated navigational performance. EPU may also be referred to as Actual Navigation Performance (ANP) or Estimated Position Error (EPE).*

*TBL 1-2-1*  
**U.S. Standard RNP Levels**

RNP Level	Typical Application	Primary Route Width (NM) – Centerline to Boundary
0.1 to 1.0	RNP AR Approach Segments	0.1 to 1.0
0.3 to 1.0	RNP Approach Segments	0.3 to 1.0
1	Terminal and En Route	1.0
2	En Route	2.0
4	Projected for oceanic/remote areas where 30 NM horizontal separation is applied.	4.0
10	Oceanic/remote areas where 50 NM lateral separation is applied.	10.0

**1-2-3. Use of Suitable Area Navigation (RNAV) Systems on Conventional Procedures and Routes**

**a. Discussion.** This paragraph sets forth policy, while providing operational and airworthiness guidance regarding the suitability and use of RNAV systems when operating on, or transitioning to, conventional, non-RNAV routes and procedures within the U.S. National Airspace System (NAS):

1. Use of a suitable RNAV system as a Substitute Means of Navigation when a Very-High Frequency (VHF) Omni-directional Range (VOR), Distance Measuring Equipment (DME), Tactical Air Navigation (TACAN), VOR/TACAN (VORTAC), VOR/DME, Non-directional Beacon (NDB), or compass locator facility including locator outer marker and locator middle marker is out-of-service (that is, the navigation aid (NAVAID) information is not available); an aircraft is not equipped with an Automatic Direction Finder (ADF) or DME; or the installed ADF or DME on an aircraft is not operational. For example, if equipped with a suitable RNAV system, a pilot may hold over an out-of-service NDB.

2. Use of a suitable RNAV system as an Alternate Means of Navigation when a VOR, DME, VORTAC, VOR/DME, TACAN, NDB, or compass locator facility including locator outer marker and locator middle marker is operational and the respective aircraft is equipped with operational navigation equipment that is compatible with conventional nav aids. For example, if equipped with a suitable RNAV system, a pilot may fly a procedure

or route based on operational VOR using that RNAV system without monitoring the VOR.

**NOTE-**

1. *Additional information and associated requirements are available in Advisory Circular 90-108 titled “Use of Suitable RNAV Systems on Conventional Routes and Procedures.”*

2. *Good planning and knowledge of your RNAV system are critical for safe and successful operations.*

3. *Pilots planning to use their RNAV system as a substitute means of navigation guidance in lieu of an out-of-service NAVAID may need to advise ATC of this intent and capability.*

4. *The navigation database should be current for the duration of the flight. If the AIRAC cycle will change during flight, operators and pilots should establish procedures to ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. To facilitate validating database currency, the FAA has developed procedures for publishing the amendment date that instrument approach procedures were last revised. The amendment date follows the amendment number, e.g., Amdt 4 14Jan10. Currency of graphic departure procedures and STARs may be ascertained by the numerical designation in the procedure title. If an amended chart is published for the procedure, or the procedure amendment date shown on the chart is on or after the expiration date of the database, the operator must not use the database to conduct the operation.*

**b. Types of RNAV Systems that Qualify as a Suitable RNAV System.** When installed in accordance with appropriate airworthiness installation requirements and operated in accordance with applicable operational guidance (for example, aircraft flight manual and Advisory Circular

material), the following systems qualify as a suitable RNAV system:

1. An RNAV system with TSO–C129/–C145/–C146 equipment, installed in accordance with AC 20–138, Airworthiness Approval of Global Positioning System (GPS) Navigation Equipment for Use as a VFR and IFR Supplemental Navigation System, or AC 20–130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors, and authorized for instrument flight rules (IFR) en route and terminal operations (including those systems previously qualified for “GPS in lieu of ADF or DME” operations), or

2. An RNAV system with DME/DME/IRU inputs that is compliant with the equipment provisions of AC 90–100A, U.S. Terminal and En Route Area Navigation (RNAV) Operations, for RNAV routes. A table of compliant equipment is available at the following website:

[http://www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/afs/afs400/afs470/policy\\_guidance/](http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs470/policy_guidance/)

**NOTE–**

*Approved RNAV systems using DME/DME/IRU, without GPS/WAAS position input, may only be used as a substitute means of navigation when specifically authorized by a Notice to Airmen (NOTAM) or other FAA guidance for a specific procedure. The NOTAM or other FAA guidance authorizing the use of DME/DME/IRU systems will also identify any required DME facilities based on an FAA assessment of the DME navigation infrastructure.*

**c. Uses of Suitable RNAV Systems.** Subject to the operating requirements, operators may use a suitable RNAV system in the following ways.

1. Determine aircraft position relative to, or distance from a VOR (see NOTE 6 below), TACAN, NDB, compass locator, DME fix; or a named fix defined by a VOR radial, TACAN course, NDB bearing, or compass locator bearing intersecting a VOR or localizer course.

2. Navigate to or from a VOR, TACAN, NDB, or compass locator.

3. Hold over a VOR, TACAN, NDB, compass locator, or DME fix.

4. Fly an arc based upon DME.

**NOTE–**

1. *The allowances described in this section apply even when a facility is identified as required on a procedure (for example, “Note ADF required”).*

2. *These operations do not include lateral navigation on localizer–based courses (including localizer back–course guidance) without reference to raw localizer data.*

3. *Unless otherwise specified, a suitable RNAV system cannot be used for navigation on procedures that are identified as not authorized (“NA”) without exception by a NOTAM. For example, an operator may not use a RNAV system to navigate on a procedure affected by an expired or unsatisfactory flight inspection, or a procedure that is based upon a recently decommissioned NAVAID.*

4. *Pilots may not substitute for the NAVAID (for example, a VOR or NDB) providing lateral guidance for the final approach segment. This restriction does not refer to instrument approach procedures with “or GPS” in the title when using GPS or WAAS. These allowances do not apply to procedures that are identified as not authorized (NA) without exception by a NOTAM, as other conditions may still exist and result in a procedure not being available. For example, these allowances do not apply to a procedure associated with an expired or unsatisfactory flight inspection, or is based upon a recently decommissioned NAVAID.*

5. *Use of a suitable RNAV system as a means to navigate on the final approach segment of an instrument approach procedure based on a VOR, TACAN or NDB signal, is allowable. The underlying NAVAID must be operational and the NAVAID monitored for final segment course alignment.*

6. *For the purpose of paragraph c, “VOR” includes VOR, VOR/DME, and VORTAC facilities and “compass locator” includes locator outer marker and locator middle marker.*

**d. Alternate Airport Considerations.** For the purposes of flight planning, any required alternate airport must have an available instrument approach procedure that does not require the use of GPS. This restriction includes conducting a conventional approach at the alternate airport using a substitute means of navigation that is based upon the use of GPS. For example, these restrictions would apply when planning to use GPS equipment as a substitute means of navigation for an out–of–service VOR that supports an ILS missed approach procedure at an alternate airport. In this case, some other approach not reliant upon the use of GPS must be available. This restriction does not apply to RNAV systems

using TSO-C145/-C146 WAAS equipment. For further WAAS guidance, see paragraph 1-1-18.

1. For flight planning purposes, TSO-C129() and TSO-C196() equipped users (GPS users) whose navigation systems have fault detection and exclusion (FDE) capability, who perform a preflight RAIM prediction at the airport where the RNAV (GPS) approach will be flown, and have proper knowledge and any required training and/or approval to conduct a GPS-based IAP, may file based on a GPS-based IAP at either the destination or the alternate airport, but not at both locations. At the alternate airport, pilots may plan for applicable alternate airport weather minimums using:

(a) Lateral navigation (LNAV) or circling minimum descent altitude (MDA);

(b) LNAV/vertical navigation (LNAV/VNAV) DA, if equipped with and using approved barometric vertical navigation (baro-VNAV) equipment;

(c) RNP 0.3 DA on an RNAV (RNP) IAP, if they are specifically authorized users using approved baro-VNAV equipment and the pilot has verified required navigation performance (RNP) availability through an approved prediction program.

2. If the above conditions cannot be met, any required alternate airport must have an approved instrument approach procedure other than GPS that is anticipated to be operational and available at the estimated time of arrival, and which the aircraft is equipped to fly.

3. This restriction does not apply to TSO-C145() and TSO-C146() equipped users (WAAS users). For further WAAS guidance, see paragraph 1-1-18.

#### 1-2-4. Pilots and Air Traffic Controllers Recognizing Interference or Spoofing

a. Pilots need to maintain position awareness while navigating. This awareness may be facilitated by keeping relevant ground-based, legacy navigational aids tuned and available. By utilizing this practice, situational awareness is promoted and guards against significant pilot delay in recognizing the onset of GPS interference. Pilots may find cross-checks of other airborne systems (for example,

DME/DME/IRU or VOR) useful to mitigate this otherwise undetected hazard.

#### REFERENCE-

*AIM Paragraph 1-1-17, Global Positioning System (GPS)*

*AIM Paragraph 1-1-18, Wide Area Augmentation System (WAAS)*

b. During preflight planning, pilots should be particularly alert for NOTAMs which could affect navigation (GPS or WAAS) along their route of flight, such as Department of Defense electronic signal tests with GPS.

#### REFERENCE-

*AIM Paragraph 1-1-17, Global Positioning System (GPS)*

*AIM Paragraph 1-1-18, Wide Area Augmentation System (WAAS)*

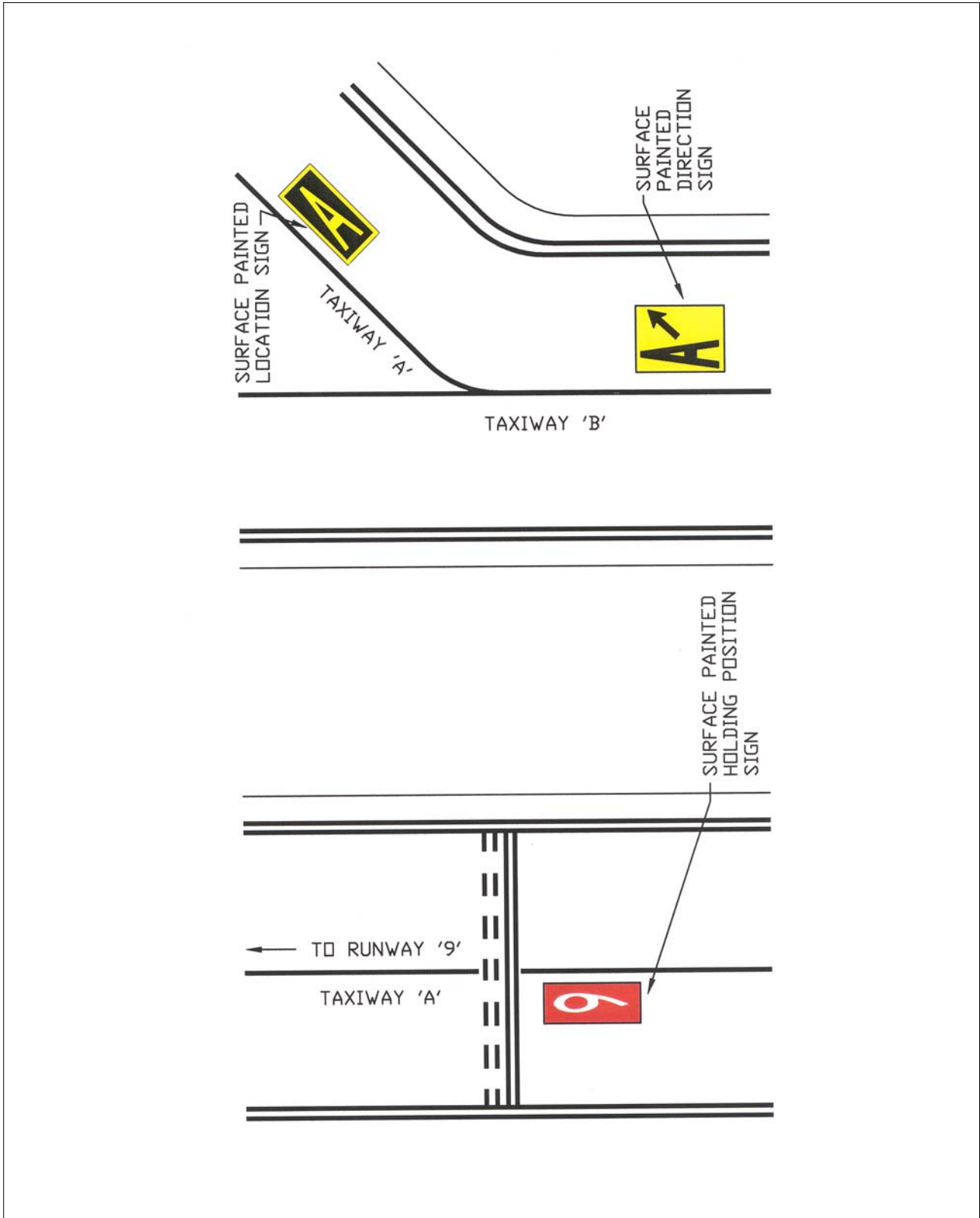
c. If the pilot experiences interruptions while navigating with GPS, the pilot and ATC may both incur a higher workload. In the aircraft, the pilot may need to change to a position determining method that does not require GPS-derived signals (for example, DME/DME/IRU or VOR). If transitioning to VOR navigation, the pilot should refer to the current Chart Supplement U.S. to identify airports with available conventional approaches associated with the VOR Minimum Operational Network (MON) program. If the pilot's aircraft is under ATC radar or multilateration surveillance, ATC may be able to provide radar vectors out of the interference affected area or to an alternate destination upon pilot request. An ADS-B Out aircraft's broadcast information may be incorrect and should not be relied upon for surveillance when interference or spoofing is suspected unless its accuracy can be verified by independent means. During the approach phase, a pilot might elect to continue in visual conditions or may need to execute the published missed approach. If the published missed approach procedure is GPS-based, the pilot will need alternate instructions. If the pilot were to choose to continue in visual conditions, the pilot could aid the controller by cancelling his/her IFR flight plan and proceeding visually to the airport to land. ATC would cancel the pilot's IFR clearance and issue a VFR squawk; freeing up the controller to handle other aircraft.

d. The FAA requests that pilots notify ATC if they experience interruptions to their GPS navigation or surveillance. GPS interference or outages associated with a known testing NOTAM should not be reported to ATC unless the interference/outage affects the pilot's ability to navigate his/her aircraft.

#### REFERENCE-

*AIM Paragraph 1-1-13, User Reports Requested on NAVAID or Global Navigation Satellite System (GNSS) Performance or Interference.*

FIG 2-3-11  
Surface Painted Signs



## 2-3-5. Holding Position Markings

**a. Runway Holding Position Markings.** For runways, these markings indicate where aircraft **MUST STOP** when approaching a runway. They consist of four yellow lines, two solid and two dashed, spaced six or twelve inches apart, and extending across the width of the taxiway or runway. The solid lines are always on the side where the aircraft must hold. There are three locations where runway holding position markings are encountered.

**1. Runway Holding Position Markings on Taxiways.** These markings identify the locations on a taxiway where aircraft **MUST STOP** when a clearance has not been issued to proceed onto the runway. Generally, runway holding position markings also identify the boundary of the runway safety area (RSA) for aircraft exiting the runway. Runway holding position markings are shown in FIG 2-3-13 and FIG 2-3-16. When instructed by ATC, “*Hold short of Runway XX*,” the pilot **MUST STOP** so that no part of the aircraft extends beyond the runway holding position marking. When approaching runways at airports with an operating control tower, pilots must not cross the runway holding position marking without ATC clearance. Pilots approaching runways at airports without an operating control tower must ensure adequate separation from other aircraft, vehicles, and pedestrians prior to crossing the holding position markings. An aircraft exiting a runway is not clear of the runway until all parts of the aircraft have crossed the applicable holding position marking.

**NOTE-**

*Runway holding position markings identify the beginning of an RSA, and a pilot MUST STOP to get clearance before crossing (at airports with operating control towers).*

**REFERENCE-**

*AIM, Paragraph 4-3-20, Exiting the Runway After Landing*

**2. Runway Holding Position Markings on Runways.** These markings identify the locations on runways where aircraft **MUST STOP**. These markings are located on runways used by ATC for Land And Hold Short Operations (for example, see FIG 4-3-8) and Taxiing operations. For taxiing operations, the pilot **MUST STOP** prior to the holding position markings unless explicitly authorized to cross by ATC. A sign with a white inscription on a red background is located adjacent to these holding position markings. (See FIG 2-3-14.) The holding position markings are placed on runways prior to the intersection with another runway, or some designated

point. Pilots receiving and accepting instructions “*Cleared to land Runway XX, hold short of Runway YY*” from ATC must either exit Runway XX prior to the holding position markings, or stop at the holding position markings prior to Runway YY. Otherwise, pilots are authorized to use the entire landing length of the runway and disregard the holding position markings.

**3. Holding Position Markings on Taxiways Located in Runway Approach Areas.** These markings are used at some airports where it is necessary to hold an aircraft on a taxiway located in the approach or departure area of a runway so that the aircraft does not interfere with the operations on that runway. This marking is collocated with the runway approach/departure area holding position sign. When specifically instructed by ATC, “*Hold short of Runway XX approach or Runway XX departure area*,” the pilot **MUST STOP** so that no part of the aircraft extends beyond the holding position marking. (See Subparagraph 2-3-8b2, Runway Approach Area Holding Position Sign, and FIG 2-3-15.)

**b. Holding Position Markings for Instrument Landing System (ILS).** Holding position markings for ILS critical areas consist of two yellow solid lines spaced two feet apart connected by pairs of solid lines spaced ten feet apart extending across the width of the taxiway as shown. (See FIG 2-3-16.) A sign with an inscription in white on a red background is located adjacent to these hold position markings. When instructed by ATC to hold short of the ILS critical area, pilots **MUST STOP** so that no part of the aircraft extends beyond the holding position marking. When approaching the holding position marking, pilots must not cross the marking without ATC clearance. The ILS critical area is not clear until all parts of the aircraft have crossed the applicable holding position marking.

**REFERENCE-**

*AIM, Paragraph 1-1-9, Instrument Landing System (ILS)*

**c. Holding Position Markings for Intersecting Taxiways** Holding position markings for intersecting taxiways consist of a single dashed line extending across the width of the taxiway as shown. (See FIG 2-3-17.) They are located on taxiways where ATC holds aircraft short of a taxiway intersection. When instructed by ATC, “*Hold short of Taxiway XX*,” the pilot **MUST STOP** so that no part of the aircraft extends beyond the holding position marking. When the marking is not present, the pilot **MUST**



# Chapter 3. Airspace

## Section 1. General

### 3-1-1. General

a. There are two categories of airspace or airspace areas:

1. Regulatory (Class A, B, C, D and E airspace areas, restricted and prohibited areas); and

2. Nonregulatory (military operations areas [MOA], warning areas, alert areas, controlled firing areas [CFA], and national security areas [NSA]).

**NOTE-**

*Additional information on special use airspace (prohibited areas, restricted areas [permanent or temporary], warning areas, MOAs [permanent or temporary], alert areas, CFAs, and NSAs) may be found in Chapter 3, Airspace, Section 4, Special Use Airspace, paragraphs 3-4-1 through 3-4-8.*

b. Within these two categories, there are four types:

1. Controlled,
2. Uncontrolled,
3. Special use, and
4. Other airspace.

c. The categories and types of airspace are dictated by:

1. The complexity or density of aircraft movements,
2. The nature of the operations conducted within the airspace,
3. The level of safety required, and
4. The national and public interest.

d. It is important that pilots be familiar with the operational requirements for each of the various types or classes of airspace. Subsequent sections will cover each class in sufficient detail to facilitate understanding.

### 3-1-2. General Dimensions of Airspace Segments

Refer to Code of Federal Regulations (CFR) for specific dimensions, exceptions, geographical areas covered, exclusions, specific transponder or equipment requirements, and flight operations.

### 3-1-3. Hierarchy of Overlapping Airspace Designations

a. When overlapping airspace designations apply to the same airspace, the operating rules associated with the more restrictive airspace designation apply.

b. For the purpose of clarification:

1. Class A airspace is more restrictive than Class B, Class C, Class D, Class E, or Class G airspace;
2. Class B airspace is more restrictive than Class C, Class D, Class E, or Class G airspace;
3. Class C airspace is more restrictive than Class D, Class E, or Class G airspace;
4. Class D airspace is more restrictive than Class E or Class G airspace; and
5. Class E is more restrictive than Class G airspace.

### 3-1-4. Basic VFR Weather Minimums

a. No person may operate an aircraft under basic VFR when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude and class of airspace. (See TBL 3-1-1.)

**NOTE-**

*Student pilots must comply with 14 CFR Section 61.89(a) (6) and (7).*

b. Except as provided in 14 CFR Section 91.157, Special VFR Weather Minimums, no person may operate an aircraft beneath the ceiling under VFR within the lateral boundaries of controlled airspace designated to the surface for an airport when the ceiling is less than 1,000 feet. (See 14 CFR Section 91.155(c).)

**TBL 3-1-1  
Basic VFR Weather Minimums**

<b>Airspace</b>	<b>Flight Visibility</b>	<b>Distance from Clouds</b>
Class A .....	Not Applicable	Not Applicable
Class B .....	3 statute miles	Clear of Clouds
Class C .....	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
Class D .....	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
Class E Less than 10,000 feet MSL .....	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
At or above 10,000 feet MSL .....	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile horizontal
Class G 1,200 feet or less above the surface (regardless of MSL altitude). Day, except as provided in section 91.155(b) .....	1 statute mile	Clear of clouds 500 feet below 1,000 feet above 2,000 feet horizontal
Night, except as provided in section 91.155(b) .....	3 statute miles	
More than 1,200 feet above the surface but less than 10,000 feet MSL. Day .....	1 statute mile	500 feet below 1,000 feet above 2,000 feet horizontal
Night .....	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface and at or above 10,000 feet MSL. ....	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile horizontal

**3-1-5. VFR Cruising Altitudes and Flight Levels**

(See TBL 3-1-2.)

**TBL 3-1-2  
VFR Cruising Altitudes and Flight Levels**

<b>If your magnetic course (ground track) is:</b>	<b>And you are more than 3,000 feet above the surface but below 18,000 feet MSL, fly:</b>	<b>And you are above 18,000 feet MSL to FL 290, fly:</b>
0° to 179° .....	Odd thousands MSL, plus 500 feet (3,500; 5,500; 7,500, etc.)	Odd Flight Levels plus 500 feet (FL 195; FL 215; FL 235, etc.)
180° to 359° .....	Even thousands MSL, plus 500 feet (4,500; 6,500; 8,500, etc.)	Even Flight Levels plus 500 feet (FL 185; FL 205; FL 225, etc.)

## Section 4. Special Use Airspace

### 3-4-1. General

a. Special use airspace (SUA) consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. SUA areas are depicted on aeronautical charts, except for controlled firing areas (CFA), temporary military operations areas (MOA), and temporary restricted areas.

b. Prohibited and restricted areas are regulatory special use airspace and are established in 14 CFR Part 73 through the rulemaking process.

c. Warning areas, MOAs, alert areas, CFAs, and national security areas (NSA) are nonregulatory special use airspace.

d. Special use airspace descriptions (except CFAs) are contained in FAA Order JO 7400.8, Special Use Airspace.

e. Permanent SUA (except CFAs) is charted on Sectional Aeronautical, VFR Terminal Area, and applicable En Route charts, and include the hours of operation, altitudes, and the controlling agency.

**NOTE-**

*For temporary restricted areas and temporary MOAs, pilots should review the Notices to Airman Publication (NTAP), the FAA SUA website, and/or contact the appropriate overlying ATC facility to determine the effect of non-depicted SUA areas along their routes of flight.*

### 3-4-2. Prohibited Areas

Prohibited areas contain airspace of defined dimensions identified by an area on the surface of the earth within which the flight of aircraft is prohibited. Such areas are established for security or other reasons associated with the national welfare. These areas are published in the Federal Register and are depicted on aeronautical charts.

### 3-4-3. Restricted Areas

a. Restricted areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Activities within these areas must be confined because of their nature or

limitations imposed upon aircraft operations that are not a part of those activities or both. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. Restricted areas are published in the Federal Register and constitute 14 CFR Part 73.

b. ATC facilities apply the following procedures when aircraft are operating on an IFR clearance (including those cleared by ATC to maintain VFR-on-top) via a route which lies within joint-use restricted airspace.

1. If the restricted area is not active and has been released to the controlling agency (FAA), the ATC facility will allow the aircraft to operate in the restricted airspace without issuing specific clearance for it to do so.

2. If the restricted area is active and has not been released to the controlling agency (FAA), the ATC facility will issue a clearance which will ensure the aircraft avoids the restricted airspace unless it is on an approved altitude reservation mission or has obtained its own permission to operate in the airspace and so informs the controlling facility.

**NOTE-**

*The above apply only to joint-use restricted airspace and not to prohibited and nonjoint-use airspace. For the latter categories, the ATC facility will issue a clearance so the aircraft will avoid the restricted airspace unless it is on an approved altitude reservation mission or has obtained its own permission to operate in the airspace and so informs the controlling facility.*

c. Permanent restricted areas are charted on Sectional Aeronautical, VFR Terminal Area, and the appropriate En Route charts.

**NOTE-**

*Temporary restricted areas are not charted.*

### 3-4-4. Warning Areas

A warning area is airspace of defined dimensions, extending from three nautical miles outward from the coast of the U.S., that contains activity that may be hazardous to nonparticipating aircraft. The purpose

of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

### **3-4-5. Military Operations Areas**

**a.** MOAs consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic. Whenever a MOA is being used, nonparticipating IFR traffic may be cleared through a MOA if IFR separation can be provided by ATC. Otherwise, ATC will reroute or restrict nonparticipating IFR traffic.

**b.** Examples of activities conducted in MOAs include, but are not limited to: air combat tactics, air intercepts, aerobatics, formation training, and low-altitude tactics. Military pilots flying in an active MOA are exempted from the provisions of 14 CFR Section 91.303(c) and (d) which prohibits aerobatic flight within Class D and Class E surface areas, and within Federal airways. Additionally, the Department of Defense has been issued an authorization to operate aircraft at indicated airspeeds in excess of 250 knots below 10,000 feet MSL within active MOAs.

**c.** Pilots operating under VFR should exercise extreme caution while flying within a MOA when military activity is being conducted. The activity status (active/inactive) of MOAs may change frequently. Therefore, pilots should contact any FSS within 100 miles of the area to obtain accurate real-time information concerning the MOA hours of operation. Prior to entering an active MOA, pilots should contact the controlling agency for traffic advisories.

**d.** Permanent MOAs are charted on Sectional Aeronautical, VFR Terminal Area, and the appropriate En Route Low Altitude charts.

#### **NOTE-**

*Temporary MOAs are not charted.*

### **3-4-6. Alert Areas**

Alert areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may

contain a high volume of pilot training or an unusual type of aerial activity. Pilots should be particularly alert when flying in these areas. All activity within an alert area must be conducted in accordance with CFRs, without waiver, and pilots of participating aircraft as well as pilots transiting the area must be equally responsible for collision avoidance.

### **3-4-7. Controlled Firing Areas**

CFAs contain activities which, if not conducted in a controlled environment, could be hazardous to nonparticipating aircraft. The distinguishing feature of the CFA, as compared to other special use airspace, is that its activities are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate an aircraft might be approaching the area. There is no need to chart CFAs since they do not cause a nonparticipating aircraft to change its flight path.

### **3-4-8. National Security Areas**

NSAs consist of airspace of defined vertical and lateral dimensions established at locations where there is a requirement for increased security and safety of ground facilities. Pilots are requested to voluntarily avoid flying through the depicted NSA. When it is necessary to provide a greater level of security and safety, flight in NSAs may be temporarily prohibited by regulation under the provisions of 14 CFR Section 99.7. Regulatory prohibitions will be issued by System Operations, System Operations Airspace and AIM Office, Airspace and Rules, and disseminated via NOTAM. Inquiries about NSAs should be directed to Airspace and Rules.

### **3-4-9. Obtaining Special Use Airspace Status**

**a.** Pilots can request the status of SUA by contacting the using or controlling agency. The frequency for the controlling agency is tabulated in the margins of the applicable IFR and VFR charts.

**b. Special Use Airspace Information Service (SUAIS) (Alaska Only).** The SUAIS is a 24-hour service operated by the military that provides civilian pilots, flying VFR, with information regarding military flight operations in certain MOAs and restricted airspace within central Alaska. The service provides “near real time” information on military flight activity in the interior Alaska MOA and Restricted Area complex. SUAIS also provides information on artillery firing, known helicopter

operations, and unmanned aerial vehicle operations. Pilots flying VFR are encouraged to use SUAIS. See the Alaska Chart Supplement for hours of operation, phone numbers, and radio frequencies.

**c.** Special use airspace scheduling data for preflight planning is available via the FAA SUA website. Pilots may also call Flight Services or access the Direct User Access Terminal System (DUATS) via the Internet for airspace schedule information.



## Section 5. Other Airspace Areas

### 3-5-1. Airport Advisory/Information Services

a. There are two advisory type services available at selected airports.

1. Local Airport Advisory (LAA) service is available only in Alaska and is operated within 10 statute miles of an airport where a control tower is not operating but where a FSS is located on the airport. At such locations, the FSS provides a complete local airport advisory service to arriving and departing aircraft. During periods of fast changing weather the FSS will automatically provide Final Guard as part of the service from the time the aircraft reports “on-final” or “taking-the-active-runway” until the aircraft reports “on-the-ground” or “airborne.”

**NOTE-**

*Current policy, when requesting remote ATC services, requires that a pilot monitor the automated weather broadcast at the landing airport prior to requesting ATC services. The FSS automatically provides Final Guard, when appropriate, during LAA/Remote Airport Advisory (RAA) operations. Final Guard is a value added wind/altimeter monitoring service, which provides an automatic wind and altimeter check during active weather situations when the pilot reports on-final or taking the active runway. During the landing or take-off operation when the winds or altimeter are actively changing the FSS will blind broadcast significant changes when the specialist believes the change might affect the operation. Pilots should acknowledge the first wind/altimeter check but due to cockpit activity no acknowledgement is expected for the blind broadcasts. It is prudent for a pilot to report on-the-ground or airborne to end the service.*

2. Remote Airport Information Service (RAIS) is provided in support of short term special events like small to medium fly-ins. The service is advertised by NOTAM D only. The FSS will not have access to a continuous readout of the current winds and altimeter; therefore, RAIS does not include weather and/or Final Guard service. However, known traffic, special event instructions, and all other services are provided.

**NOTE-**

*The airport authority and/or manager should request RAIS support on official letterhead directly with the manager of the FSS that will provide the service at least 60 days in advance. Approval authority rests with the FSS manager and is based on workload and resource availability.*

**REFERENCE-**

*AIM, Paragraph 4-1-9, Traffic Advisory Practices at Airports Without Operating Control Towers*

b. It is not mandatory that pilots participate in the Airport Advisory programs. Participation enhances safety for everyone operating around busy GA airports; therefore, everyone is encouraged to participate and provide feedback that will help improve the program.

### 3-5-2. Military Training Routes

a. National security depends largely on the deterrent effect of our airborne military forces. To be proficient, the military services must train in a wide range of airborne tactics. One phase of this training involves “low level” combat tactics. The required maneuvers and high speeds are such that they may occasionally make the see-and-avoid aspect of VFR flight more difficult without increased vigilance in areas containing such operations. In an effort to ensure the greatest practical level of safety for all flight operations, the Military Training Route (MTR) program was conceived.

b. The MTR program is a joint venture by the FAA and the Department of Defense (DOD). MTRs are mutually developed for use by the military for the purpose of conducting low-altitude, high-speed training. The routes above 1,500 feet AGL are developed to be flown, to the maximum extent possible, under IFR. The routes at 1,500 feet AGL and below are generally developed to be flown under VFR.

c. Generally, MTRs are established below 10,000 feet MSL for operations at speeds in excess of 250 knots. However, route segments may be defined at higher altitudes for purposes of route continuity. For example, route segments may be defined for descent, climbout, and mountainous terrain. There are IFR and VFR routes as follows:

**1. IFR Military Training Routes-(IR).** Operations on these routes are conducted in accordance with IFR regardless of weather conditions.

**2. VFR Military Training Routes-(VR).** Operations on these routes are conducted in accordance with VFR except flight visibility must be

5 miles or more; and flights must not be conducted below a ceiling of less than 3,000 feet AGL.

**d.** Military training routes will be identified and charted as follows:

**1. Route identification.**

**(a)** MTRs with no segment above 1,500 feet AGL must be identified by four number characters; e.g., IR1206, VR1207.

**(b)** MTRs that include one or more segments above 1,500 feet AGL must be identified by three number characters; e.g., IR206, VR207.

**(c)** Alternate IR/VR routes or route segments are identified by using the basic/principal route designation followed by a letter suffix, e.g., IR008A, VR1007B, etc.

**2. Route charting.**

**(a) IFR Enroute Low Altitude Chart.** This chart will depict all IR routes and all VR routes that accommodate operations above 1,500 feet AGL.

**(b) VFR Sectional Aeronautical Charts.** These charts will depict military training activities such as IR and VR information.

**(c) Area Planning (AP/1B) Chart (DOD Flight Information Publication–FLIP).** This chart is published by the National Geospatial–Intelligence Agency (NGA) primarily for military users and contains detailed information on both IR and VR routes.

**REFERENCE–**

*AIM, Paragraph 9–1–5, Subparagraph a, National Geospatial–Intelligence Agency (NGA) Products*

**e.** The FLIP contains charts and narrative descriptions of these routes. To obtain this publication contact:

Defense Logistics Agency for Aviation  
Mapping Customer Operations (DLA AVN/QAM)  
8000 Jefferson Davis Highway  
Richmond, VA 23297–5339  
Toll free phone: 1–800–826–0342  
Commercial: 804–279–6500

This NGA FLIP is available for pilot briefings at FSS and many airports.

**f.** Nonparticipating aircraft are not prohibited from flying within an MTR; however, extreme vigilance should be exercised when conducting flight

through or near these routes. Pilots should contact FSSs within 100 NM of a particular MTR to obtain current information or route usage in their vicinity. Information available includes times of scheduled activity, altitudes in use on each route segment, and actual route width. Route width varies for each MTR and can extend several miles on either side of the charted MTR centerline. Route width information for IR and VR MTRs is also available in the FLIP AP/1B along with additional MTR (slow routes/air refueling routes) information. When requesting MTR information, pilots should give the FSS their position, route of flight, and destination in order to reduce frequency congestion and permit the FSS specialist to identify the MTR which could be a factor.

**3–5–3. Temporary Flight Restrictions**

**a. General.** This paragraph describes the types of conditions under which the FAA may impose temporary flight restrictions. It also explains which FAA elements have been delegated authority to issue a temporary flight restrictions NOTAM and lists the types of responsible agencies/offices from which the FAA will accept requests to establish temporary flight restrictions. The 14 CFR is explicit as to what operations are prohibited, restricted, or allowed in a temporary flight restrictions area. Pilots are responsible to comply with 14 CFR Sections 91.137, 91.138, 91.141 and 91.143 when conducting flight in an area where a temporary flight restrictions area is in effect, and should check appropriate NOTAMs during flight planning.

**b. The purpose for establishing a temporary flight restrictions area is to:**

**1.** Protect persons and property in the air or on the surface from an existing or imminent hazard associated with an incident on the surface when the presence of low flying aircraft would magnify, alter, spread, or compound that hazard (14 CFR Section 91.137(a)(1));

**2.** Provide a safe environment for the operation of disaster relief aircraft (14 CFR Section 91.137(a)(2)); or

**3.** Prevent an unsafe congestion of sightseeing aircraft above an incident or event which may generate a high degree of public interest (14 CFR Section 91.137(a)(3)).



## Section 3. Airport Operations

### 4-3-1. General

Increased traffic congestion, aircraft in climb and descent attitudes, and pilot preoccupation with cockpit duties are some factors that increase the hazardous accident potential near the airport. The situation is further compounded when the weather is marginal, that is, just meeting VFR requirements. Pilots must be particularly alert when operating in the vicinity of an airport. This section defines some rules, practices, and procedures that pilots should be familiar with and adhere to for safe airport operations.

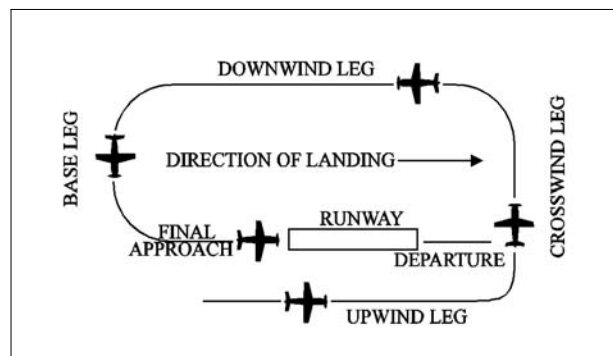
### 4-3-2. Airports with an Operating Control Tower

a. When operating at an airport where traffic control is being exercised by a control tower, pilots are required to maintain two-way radio contact with the tower while operating within the Class B, Class C, and Class D surface area unless the tower authorizes otherwise. Initial callup should be made about 15 miles from the airport. Unless there is a good reason to leave the tower frequency before exiting the Class B, Class C, and Class D surface areas, it is a good operating practice to remain on the tower frequency for the purpose of receiving traffic information. In the interest of reducing tower frequency congestion, pilots are reminded that it is not necessary to request permission to leave the tower frequency once outside of Class B, Class C, and Class D surface areas. Not all airports with an operating control tower will have Class D airspace. These airports do not have weather reporting which is a requirement for surface based controlled airspace, previously known as a control zone. The controlled airspace over these airports will normally begin at 700 feet or 1,200 feet above ground level and can be determined from the visual aeronautical charts. Pilots are expected to use good operating practices and communicate with the control tower as described in this section.

b. When necessary, the tower controller will issue clearances or other information for aircraft to generally follow the desired flight path (traffic patterns) when flying in Class B, Class C, and Class D surface areas and the proper taxi routes when operating on the ground. If not otherwise authorized

or directed by the tower, pilots of fixed-wing aircraft approaching to land must circle the airport to the left. Pilots approaching to land in a helicopter must avoid the flow of fixed-wing traffic. However, in all instances, an appropriate clearance must be received from the tower before landing.

FIG 4-3-1  
Components of a Traffic Pattern



**NOTE-**

*This diagram is intended only to illustrate terminology used in identifying various components of a traffic pattern. It should not be used as a reference or guide on how to enter a traffic pattern.*

c. The following terminology for the various components of a traffic pattern has been adopted as standard for use by control towers and pilots (See FIG 4-3-1):

1. **Upwind leg.** A flight path parallel to the landing runway in the direction of landing.
2. **Crosswind leg.** A flight path at right angles to the landing runway off its takeoff end.
3. **Downwind leg.** A flight path parallel to the landing runway in the opposite direction of landing.
4. **Base leg.** A flight path at right angles to the landing runway off its approach end and extending from the downwind leg to the intersection of the extended runway centerline.
5. **Final approach.** A flight path in the direction of landing along the extended runway centerline from the base leg to the runway.
6. **Departure.** The flight path which begins after takeoff and continues straight ahead along the extended runway centerline. The departure climb continues until reaching a point at least  $\frac{1}{2}$  mile

beyond the departure end of the runway and within 300 feet of the traffic pattern altitude.

**d.** Many towers are equipped with a tower radar display. The radar uses are intended to enhance the effectiveness and efficiency of the local control, or tower, position. They are not intended to provide radar services or benefits to pilots except as they may accrue through a more efficient tower operation. The four basic uses are:

**1. To determine an aircraft's exact location.**

This is accomplished by radar identifying the VFR aircraft through any of the techniques available to a radar position, such as having the aircraft *squawk ident*. Once identified, the aircraft's position and spatial relationship to other aircraft can be quickly determined, and standard instructions regarding VFR operation in Class B, Class C, and Class D surface areas will be issued. Once initial radar identification of a VFR aircraft has been established and the appropriate instructions have been issued, radar monitoring may be discontinued; the reason being that the local controller's primary means of surveillance in VFR conditions is visually scanning the airport and local area.

**2. To provide radar traffic advisories.** Radar traffic advisories may be provided to the extent that the local controller is able to monitor the radar display. Local control has primary control responsibilities to the aircraft operating on the runways, which will normally supersede radar monitoring duties.

**3. To provide a direction or suggested heading.** The local controller may provide pilots flying VFR with generalized instructions which will facilitate operations; e.g., "PROCEED SOUTH-WESTBOUND, ENTER A RIGHT DOWNWIND RUNWAY THREE ZERO," or provide a suggested heading to establish radar identification or as an advisory aid to navigation; e.g., "SUGGESTED HEADING TWO TWO ZERO, FOR RADAR IDENTIFICATION." In both cases, the instructions are advisory aids to the pilot flying VFR and are not radar vectors.

**NOTE—**

*Pilots have complete discretion regarding acceptance of the suggested headings or directions and have sole responsibility for seeing and avoiding other aircraft.*

**4. To provide information and instructions to aircraft operating within Class B, Class C, and**

**Class D surface areas.** In an example of this situation, the local controller would use the radar to advise a pilot on an extended downwind when to turn base leg.

**NOTE—**

*The above tower radar applications are intended to augment the standard functions of the local control position. There is no controller requirement to maintain constant radar identification. In fact, such a requirement could compromise the local controller's ability to visually scan the airport and local area to meet FAA responsibilities to the aircraft operating on the runways and within the Class B, Class C, and Class D surface areas. Normally, pilots will not be advised of being in radar contact since that continued status cannot be guaranteed and since the purpose of the radar identification is not to establish a link for the provision of radar services.*

**e.** A few of the radar equipped towers are authorized to use the radar to ensure separation between aircraft in specific situations, while still others may function as limited radar approach controls. The various radar uses are strictly a function of FAA operational need. The facilities may be indistinguishable to pilots since they are all referred to as tower and no publication lists the degree of radar use. Therefore, when in communication with a tower controller who may have radar available, do not assume that constant radar monitoring and complete ATC radar services are being provided.

**4-3-3. Traffic Patterns**

**a.** It is recommended that aircraft enter the airport traffic pattern at one of the following altitudes listed below. These altitudes should be maintained unless another traffic pattern altitude is published in the Chart Supplement U.S. or unless otherwise required by the applicable distance from cloud criteria (14 CFR Section 91.155). (See FIG 4-3-2 and FIG 4-3-3):

**1.** Propeller-driven aircraft enter the traffic pattern at 1,000 feet above ground level (AGL).

**2.** Large and turbine-powered aircraft enter the traffic pattern at an altitude of not less than 1,500 feet AGL or 500 feet above the established pattern altitude.

**3.** Helicopters operating in the traffic pattern may fly a pattern similar to the fixed-wing aircraft pattern, but at a lower altitude (500 AGL) and closer to the runway. This pattern may be on the opposite side of the runway from fixed-wing traffic when

airspeed requires or for practice power-off landings (autorotation) and if local policy permits. Landings not to the runway must avoid the flow of fixed wing traffic.

**b.** A pilot may vary the size of the traffic pattern depending on the aircraft's performance characteristics. Pilots of en route aircraft should be constantly alert for aircraft in traffic patterns and avoid these areas whenever possible.

**c.** Unless otherwise indicated, all turns in the traffic pattern must be made to the left, except for helicopters, as applicable.

**d.** On Sectional, Aeronautical, and VFR Terminal Area Charts, right traffic patterns are indicated at public-use and joint-use airports with the abbreviation "RP" (for Right Pattern), followed by the appropriate runway number(s) at the bottom of the airport data block.

**EXAMPLE-**

*RP 9, 18, 22R*

**NOTE-**

**1.** *Pilots are encouraged to use the standard traffic pattern. However, those pilots who choose to execute a straight-in approach, maneuvering for and execution of the approach should not disrupt the flow of arriving and departing traffic. Likewise, pilots operating in the traffic pattern should be alert at all times for aircraft executing straight-in approaches.*

**REFERENCE-**

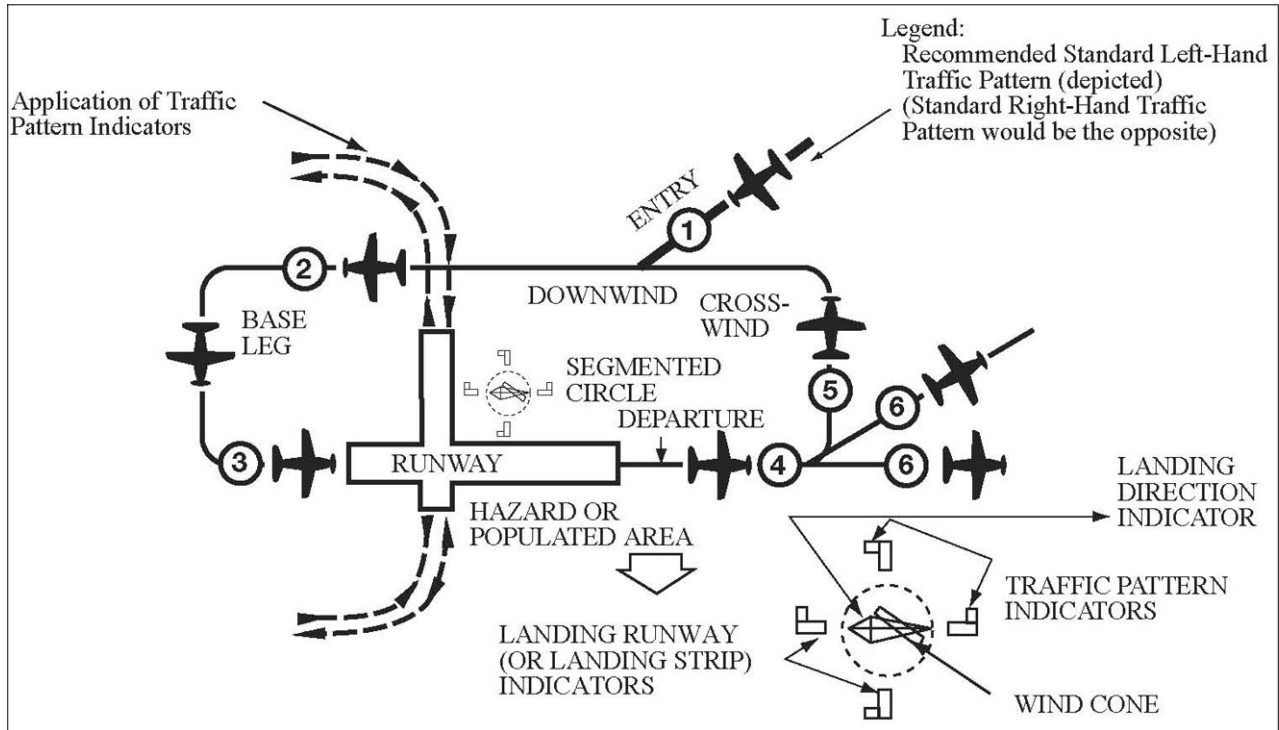
*AC 90-66, Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers*

**2.** *RP\* indicates special conditions exist and refers pilots to the Chart Supplement U.S.*

**3.** *Right traffic patterns are not shown at airports with full-time control towers.*

**e.** Wind conditions affect all airplanes in varying degrees. Figure 4-3-4 is an example of a chart used to determine the headwind, crosswind, and tailwind components based on wind direction and velocity relative to the runway. Pilots should refer to similar information provided by the aircraft manufacturer when determining these wind components.

**FIG 4-3-2**  
**Traffic Pattern Operations**  
**Single Runway**



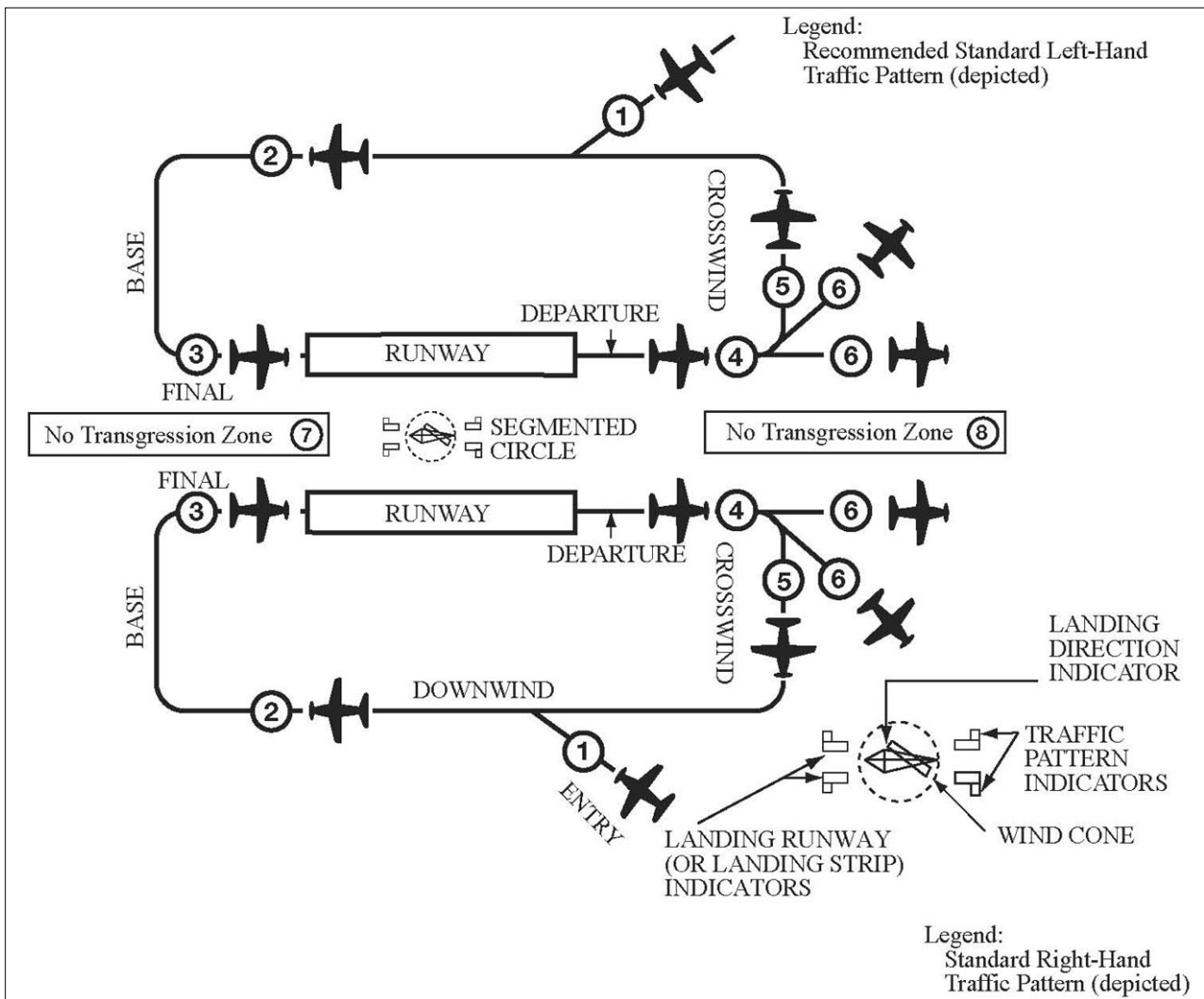
**EXAMPLE—**  
**Key to traffic pattern operations**

1. Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude.
2. Maintain pattern altitude until abeam approach end of the landing runway on downwind leg.
3. Complete turn to final at least  $\frac{1}{4}$  mile from the runway.
4. Continue straight ahead until beyond departure end of

runway.

5. If remaining in the traffic pattern, commence turn to crosswind leg beyond the departure end of the runway within 300 feet of pattern altitude.
6. If departing the traffic pattern, continue straight out, or exit with a 45 degree turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure end of the runway, after reaching pattern altitude.

**FIG 4-3-3  
Traffic Pattern Operations  
Parallel Runways**



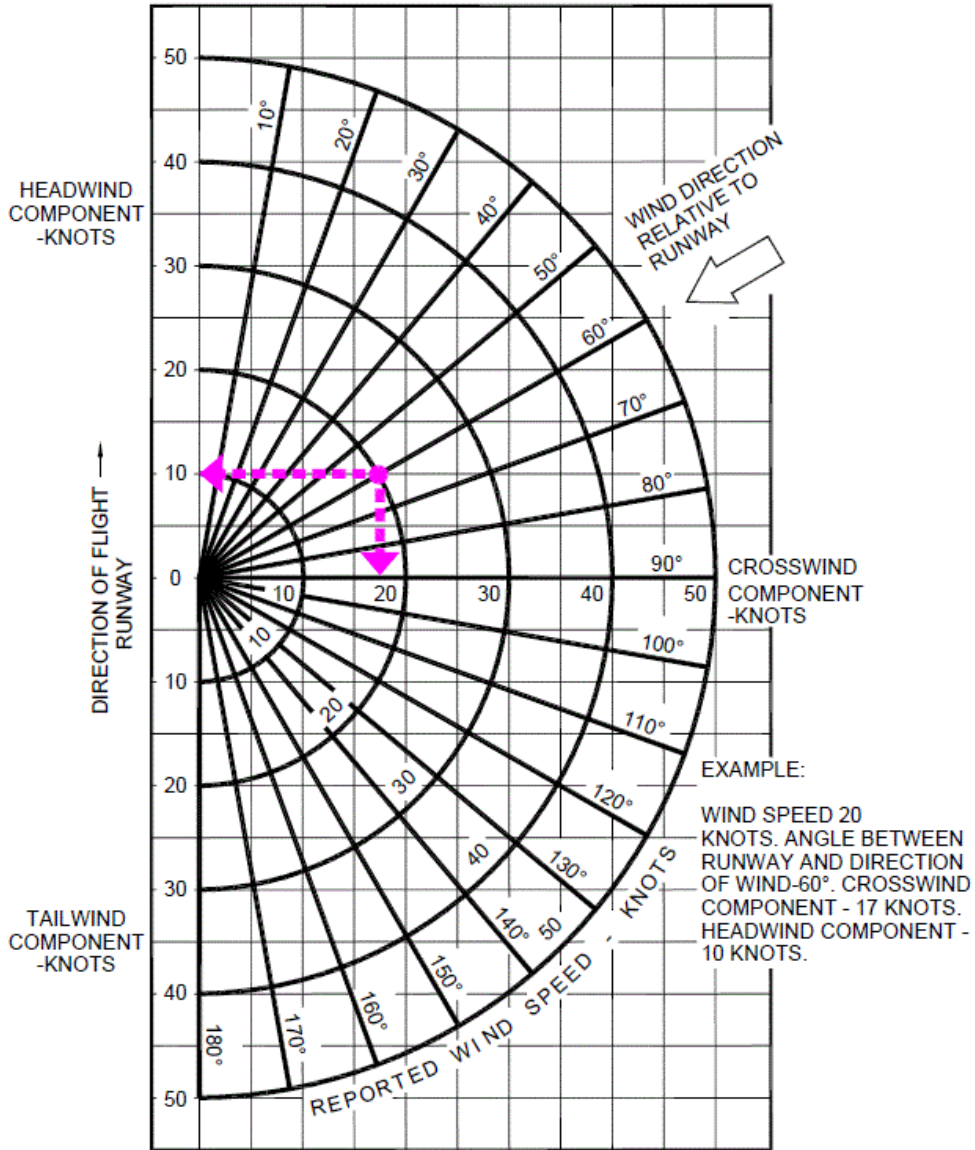
**EXAMPLE—  
Key to traffic pattern operations**

1. Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude.
2. Maintain pattern altitude until abeam approach end of the landing runway on downwind leg.
3. Complete turn to final at least 1/4 mile from the runway.
4. Continue straight ahead until beyond departure end of runway.
5. If remaining in the traffic pattern, commence turn to

crosswind leg beyond the departure end of the runway within 300 feet of pattern altitude.

6. If departing the traffic pattern, continue straight out, or exit with a 45 degree turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure end of the runway, after reaching pattern altitude.
7. Do not overshoot final or continue on a track which will penetrate the final approach of the parallel runway.
8. Do not continue on a track which will penetrate the departure path of the parallel runway.

FIG 4-3-4  
Headwind/Tailwind/Crosswind Component Calculator



#### 4-3-4. Visual Indicators at Airports Without an Operating Control Tower

a. At those airports *without an operating control tower*, a segmented circle visual indicator system, if installed, is designed to provide traffic pattern information.

**REFERENCE-**  
AIM, Paragraph 4-1-9, *Traffic Advisory Practices at Airports Without Operating Control Towers*

b. The segmented circle system consists of the following components:

**1. The segmented circle.** Located in a position affording maximum visibility to pilots in the air and on the ground and providing a centralized location for other elements of the system.

**2. The wind direction indicator.** A wind cone, wind sock, or wind tee installed near the operational runway to indicate wind direction. The large end of the wind cone/wind sock points into the wind as does the large end (cross bar) of the wind tee. In lieu of a tetrahedron and where a wind sock or wind cone is collocated with a wind tee, the wind tee may be manually aligned with the runway in use to indicate landing direction. These signaling devices may be located in the center of the segmented circle and may be lighted for night use. Pilots are cautioned against using a tetrahedron to indicate wind direction.

**3. The landing direction indicator.** A tetrahedron is installed when conditions at the airport warrant its use. It may be used to indicate the direction of landings and takeoffs. A tetrahedron may be located at the center of a segmented circle and may be lighted for night operations. The small end of the tetrahedron points in the direction of landing. Pilots are cautioned against using a tetrahedron for any purpose other than as an indicator of landing direction. Further, pilots should use extreme caution when making runway selection by use of a tetrahedron in very light or calm wind conditions as the tetrahedron may not be aligned with the designated calm-wind runway. At airports with control towers, the tetrahedron should only be referenced when the control tower is not in operation. Tower instructions supersede tetrahedron indications.

**4. Landing strip indicators.** Installed in pairs as shown in the segmented circle diagram and used to show the alignment of landing strips.

**5. Traffic pattern indicators.** Arranged in pairs in conjunction with landing strip indicators and used to indicate the direction of turns when there is a variation from the normal left traffic pattern. (If there is no segmented circle installed at the airport, traffic pattern indicators may be installed on or near the end of the runway.)

c. Preparatory to landing at an airport without a control tower, or when the control tower is not in operation, pilots should concern themselves with the indicator for the approach end of the runway to be used. When approaching for landing, all turns must be made to the left unless a traffic pattern indicator indicates that turns should be made to the right. If the pilot will mentally enlarge the indicator for the runway to be used, the base and final approach legs of the traffic pattern to be flown immediately become apparent. Similar treatment of the indicator at the departure end of the runway will clearly indicate the direction of turn after takeoff.

d. When two or more aircraft are approaching an airport for the purpose of landing, the pilot of the aircraft at the lower altitude has the right-of-way over the pilot of the aircraft at the higher altitude. However, the pilot operating at the lower altitude should not take advantage of another aircraft, which is on final approach to land, by cutting in front of, or overtaking that aircraft.

#### 4-3-5. Unexpected Maneuvers in the Airport Traffic Pattern

There have been several incidents in the vicinity of controlled airports that were caused primarily by aircraft executing unexpected maneuvers. ATC service is based upon observed or known traffic and airport conditions. Controllers establish the sequence of arriving and departing aircraft by requiring them to adjust flight as necessary to achieve proper spacing. These adjustments can only be based on observed traffic, accurate pilot reports, and anticipated aircraft maneuvers. Pilots are expected to cooperate so as to preclude disrupting traffic flows or creating conflicting patterns. The pilot-in-command of an aircraft is directly responsible for and is the final authority as to the operation of the aircraft. On occasion it may be necessary for pilots to maneuver their aircraft to maintain spacing with the traffic they have been sequenced to follow. The controller can anticipate minor maneuvering such as shallow "S" turns. The controller cannot, however, anticipate a

major maneuver such as a 360 degree turn. If a pilot makes a 360 degree turn after obtaining a landing sequence, the result is usually a gap in the landing interval and, more importantly, it causes a chain reaction which may result in a conflict with following traffic and an interruption of the sequence established by the tower or approach controller. Should a pilot decide to make maneuvering turns to maintain spacing behind a preceding aircraft, the pilot should always advise the controller if at all possible. Except when requested by the controller or in emergency situations, a 360 degree turn should never be executed in the traffic pattern or when receiving radar service without first advising the controller.

#### 4-3-6. Use of Runways/Declared Distances

**a.** Runways are identified by numbers which indicate the nearest 10-degree increment of the azimuth of the runway centerline. For example, where the magnetic azimuth is 183 degrees, the runway designation would be 18; for a magnetic azimuth of 87 degrees, the runway designation would be 9. For a magnetic azimuth ending in the number 5, such as 185, the runway designation could be either 18 or 19. Wind direction issued by the tower is also magnetic and wind velocity is in knots.

**b.** Airport proprietors are responsible for taking the lead in local aviation noise control. Accordingly, they may propose specific noise abatement plans to the FAA. If approved, these plans are applied in the form of Formal or Informal Runway Use Programs for noise abatement purposes.

#### REFERENCE-

*Pilot/Controller Glossary Term- Runway Use Program*

**1.** At airports where no runway use program is established, ATC clearances may specify:

**(a)** The runway most nearly aligned with the wind when it is 5 knots or more;

**(b)** The “calm wind” runway when wind is less than 5 knots; or

**(c)** Another runway if operationally advantageous.

#### NOTE-

*It is not necessary for a controller to specifically inquire if the pilot will use a specific runway or to offer a choice of runways. If a pilot prefers to use a different runway from that specified, or the one most nearly aligned with the wind, the pilot is expected to inform ATC accordingly.*

**2.** At airports where a runway use program is established, ATC will assign runways deemed to have the least noise impact. If in the interest of safety a runway different from that specified is preferred, the pilot is expected to advise ATC accordingly. ATC will honor such requests and advise pilots when the requested runway is noise sensitive. When use of a runway other than the one assigned is requested, pilot cooperation is encouraged to preclude disruption of traffic flows or the creation of conflicting patterns.

#### c. Declared Distances.

**1.** Declared distances for a runway represent the maximum distances available and suitable for meeting takeoff and landing distance performance requirements. These distances are determined in accordance with FAA runway design standards by adding to the physical length of paved runway any clearway or stopway and subtracting from that sum any lengths necessary to obtain the standard runway safety areas, runway object free areas, or runway protection zones. As a result of these additions and subtractions, the declared distances for a runway may be more or less than the physical length of the runway as depicted on aeronautical charts and related publications, or available in electronic navigation databases provided by either the U.S. Government or commercial companies.

**2.** All 14 CFR Part 139 airports report declared distances for each runway. Other airports may also report declared distances for a runway if necessary to meet runway design standards or to indicate the presence of a clearway or stopway. Where reported, declared distances for each runway end are published in the Chart Supplement U.S. For runways without published declared distances, the declared distances may be assumed to be equal to the physical length of the runway unless there is a displaced landing threshold, in which case the Landing Distance Available (LDA) is shortened by the amount of the threshold displacement.

#### NOTE-

*A symbol **D** is shown on U.S. Government charts to indicate that runway declared distance information is available (See appropriate Chart Supplement U.S., Chart Supplement Alaska or Pacific).*

**(a)** The FAA uses the following definitions for runway declared distances (See FIG 4-3-5):

#### REFERENCE-

*Pilot/Controller Glossary Terms: “Accelerate-Stop Distance Available,” “Landing Distance Available,” “Takeoff Distance Available,” “Takeoff Run Available,” “Stopway,” and “Clearway.”*



**(1) Takeoff Run Available (TORA)** – The runway length declared available and suitable for the ground run of an airplane taking off.

The TORA is typically the physical length of the runway, but it may be shorter than the runway length if necessary to satisfy runway design standards. For example, the TORA may be shorter than the runway length if a portion of the runway must be used to satisfy runway protection zone requirements.

**(2) Takeoff Distance Available (TODA)** – The takeoff run available plus the length of any remaining runway or clearway beyond the far end of the takeoff run available.

The TODA is the distance declared available for satisfying takeoff distance requirements for airplanes where the certification and operating rules and available performance data allow for the consideration of a clearway in takeoff performance computations.

**NOTE–**

*The length of any available clearway will be included in the TODA published in the entry for that runway end within the Chart Supplement U.S.*

**(3) Accelerate–Stop Distance Available (ASDA)** – The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.

The ASDA may be longer than the physical length of the runway when a stopway has been designated available by the airport operator, or it may be shorter than the physical length of the runway if necessary to use a portion of the runway to satisfy runway design standards; for example, where the airport operator uses a portion of the runway to achieve the runway safety area requirement. ASDA is the distance used to satisfy the airplane accelerate–stop distance performance requirements where the certification and operating rules require accelerate–stop distance computations.

**NOTE–**

*The length of any available stopway will be included in the ASDA published in the entry for that runway end within the Chart Supplement U.S.*

**(4) Landing Distance Available (LDA)** – The runway length declared available and suitable for a landing airplane.

The LDA may be less than the physical length of the runway or the length of the runway remaining beyond a displaced threshold if necessary to satisfy runway design standards; for example, where the airport operator uses a portion of the runway to achieve the runway safety area requirement.

Although some runway elements (such as stopway length and clearway length) may be available information, pilots must use the declared distances determined by the airport operator and not attempt to independently calculate declared distances by adding those elements to the reported physical length of the runway.

**(b)** The airplane operating rules and/or the airplane operating limitations establish minimum distance requirements for takeoff and landing and are based on performance data supplied in the Airplane Flight Manual or Pilot’s Operating Handbook. The minimum distances required for takeoff and landing obtained either in planning prior to takeoff or in performance assessments conducted at the time of landing must fall within the applicable declared distances before the pilot can accept that runway for takeoff or landing.

**(c)** Runway design standards may impose restrictions on the amount of runway available for use in takeoff and landing that are not apparent from the reported physical length of the runway or from runway markings and lighting. The runway elements of Runway Safety Area (RSA), Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) may reduce a runway’s declared distances to less than the physical length of the runway at geographically constrained airports (See FIG 4–3–6). When considering the amount of runway available for use in takeoff or landing performance calculations, the declared distances published for a runway must always be used in lieu of the runway’s physical length.

**REFERENCE–**

*AC 150/5300–13, Airport Design*

**(d)** While some runway elements associated with declared distances may be identifiable through runway markings or lighting (for example, a displaced threshold or a stopway), the individual declared distance limits are not marked or otherwise identified on the runway. An aircraft is not prohibited from operating beyond a declared distance limit during the takeoff, landing, or taxi operation

provided the runway surface is appropriately marked as usable runway (See FIG 4-3-6). The following examples clarify the intent of this paragraph.

**REFERENCE-**

AIM, Paragraph 2-3-3, Runway Markings  
AC 150/5340-1, Standards for Airport Markings

**EXAMPLE-**

**1.** *The declared LDA for runway 9 must be used when showing compliance with the landing distance requirements of the applicable airplane operating rules and/or airplane operating limitations or when making a before landing performance assessment. The LDA is less than the physical runway length, not only because of the displaced*

*threshold, but also because of the subtractions necessary to meet the RSA beyond the far end of the runway. However, during the actual landing operation, it is permissible for the airplane to roll beyond the unmarked end of the LDA.*

**2.** *The declared ASDA for runway 9 must be used when showing compliance with the accelerate-stop distance requirements of the applicable airplane operating rules and/or airplane operating limitations. The ASDA is less than the physical length of the runway due to subtractions necessary to achieve the full RSA requirement. However, in the event of an aborted takeoff, it is permissible for the airplane to roll beyond the unmarked end of the ASDA as it is brought to a full-stop on the remaining usable runway.*

FIG 4-3-5

**Declared Distances with Full-Standard Runway Safety Areas, Runway Object Free Areas, and Runway Protection Zones**

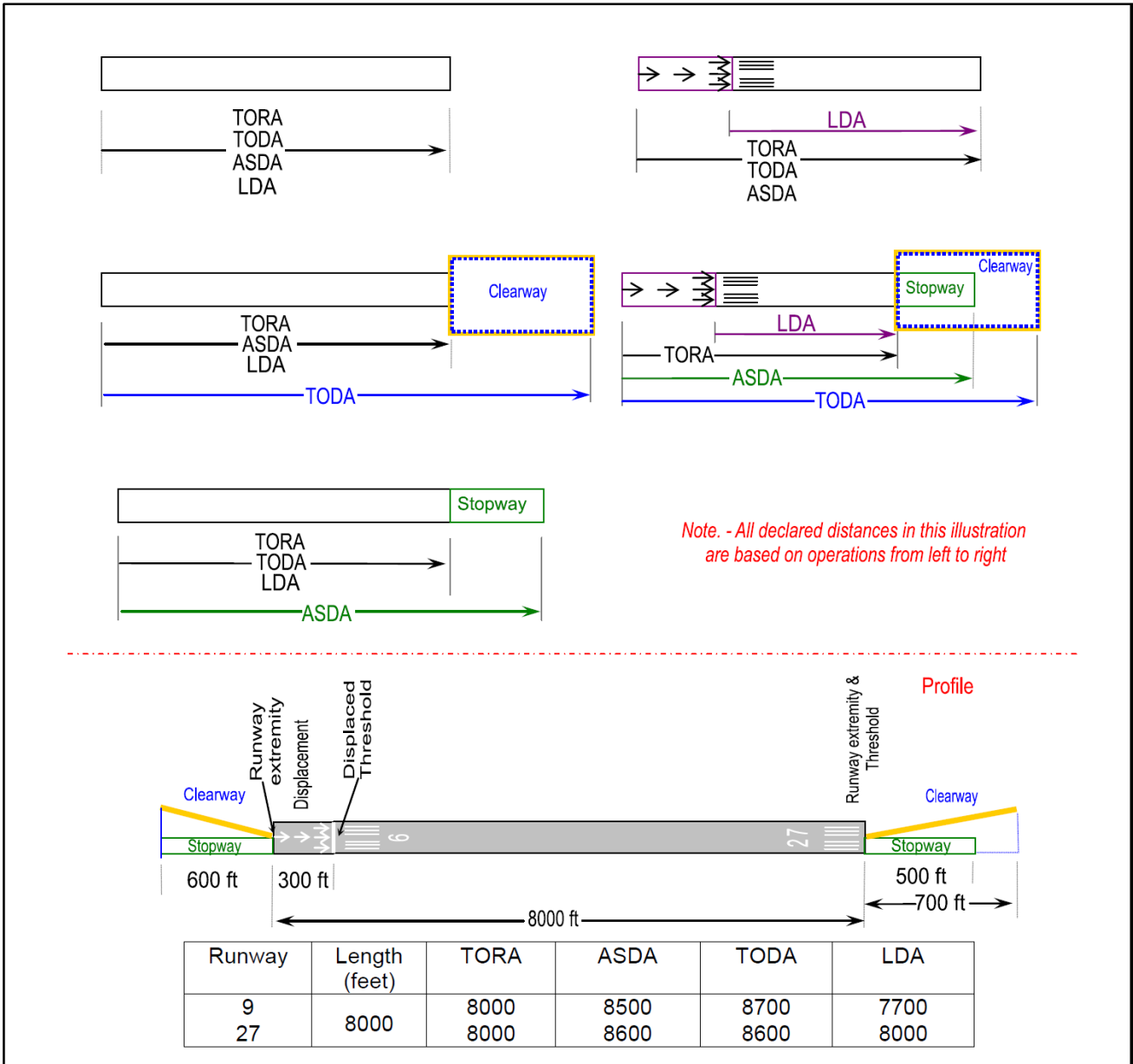
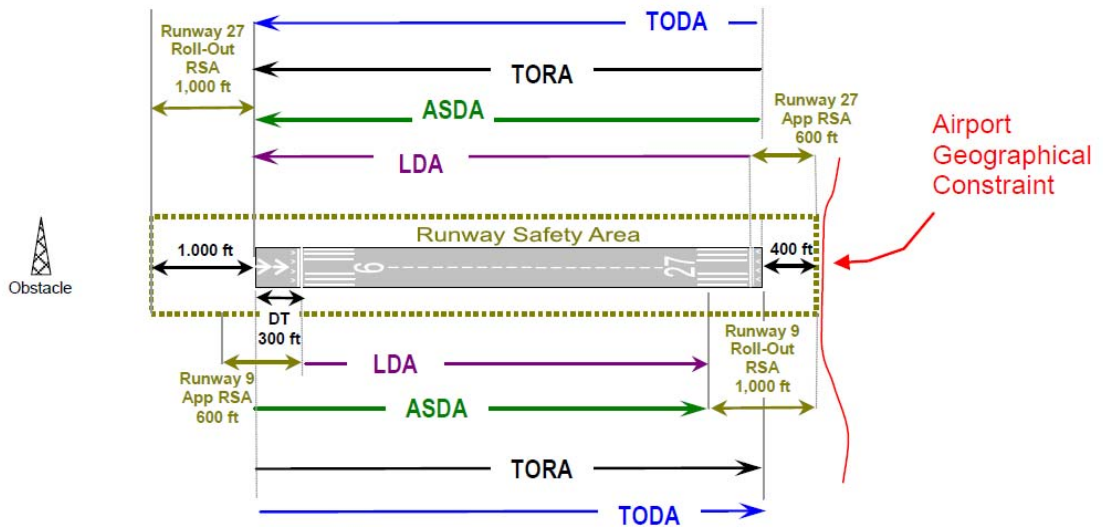


FIG 4-3-6

Effects of a Geographical Constraint on a Runway's Declared Distances

**Runway 27 operations:** Runway 27 threshold displaced to provide the required RSA at the approach end of the runway. As a result, the LDA is reduced 200 ft.



**Runway 9 operations:** The ASDA is reduced by 600 ft to achieve the required RSA at the roll-out end of the runway. The LDA is reduced by 900 ft because, 1) the 300 ft displaced threshold located at the approach end of the runway (due to an approach obstacle), and 2) as result of the 600 ft of runway needed to achieve the required RSA at the roll-out end of the runway.

Runway	Length (feet)	TORA	TODA	ASDA	LDA
9	8000	8000	8000	7400	7100
27		8000	8000	8000	7800

**NOTE-**

A runway's RSA begins a set distance prior to the threshold and will extend a set distance beyond the end of the runway depending on the runway's design criteria. If these required lengths cannot be achieved, the ASDA and/or LDA will be reduced as necessary to obtain the required lengths to the extent practicable.

#### 4-3-7. Low Level Wind Shear/Microburst Detection Systems

Low Level Wind Shear Alert System (LLWAS), Terminal Doppler Weather Radar (TDWR), Weather System Processor (WSP), and Integrated Terminal Weather System (ITWS) display information on hazardous wind shear and microburst activity in the vicinity of an airport to air traffic controllers who relay this information to pilots.

a. LLWAS provides wind shear alert and gust front information but does not provide microburst alerts. The LLWAS is designed to detect low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation. Controllers will provide this information to pilots by giving the pilot the airport wind followed by the boundary wind.

**EXAMPLE-**

*Wind shear alert, airport wind 230 at 8, south boundary wind 170 at 20.*

b. LLWAS “network expansion,” (LLWAS NE) and LLWAS Relocation/Sustainment (LLWAS-RS) are systems integrated with TDWR. These systems provide the capability of detecting microburst alerts and wind shear alerts. Controllers will issue the appropriate wind shear alerts or microburst alerts. In some of these systems controllers also have the ability to issue wind information oriented to the threshold or departure end of the runway.

**EXAMPLE-**

*Runway 17 arrival microburst alert, 40 knot loss 3 mile final.*

**REFERENCE-**

*AIM, Paragraph 7-1-26, Microbursts*

c. More advanced systems are in the field or being developed such as ITWS. ITWS provides alerts for microbursts, wind shear, and significant thunderstorm activity. ITWS displays wind information oriented to the threshold or departure end of the runway.

d. The WSP provides weather processor enhancements to selected Airport Surveillance Radar (ASR)-9 facilities. The WSP provides Air Traffic with detection and alerting of hazardous weather such as wind shear, microbursts, and significant thunderstorm activity. The WSP displays terminal area 6 level weather, storm cell locations and movement, as well as the location and predicted future position

and intensity of wind shifts that may affect airport operations. Controllers will receive and issue alerts based on Areas Noted for Attention (ARENA). An ARENA extends on the runway center line from a 3 mile final to the runway to a 2 mile departure.

e. An airport equipped with the LLWAS, ITWS, or WSP is so indicated in the Chart Supplement U.S. under Weather Data Sources for that particular airport.

#### 4-3-8. Braking Action Reports and Advisories

a. When available, ATC furnishes pilots the quality of braking action received from pilots. The quality of braking action is described by the terms “good,” “good to medium,” “medium,” “medium to poor,” “poor,” and “nil.” When pilots report the quality of braking action by using the terms noted above, they should use descriptive terms that are easily understood, such as, “braking action poor the first/last half of the runway,” together with the particular type of aircraft.

b. FICON NOTAMs will provide contaminant measurements for paved runways; however, a FICON NOTAM for braking action will only be used for non-paved runway surfaces, taxiways, and aprons. These NOTAMs are classified according to the most critical term (“good to medium,” “medium,” “medium to poor,” and “poor”).

1. FICON NOTAM reporting of a braking condition for paved runway surfaces is not permissible by Federally Obligated Airports or those airports certificated under 14 CFR Part 139.

2. A “NIL” braking condition at these airports must be mitigated by closure of the affected surface. Do not include the type of vehicle in the FICON NOTAM.

c. When tower controllers receive runway braking action reports which include the terms medium, poor, or nil, or whenever weather conditions are conducive to deteriorating or rapidly changing runway braking conditions, the tower will include on the ATIS broadcast the statement, “**BRAKING ACTION ADVISORIES ARE IN EFFECT.**”

d. During the time that braking action advisories are in effect, ATC will issue the most recent braking action report for the runway in use to each arriving and departing aircraft. Pilots should be prepared for

deteriorating braking conditions and should request current runway condition information if not issued by controllers. Pilots should also be prepared to provide a descriptive runway condition report to controllers after landing.

#### 4-3-9. Runway Condition Reports

**a.** Aircraft braking coefficient is dependent upon the surface friction between the tires on the aircraft wheels and the pavement surface. Less friction means less aircraft braking coefficient and less aircraft braking response.

**b.** Runway condition code (RwyCC) values range from 1 (poor) to 6 (dry). For frozen contaminants on runway surfaces, a runway condition code reading of 4 indicates the level when braking deceleration or directional control is between good and medium.

**NOTE-**

*A RwyCC of “0” is used to delineate a braking action report of NIL and is prohibited from being reported in a FICON NOTAM.*

**c.** Airport management should conduct runway condition assessments on wet runways or runways covered with compacted snow and/or ice.

**1.** Numerical readings may be obtained by using the Runway Condition Assessment Matrix (RCAM). The RCAM provides the airport operator with data to complete the report that includes the following:

- (a) Runway(s) in use
- (b) Time of the assessment
- (c) Runway condition codes for each zone (touchdown, mid-point, roll-out)

(d) Pilot-reported braking action report (if available)

(e) The contaminant (for example, wet snow, dry snow, slush, ice, etc.)

**2.** Assessments for each zone (see 4-3-9c1(c)) will be issued in the direction of takeoff and landing on the runway, ranging from “1” to “6” to describe contaminated surfaces.

**NOTE-**

*A RwyCC of “0” is used to delineate a braking action report of NIL and is prohibited from being reported in a FICON NOTAM.*

**3.** When any 1 or more runway condition codes are reported as less than 6, airport management must notify ATC for dissemination to pilots.

**4.** Controllers will not issue runway condition codes when all 3 segments of a runway are reporting values of 6.

**d.** When runway condition code reports are provided by airport management, the ATC facility providing approach control or local airport advisory must provide the report to all pilots.

**e.** Pilots should use runway condition code information with other knowledge including aircraft performance characteristics, type, and weight, previous experience, wind conditions, and aircraft tire type (such as bias ply vs. radial constructed) to determine runway suitability.

**f.** The Runway Condition Assessment Matrix identifies the descriptive terms “good,” “good to medium,” “medium,” “medium to poor,” “poor,” and “nil” used in braking action reports.

**REFERENCE-**

*Advisory Circular AC 91-79A (Revision 1), Mitigating the Risks of a Runway Overrun Upon Landing, Appendix 1*

**FIG 4-3-7  
Runway Condition Assessment Matrix (RCAM)**

Assessment Criteria		Control/Braking Assessment Criteria	
Runway Condition Description	RwyCC	Deceleration or Directional Control Observation	Pilot Reported Braking Action
<ul style="list-style-type: none"> <li>Dry</li> </ul>	6	---	---
<ul style="list-style-type: none"> <li>Frost</li> <li>Wet (Includes damp and 1/8 inch depth or less of water)</li> </ul> <p><b>1/8 inch (3mm) depth or less of:</b></p> <ul style="list-style-type: none"> <li>Slush</li> <li>Dry Snow</li> <li>Wet Snow</li> </ul>	5	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
<p><b>-15°C and Colder outside air temperature:</b></p> <ul style="list-style-type: none"> <li>Compacted Snow</li> </ul>	4	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
<ul style="list-style-type: none"> <li>Slippery When Wet (wet runway)</li> <li>Dry Snow or Wet Snow (any depth) over Compacted Snow</li> </ul> <p><b>Greater than 1/8 inch (3 mm) depth of:</b></p> <ul style="list-style-type: none"> <li>Dry Snow</li> <li>Wet Snow</li> </ul> <p><b>Warmer than -15°C outside air temperature:</b></p> <ul style="list-style-type: none"> <li>Compacted Snow</li> </ul>	3	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
<p><b>Greater than 1/8 inch(3 mm) depth of:</b></p> <ul style="list-style-type: none"> <li>Water</li> <li>Slush</li> </ul>	2	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
<ul style="list-style-type: none"> <li>Ice</li> </ul>	1	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
<ul style="list-style-type: none"> <li>Wet Ice</li> <li>Slush over Ice</li> <li>Water over Compacted Snow</li> <li>Dry Snow or Wet Snow over Ice</li> </ul>	0	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

#### 4-3-10. Intersection Takeoffs

a. In order to enhance airport capacities, reduce taxiing distances, minimize departure delays, and provide for more efficient movement of air traffic, controllers may initiate intersection takeoffs as well as approve them when the pilot requests. If for ANY reason a pilot prefers to use a different intersection or the full length of the runway or desires to obtain the distance between the intersection and the runway end, **THE PILOT IS EXPECTED TO INFORM ATC ACCORDINGLY.**

b. Pilots are expected to assess the suitability of an intersection for use at takeoff during their preflight planning. They must consider the resultant length reduction to the published runway length and to the published declared distances from the intersection intended to be used for takeoff. The minimum runway required for takeoff must fall within the reduced runway length and the reduced declared distances before the intersection can be accepted for takeoff.

**REFERENCE-**

*AIM, Paragraph 4-3-6, Use of Runways/Declared Distances*

c. Controllers will issue the measured distance from the intersection to the runway end rounded “down” to the nearest 50 feet to any pilot who requests and to all military aircraft, unless use of the intersection is covered in appropriate directives. Controllers, however, will not be able to inform pilots of the distance from the intersection to the end of any of the published declared distances.

**REFERENCE-**

*FAA Order JO 7110.65, Paragraph 3-7-1, Ground Traffic Movement*

d. An aircraft is expected to taxi to (but not onto) the end of the assigned runway unless prior approval for an intersection departure is received from ground control.

e. Pilots should state their position on the airport when calling the tower for takeoff from a runway intersection.

**EXAMPLE-**

*Cleveland Tower, Apache Three Seven Two Two Papa, at the intersection of taxiway Oscar and runway two three right, ready for departure.*

f. Controllers are required to separate small aircraft that are departing from an intersection on the same runway (same or opposite direction) behind a large nonheavy aircraft (except B757), by ensuring that at least a 3-minute interval exists between the

time the preceding large aircraft has taken off and the succeeding small aircraft begins takeoff roll. The 3-minute separation requirement will also be applied to small aircraft with a maximum certificated takeoff weight of 12,500 pounds or less departing behind a small aircraft with a maximum certificated takeoff weight of more than 12,500 pounds. To inform the pilot of the required 3-minute hold, the controller will state, “Hold for wake turbulence.” If after considering wake turbulence hazards, the pilot feels that a lesser time interval is appropriate, the pilot may request a waiver to the 3-minute interval. To initiate such a request, simply say “Request waiver to 3-minute interval” or a similar statement. Controllers may then issue a takeoff clearance if other traffic permits, since the pilot has accepted the responsibility for wake turbulence separation.

g. The 3-minute interval is not required when the intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction. Controllers may permit the small aircraft to alter course after takeoff to avoid the flight path of the preceding departure.

h. A 4-minute interval is mandatory for small, large, and heavy aircraft behind a super aircraft. The 3-minute interval is mandatory behind a heavy aircraft in all cases, and for small aircraft behind a B757.

#### 4-3-11. Pilot Responsibilities When Conducting Land and Hold Short Operations (LAHSO)

a. LAHSO is an acronym for “Land and Hold Short Operations.” These operations include landing and holding short of an intersecting runway, an intersecting taxiway, or some other designated point on a runway other than an intersecting runway or taxiway. (See FIG 4-3-8, FIG 4-3-9, FIG 4-3-10.)

**b. Pilot Responsibilities and Basic Procedures.**

1. LAHSO is an air traffic control procedure that requires pilot participation to balance the needs for increased airport capacity and system efficiency, consistent with safety. This procedure can be done safely provided pilots and controllers are knowledgeable and understand their responsibilities. The following paragraphs outline specific pilot/operator responsibilities when conducting LAHSO.

2. At controlled airports, air traffic may clear a pilot to land and hold short. Pilots may accept such a

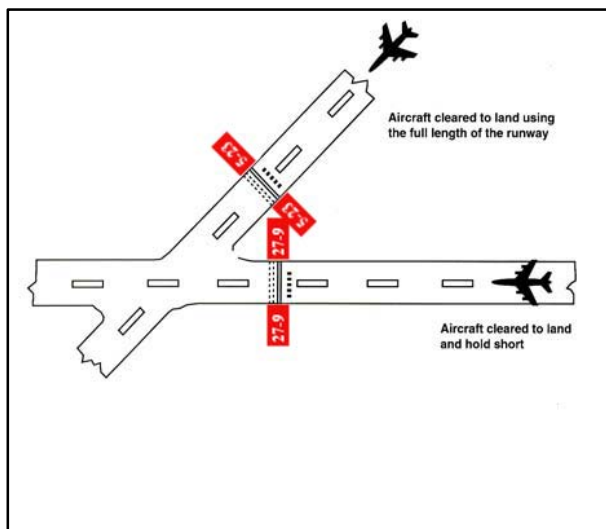


clearance provided that the pilot-in-command determines that the aircraft can safely land and stop within the Available Landing Distance (ALD). ALD data are published in the special notices section of the Chart Supplement U.S. and in the U.S. Terminal Procedures Publications. Controllers will also provide ALD data upon request. Student pilots or pilots not familiar with LAHSO should not participate in the program.

3. The pilot-in-command has the final authority to accept or decline any land and hold short clearance. The safety and operation of the aircraft remain the responsibility of the pilot. Pilots are expected to decline a LAHSO clearance if they determine it will compromise safety.

4. To conduct LAHSO, pilots should become familiar with all available information concerning LAHSO at their destination airport. Pilots should have, *readily available*, the published ALD and runway slope information for all LAHSO runway combinations at each airport of intended landing. Additionally, knowledge about landing performance data permits the pilot to *readily* determine that the ALD for the assigned runway is sufficient for safe LAHSO. As part of a pilot's preflight planning process, pilots should determine if their destination airport has LAHSO. If so, their preflight planning process should include an assessment of which LAHSO combinations would work for them given their aircraft's required landing distance. Good pilot decision making is knowing in advance whether one can accept a LAHSO clearance if offered.

FIG 4-3-8  
Land and Hold Short of an Intersecting Runway



**EXAMPLE-**  
FIG 4-3-10 – holding short at a designated point may be required to avoid conflicts with the runway safety area/flight path of a nearby runway.

**NOTE-**  
Each figure shows the approximate location of LAHSO markings, signage, and in-pavement lighting when installed.

**REFERENCE-**  
AIM, Chapter 2, Aeronautical Lighting and Other Airport Visual Aids.

FIG 4-3-9  
Land and Hold Short of an Intersecting Taxiway

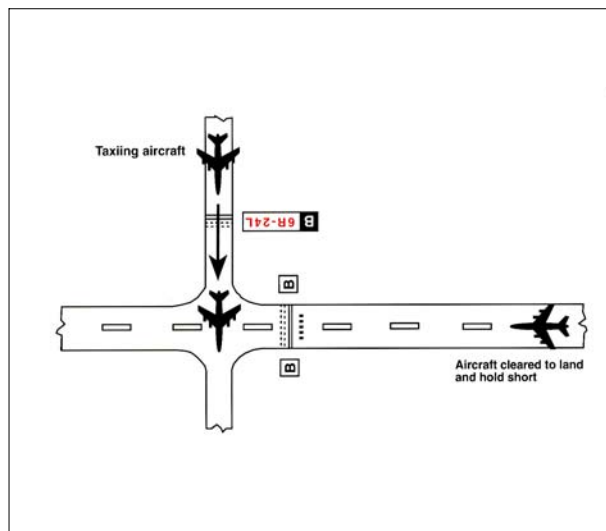
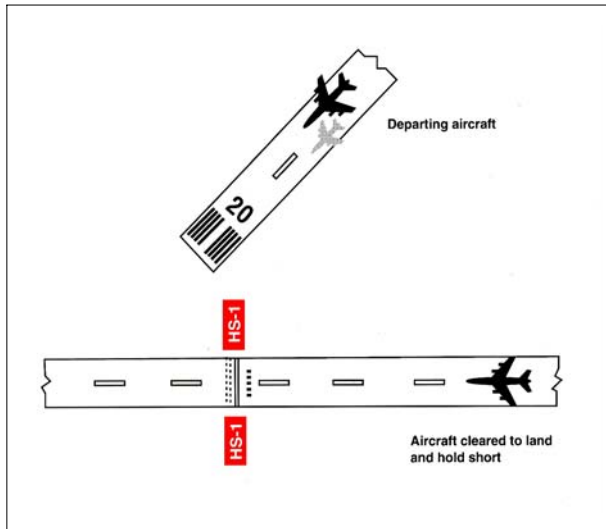


FIG 4-3-10  
**Land and Hold Short of a Designated Point  
 on a Runway Other Than an Intersecting  
 Runway or Taxiway**



5. If, for any reason, such as difficulty in discerning the location of a LAHSO intersection, wind conditions, aircraft condition, etc., the pilot elects to request to land on the full length of the runway, to land on another runway, or to decline LAHSO, a pilot is expected to promptly inform air traffic, ideally even before the clearance is issued. A LAHSO clearance, once accepted, must be adhered to, just as any other ATC clearance, unless an amended clearance is obtained or an emergency occurs. A LAHSO clearance does not preclude a rejected landing.

6. A pilot who accepts a LAHSO clearance should land and exit the runway at the first convenient taxiway (unless directed otherwise) before reaching the hold short point. Otherwise, the pilot must stop and hold at the hold short point. If a rejected landing becomes necessary after accepting a LAHSO clearance, the pilot should maintain safe separation from other aircraft or vehicles, and should promptly notify the controller.

7. Controllers need a full read back of all LAHSO clearances. Pilots should read back their LAHSO clearance and include the words, “HOLD SHORT OF (RUNWAY/TAXIWAY/OR POINT)” in their acknowledgment of all LAHSO clearances. In order to reduce frequency congestion, pilots are encouraged to read back the LAHSO clearance

without prompting. Don’t make the controller have to ask for a read back!

### c. LAHSO Situational Awareness

1. Situational awareness is vital to the success of LAHSO. Situational awareness starts with having current airport information in the cockpit, readily accessible to the pilot. (An airport diagram assists pilots in identifying their location on the airport, thus reducing requests for “progressive taxi instructions” from controllers.)

2. Situational awareness includes effective pilot-controller radio communication. ATC expects pilots to specifically acknowledge and read back all LAHSO clearances as follows:

#### EXAMPLE-

**ATC:** “(Aircraft ID) cleared to land runway six right, hold short of taxiway bravo for crossing traffic (type aircraft).”

**Aircraft:** “(Aircraft ID), wilco, cleared to land runway six right to hold short of taxiway bravo.”

**ATC:** “(Aircraft ID) cross runway six right at taxiway bravo, landing aircraft will hold short.”

**Aircraft:** “(Aircraft ID), wilco, cross runway six right at bravo, landing traffic (type aircraft) to hold.”

3. For those airplanes flown with two crewmembers, effective intra-cockpit communication between cockpit crewmembers is also critical. There have been several instances where the pilot working the radios accepted a LAHSO clearance but then simply forgot to tell the pilot flying the aircraft.

4. Situational awareness also includes a thorough understanding of the airport markings, signage, and lighting associated with LAHSO. These visual aids consist of a three-part system of yellow hold-short markings, red and white signage and, in certain cases, in-pavement lighting. Visual aids assist the pilot in determining where to hold short. FIG 4-3-8, FIG 4-3-9, FIG 4-3-10 depict how these markings, signage, and lighting combinations will appear once installed. Pilots are cautioned that not all airports conducting LAHSO have installed any or all of the above markings, signage, or lighting.

5. Pilots should only receive a LAHSO clearance when there is a minimum ceiling of 1,000 feet and 3 statute miles visibility. The intent of having “basic” VFR weather conditions is to allow pilots to maintain visual contact with other aircraft and ground vehicle operations. Pilots should consider the effects of prevailing inflight visibility (such as landing into the sun) and how it may affect overall

situational awareness. Additionally, surface vehicles and aircraft being taxied by maintenance personnel may also be participating in LAHSO, especially in those operations that involve crossing an active runway.

#### **4-3-12. Low Approach**

**a.** A low approach (sometimes referred to as a low pass) is the go-around maneuver following an approach. Instead of landing or making a touch-and-go, a pilot may wish to go around (low approach) in order to expedite a particular operation (a series of practice instrument approaches is an example of such an operation). Unless otherwise authorized by ATC, the low approach should be made straight ahead, with no turns or climb made until the pilot has made a thorough visual check for other aircraft in the area.

**b.** When operating within a Class B, Class C, and Class D surface area, a pilot intending to make a low approach should contact the tower for approval. This request should be made prior to starting the final approach.

**c.** When operating to an airport, not within a Class B, Class C, and Class D surface area, a pilot intending to make a low approach should, prior to leaving the final approach fix inbound (nonprecision approach) or the outer marker or fix used in lieu of the outer marker inbound (precision approach), so advise the FSS, UNICOM, or make a broadcast as appropriate.

#### **REFERENCE-**

*AIM, Paragraph 4-1-9, Traffic Advisory Practices at Airports Without Operating Control Towers*

#### **4-3-13. Traffic Control Light Signals**

**a.** The following procedures are used by ATCTs in the control of aircraft, ground vehicles, equipment,

and personnel not equipped with radio. These same procedures will be used to control aircraft, ground vehicles, equipment, and personnel equipped with radio if radio contact cannot be established. ATC personnel use a directive traffic control signal which emits an intense narrow light beam of a selected color (either red, white, or green) when controlling traffic by light signals.

**b.** Although the traffic signal light offers the advantage that some control may be exercised over nonradio equipped aircraft, pilots should be cognizant of the disadvantages which are:

**1.** Pilots may not be looking at the control tower at the time a signal is directed toward their aircraft.

**2.** The directions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplement or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert.

**c.** Between sunset and sunrise, a pilot wishing to attract the attention of the control tower should turn on a landing light and taxi the aircraft into a position, clear of the active runway, so that light is visible to the tower. The landing light should remain on until appropriate signals are received from the tower.

**d.** Airport Traffic Control Tower Light Gun Signals. (See TBL 4-3-1.)

**e.** During daylight hours, acknowledge tower transmissions or light signals by moving the ailerons or rudder. At night, acknowledge by blinking the landing or navigation lights. If radio malfunction occurs after departing the parking area, watch the tower for light signals or monitor tower frequency.

*TBL 4-3-1*  
**Airport Traffic Control Tower Light Gun Signals**

Meaning			
Color and Type of Signal	Movement of Vehicles, Equipment and Personnel	Aircraft on the Ground	Aircraft in Flight
Steady green	Cleared to cross, proceed or go	Cleared for takeoff	Cleared to land
Flashing green	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	STOP	STOP	Give way to other aircraft and continue circling
Flashing red	Clear the taxiway/runway	Taxi clear of the runway in use	Airport unsafe, do not land
Flashing white	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution	Exercise extreme caution

#### 4-3-14. Communications

**a.** Pilots of departing aircraft should communicate with the control tower on the appropriate ground control/clearance delivery frequency prior to starting engines to receive engine start time, taxi and/or clearance information. Unless otherwise advised by the tower, remain on that frequency during taxiing and runup, then change to local control frequency when ready to request takeoff clearance.

**NOTE-**

*Pilots are encouraged to monitor the local tower frequency as soon as practical consistent with other ATC requirements.*

**REFERENCE-**

*AIM, Paragraph 4-1-13, Automatic Terminal Information Service (ATIS)*

**b.** The tower controller will consider that pilots of turbine-powered aircraft are ready for takeoff when they reach the runway or warm-up block unless advised otherwise.

**c.** The majority of ground control frequencies are in the 121.6–121.9 MHz bandwidth. Ground control frequencies are provided to eliminate frequency congestion on the tower (local control) frequency and are limited to communications between the tower and aircraft on the ground and between the tower and utility vehicles on the airport, provide a clear VHF channel for arriving and departing aircraft. They are used for issuance of taxi information, clearances, and other necessary contacts between the tower and aircraft or other vehicles operated on the airport. A pilot who has just landed should not change from the

tower frequency to the ground control frequency until directed to do so by the controller. Normally, only one ground control frequency is assigned at an airport; however, at locations where the amount of traffic so warrants, a second ground control frequency and/or another frequency designated as a clearance delivery frequency, may be assigned.

**d.** A controller may omit the ground or local control frequency if the controller believes the pilot knows which frequency is in use. If the ground control frequency is in the 121 MHz bandwidth the controller may omit the numbers preceding the decimal point; e.g., 121.7, “CONTACT GROUND POINT SEVEN.” However, if any doubt exists as to what frequency is in use, the pilot should promptly request the controller to provide that information.

**e.** Controllers will normally avoid issuing a radio frequency change to helicopters, known to be single-piloted, which are hovering, air taxiing, or flying near the ground. At times, it may be necessary for pilots to alert ATC regarding single pilot operations to minimize delay of essential ATC communications. Whenever possible, ATC instructions will be relayed through the frequency being monitored until a frequency change can be accomplished. You must promptly advise ATC if you are unable to comply with a frequency change. Also, you should advise ATC if you must land to accomplish the frequency change unless it is clear the landing will have no impact on other air traffic; e.g., on a taxiway or in a helicopter operating area.

#### 4-3-15. Gate Holding Due to Departure Delays

**a.** Pilots should contact ground control or clearance delivery prior to starting engines as gate hold procedures will be in effect whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call up unless modified by flow control restrictions. Pilots should monitor the ground control or clearance delivery frequency for engine startup advisories or new proposed start time if the delay changes.

**b.** The tower controller will consider that pilots of turbine-powered aircraft are ready for takeoff when they reach the runway or warm-up block unless advised otherwise.

#### 4-3-16. VFR Flights in Terminal Areas

Use reasonable restraint in exercising the prerogative of VFR flight, especially in terminal areas. The weather minimums and distances from clouds are minimums. Giving yourself a greater margin in specific instances is just good judgment.

**a. Approach Area.** Conducting a VFR operation in a Class B, Class C, Class D, and Class E surface area when the official visibility is 3 or 4 miles is not prohibited, but good judgment would dictate that you keep out of the approach area.

**b. Reduced Visibility.** It has always been recognized that precipitation reduces forward visibility. Consequently, although again it may be perfectly legal to cancel your IFR flight plan at any time you can proceed VFR, it is good practice, when precipitation is occurring, to continue IFR operation into a terminal area until you are reasonably close to your destination.

**c. Simulated Instrument Flights.** In conducting simulated instrument flights, be sure that the weather is good enough to compensate for the restricted visibility of the safety pilot and your greater concentration on your flight instruments. Give yourself a little greater margin when your flight plan lies in or near a busy airway or close to an airport.

#### 4-3-17. VFR Helicopter Operations at Controlled Airports

##### **a. General.**

**1.** The following ATC procedures and phraseologies recognize the unique capabilities of helicopters and were developed to improve service to all users. Helicopter design characteristics and user needs often require operations from movement areas and nonmovement areas within the airport boundary. In order for ATC to properly apply these procedures, it is essential that pilots familiarize themselves with the local operations and make it known to controllers when additional instructions are necessary.

**2.** Insofar as possible, helicopter operations will be instructed to avoid the flow of fixed-wing aircraft to minimize overall delays; however, there will be many situations where faster/larger helicopters may be integrated with fixed-wing aircraft for the benefit of all concerned. Examples would include IFR flights, avoidance of noise sensitive areas, or use of runways/taxiways to minimize the hazardous effects of rotor downwash in congested areas.

**3.** Because helicopter pilots are intimately familiar with the effects of rotor downwash, they are best qualified to determine if a given operation can be conducted safely. Accordingly, the pilot has the final authority with respect to the specific airspeed/altitude combinations. ATC clearances are in no way intended to place the helicopter in a hazardous position. It is expected that pilots will advise ATC if a specific clearance will cause undue hazards to persons or property.

**b.** Controllers normally limit ATC ground service and instruction to *movement* areas; therefore, operations from *nonmovement* areas are conducted at pilot discretion and should be based on local policies, procedures, or letters of agreement. In order to maximize the flexibility of helicopter operations, it is necessary to rely heavily on sound pilot judgment. For example, hazards such as debris, obstructions, vehicles, or personnel must be recognized by the pilot, and action should be taken as necessary to avoid such hazards. Taxi, hover taxi, and air taxi operations are considered to be ground movements. Helicopters conducting such operations are expected to adhere to the same conditions, requirements, and practices as apply to other ground taxiing and ATC procedures in the AIM.

**1.** The phraseology *taxi* is used when it is intended or expected that the helicopter will taxi on the airport surface, either via taxiways or other prescribed routes. *Taxi* is used primarily for helicopters equipped with wheels or in response to a

pilot request. Preference should be given to this procedure whenever it is necessary to minimize effects of rotor downwash.

2. Pilots may request a *hover taxi* when slow forward movement is desired or when it may be appropriate to move very short distances. Pilots should avoid this procedure if rotor downwash is likely to cause damage to parked aircraft or if blowing dust/snow could obscure visibility. If it is necessary to operate above 25 feet AGL when hover taxiing, the pilot should initiate a request to ATC.

3. *Air taxi* is the preferred method for helicopter ground movements on airports provided ground operations and conditions permit. Unless otherwise requested or instructed, pilots are expected to remain below 100 feet AGL. However, if a higher than normal airspeed or altitude is desired, the request should be made prior to lift-off. The pilot is solely responsible for selecting a safe airspeed for the altitude/operation being conducted. Use of *air taxi* enables the pilot to proceed at an optimum airspeed/altitude, minimize downwash effect, conserve fuel, and expedite movement from one point to another. Helicopters should avoid overflight of other aircraft, vehicles, and personnel during air-taxi operations. Caution must be exercised concerning active runways and pilots must be certain that air taxi instructions are understood. Special precautions may be necessary at unfamiliar airports or airports with multiple/intersecting active runways. The taxi procedures given in Paragraph 4-3-18, Taxiing, Paragraph 4-3-19, Taxi During Low Visibility, and Paragraph 4-3-20, Exiting the Runway After Landing, also apply.

**REFERENCE-**

*Pilot/Controller Glossary Term- Taxi.*

*Pilot/Controller Glossary Term- Hover Taxi.*

*Pilot/Controller Glossary Term- Air Taxi.*

**c. Takeoff and Landing Procedures.**

1. Helicopter operations may be conducted from a runway, taxiway, portion of a landing strip, or any clear area which could be used as a landing site such as the scene of an accident, a construction site, or the roof of a building. The terms used to describe designated areas from which helicopters operate are: movement area, landing/takeoff area, apron/ramp, heliport and helipad (See Pilot/Controller Glossary).

These areas may be improved or unimproved and may be separate from or located on an airport/heliport. ATC will issue takeoff clearances from *movement* areas other than active runways, or in diverse directions from active runways, with additional instructions as necessary. Whenever possible, takeoff clearance will be issued in lieu of extended hover/air taxi operations. Phraseology will be “CLEARED FOR TAKEOFF FROM (taxiway, helipad, runway number, etc.), MAKE RIGHT/LEFT TURN FOR (direction, heading, NAVAID radial) DEPARTURE/DEPARTURE ROUTE (number, name, etc.)” Unless requested by the pilot, downwind takeoffs will not be issued if the tailwind exceeds 5 knots.

2. Pilots should be alert to wind information as well as to wind indications in the vicinity of the helicopter. ATC should be advised of the intended method of departing. A pilot request to takeoff in a given direction indicates that the pilot is willing to accept the wind condition and controllers will honor the request if traffic permits. Departure points could be a significant distance from the control tower and it may be difficult or impossible for the controller to determine the helicopter’s relative position to the wind.

3. If takeoff is requested from *nonmovement* areas, an area not authorized for helicopter use, an area not visible from the tower, an unlighted area at night, or an area off the airport, the phraseology “DEPARTURE FROM (requested location) WILL BE AT YOUR OWN RISK (additional instructions, as necessary). USE CAUTION (if applicable).” The pilot is responsible for operating in a safe manner and should exercise due caution.

4. Similar phraseology is used for helicopter landing operations. Every effort will be made to permit helicopters to proceed direct and land as near as possible to their final destination on the airport. Traffic density, the need for detailed taxiing instructions, frequency congestion, or other factors may affect the extent to which service can be expedited. As with ground movement operations, a high degree of pilot/controller cooperation and communication is necessary to achieve safe and efficient operations.

#### 4-3-18. Taxiing

**a. General.** Approval must be obtained prior to moving an aircraft or vehicle onto the movement area during the hours an Airport Traffic Control Tower is in operation.

1. Always state your position on the airport when calling the tower for taxi instructions.

2. The movement area is normally described in local bulletins issued by the airport manager or control tower. These bulletins may be found in FSSs, fixed base operators offices, air carrier offices, and operations offices.

3. The control tower also issues bulletins describing areas where they cannot provide ATC service due to nonvisibility or other reasons.

4. A clearance must be obtained prior to taxiing on a runway, taking off, or landing during the hours an Airport Traffic Control Tower is in operation.

5. A clearance must be obtained prior to crossing any runway. ATC will issue an explicit clearance for all runway crossings.

6. When assigned a takeoff runway, ATC will first specify the runway, issue taxi instructions, and state any hold short instructions or runway crossing clearances if the taxi route will cross a runway. This does not authorize the aircraft to “enter” or “cross” the assigned departure runway at any point. In order to preclude misunderstandings in radio communications, ATC will not use the word “cleared” in conjunction with authorization for aircraft to taxi.

7. When issuing taxi instructions to any point other than an assigned takeoff runway, ATC will specify the point to taxi to, issue taxi instructions, and state any hold short instructions or runway crossing clearances if the taxi route will cross a runway.

**NOTE-**

*ATC is required to obtain a readback from the pilot of all runway hold short instructions.*

8. If a pilot is expected to hold short of a runway approach/departure (*Runway XX APPCH/Runway XX DEP*) hold area or ILS holding position (see FIG 2-3-15, Taxiways Located in Runway Approach Area), ATC will issue instructions.

9. When taxi instructions are received from the controller, pilots should always read back:

(a) The runway assignment.

(b) Any clearance to enter a specific runway.

(c) Any instruction to hold short of a specific runway or line up and wait.

Controllers are required to request a readback of runway hold short assignment when it is not received from the pilot/vehicle.

**b.** ATC clearances or instructions pertaining to taxiing are predicated on known traffic and known physical airport conditions. Therefore, it is important that pilots clearly understand the clearance or instruction. Although an ATC clearance is issued for taxiing purposes, when operating in accordance with the CFRs, it is the responsibility of the pilot to avoid collision with other aircraft. Since “the pilot-in-command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft” the pilot should obtain clarification of any clearance or instruction which is not understood.

**REFERENCE-**

*AIM, Paragraph 7-3-1, General*

1. Good operating practice dictates that pilots acknowledge all runway crossing, hold short, or takeoff clearances unless there is some misunderstanding, at which time the pilot should query the controller until the clearance is understood.

**NOTE-**

*Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.*

2. Pilots operating a single pilot aircraft should monitor only assigned ATC communications after being cleared onto the active runway for departure. Single pilot aircraft should not monitor other than ATC communications until flight from Class B, Class C, or Class D surface area is completed. This same procedure should be practiced from after receipt of the clearance for landing until the landing and taxi activities are complete. Proper effective scanning for other aircraft, surface vehicles, or other objects should be continuously exercised in all cases.

3. If the pilot is unfamiliar with the airport or for any reason confusion exists as to the correct taxi routing, a request may be made for progressive taxi instructions which include step-by-step routing directions. Progressive instructions may also be issued if the controller deems it necessary due to traffic or field conditions (for example, construction or closed taxiways).

c. At those airports where the U.S. Government operates the control tower and ATC has authorized noncompliance with the requirement for two-way radio communications while operating within the Class B, Class C, or Class D surface area, or at those airports where the U.S. Government does not operate the control tower and radio communications cannot be established, pilots must obtain a clearance by visual light signal prior to taxiing on a runway and prior to takeoff and landing.

d. The following phraseologies and procedures are used in radiotelephone communications with aeronautical ground stations.

**1. Request for taxi instructions prior to departure.** State your aircraft identification, location, type of operation planned (VFR or IFR), and the point of first intended landing.

**EXAMPLE–**

*Aircraft:* “Washington ground, Beechcraft One Three One Five Niner at hangar eight, ready to taxi, I–F–R to Chicago.”

*Tower:* “Beechcraft one three one five niner, Washington ground, runway two seven, taxi via taxiways Charlie and Delta, hold short of runway three three left.”

*Aircraft:* “Beechcraft One Three One Five Niner, hold short of runway three three left.”

**2. Receipt of ATC clearance.** ARTCC clearances are relayed to pilots by airport traffic controllers in the following manner.

**EXAMPLE–**

*Tower:* “Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand.”

*Aircraft:* “Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand.”

**NOTE–**

Normally, an ATC IFR clearance is relayed to a pilot by the ground controller. At busy locations, however, pilots may be instructed by the ground controller to “contact clearance delivery” on a frequency designated for this purpose. No surveillance or control over the movement of traffic is exercised by this position of operation.

**3. Request for taxi instructions after landing.** State your aircraft identification, location, and that you request taxi instructions.

**EXAMPLE–**

*Aircraft:* “Dulles ground, Beechcraft One Four Two Six One clearing runway one right on taxiway echo three, request clearance to Page.”

*Tower:* “Beechcraft One Four Two Six One, Dulles ground, taxi to Page via taxiways echo three, echo one, and echo niner.”

or

*Aircraft:* “Orlando ground, Beechcraft One Four Two Six One clearing runway one eight left at taxiway bravo three, request clearance to Page.”

*Tower:* “Beechcraft One Four Two Six One, Orlando ground, hold short of runway one eight right.”

*Aircraft:* “Beechcraft One Four Two Six One, hold short of runway one eight right.”

**4–3–19. Taxi During Low Visibility**

a. Pilots and aircraft operators should be constantly aware that during certain low visibility conditions the movement of aircraft and vehicles on airports may not be visible to the tower controller. This may prevent visual confirmation of an aircraft’s adherence to taxi instructions.

b. Of vital importance is the need for pilots to notify the controller when difficulties are encountered or at the first indication of becoming disoriented. Pilots should proceed with extreme caution when taxiing toward the sun. When vision difficulties are encountered pilots should immediately inform the controller.

c. Advisory Circular 120–57, Low Visibility Operations Surface Movement Guidance and Control System, commonly known as LVOSMGCS (pronounced “LVO SMIGS”) describes an adequate example of a low visibility taxi plan for any airport which has takeoff or landing operations in less than 1,200 feet runway visual range (RVR) visibility conditions. These plans, which affect aircrew and vehicle operators, may incorporate additional lighting, markings, and procedures to control airport surface traffic. They will be addressed at two levels; operations less than 1,200 feet RVR to 500 feet RVR and operations less than 500 feet RVR.

**NOTE–**

Specific lighting systems and surface markings may be found in Paragraph 2–1–11, Taxiway Lights, and Paragraph 2–3–4, Taxiway Markings.



d. When low visibility conditions exist, pilots should focus their entire attention on the safe operation of the aircraft while it is moving. Checklists and nonessential communication should be withheld until the aircraft is stopped and the brakes set.

#### 4-3-20. Exiting the Runway After Landing

The following procedures must be followed after landing and reaching taxi speed.

a. Exit the runway without delay at the first available taxiway or on a taxiway as instructed by ATC. Pilots must not exit the landing runway onto another runway unless authorized by ATC. At airports with an operating control tower, pilots should not stop or reverse course on the runway without first obtaining ATC approval.

b. Taxi clear of the runway unless otherwise directed by ATC. An aircraft is considered clear of the runway when all parts of the aircraft are past the runway edge and there are no restrictions to its continued movement beyond the runway holding position markings. In the absence of ATC instructions, the pilot is expected to taxi clear of the landing runway by taxiing beyond the runway holding position markings associated with the landing runway, even if that requires the aircraft to protrude into or cross another taxiway or ramp area. Once all parts of the aircraft have crossed the runway holding position markings, the pilot must hold unless further instructions have been issued by ATC.

##### **NOTE-**

1. *The tower will issue the pilot instructions which will permit the aircraft to enter another taxiway, runway, or ramp area when required.*

2. *Guidance contained in subparagraphs a and b above is considered an integral part of the landing clearance and satisfies the requirement of 14 CFR Section 91.129.*

c. Immediately change to ground control frequency when advised by the tower and obtain a taxi clearance.

##### **NOTE-**

1. *The tower will issue instructions required to resolve any potential conflicts with other ground traffic prior to advising the pilot to contact ground control.*

2. *Ground control will issue taxi clearance to parking. That clearance does not authorize the aircraft to “enter” or “cross” any runways. Pilots not familiar with the taxi route should request specific taxi instructions from ATC.*

#### 4-3-21. Practice Instrument Approaches

a. Various air traffic incidents have indicated the necessity for adoption of measures to achieve more organized and controlled operations where practice instrument approaches are conducted. Practice instrument approaches are considered to be instrument approaches made by either a VFR aircraft not on an IFR flight plan or an aircraft on an IFR flight plan. To achieve this and thereby enhance air safety, it is Air Traffic’s policy to provide for separation of such operations at locations where approach control facilities are located and, as resources permit, at certain other locations served by ARTCCs or parent approach control facilities. Pilot requests to practice instrument approaches may be approved by ATC subject to traffic and workload conditions. Pilots should anticipate that in some instances the controller may find it necessary to deny approval or withdraw previous approval when traffic conditions warrant. It must be clearly understood, however, that even though the controller may be providing separation, pilots on VFR flight plans are required to comply with basic VFR weather minimums (14 CFR Section 91.155). Application of ATC procedures or any action taken by the controller to avoid traffic conflicts does not relieve IFR and VFR pilots of their responsibility to see-and-avoid other traffic while operating in VFR conditions (14 CFR Section 91.113). In addition to the normal IFR separation minimums (which includes visual separation) during VFR conditions, 500 feet vertical separation may be applied between VFR aircraft and between a VFR aircraft and the IFR aircraft. Pilots not on IFR flight plans desiring practice instrument approaches should always state ‘practice’ when making requests to ATC. Controllers will instruct VFR aircraft requesting an instrument approach to maintain VFR. This is to preclude misunderstandings between the pilot and controller as to the status of the aircraft. If pilots wish to proceed in accordance with instrument flight rules, they must specifically request and obtain, an IFR clearance.

b. Before practicing an instrument approach, pilots should inform the approach control facility or the tower of the type of practice approach they desire to make and how they intend to terminate it, i.e., full-stop landing, touch-and-go, or missed or low approach maneuver. This information may be furnished progressively when conducting a series of approaches. Pilots on an IFR flight plan, who have

made a series of instrument approaches to full stop landings should inform ATC when they make their final landing. The controller will control flights practicing instrument approaches so as to ensure that they do not disrupt the flow of arriving and departing itinerant IFR or VFR aircraft. The priority afforded itinerant aircraft over practice instrument approaches is not intended to be so rigidly applied that it causes grossly inefficient application of services. A minimum delay to itinerant traffic may be appropriate to allow an aircraft practicing an approach to complete that approach.

**NOTE—**

*A clearance to land means that appropriate separation on the landing runway will be ensured. A landing clearance does not relieve the pilot from compliance with any previously issued restriction.*

**c.** At airports without a tower, pilots wishing to make practice instrument approaches should notify the facility having control jurisdiction of the desired approach as indicated on the approach chart. All approach control facilities and ARTCCs are required to publish a Letter to Airmen depicting those airports where they provide standard separation to both VFR and IFR aircraft conducting practice instrument approaches.

**d.** The controller will provide approved separation between both VFR and IFR aircraft when authorization is granted to make practice approaches to airports where an approach control facility is located and to certain other airports served by approach control or an ARTCC. Controller responsibility for separation of VFR aircraft begins at the point where the approach clearance becomes effective, or when the aircraft enters Class B or Class C airspace, or a TRSA, whichever comes first.

**e.** VFR aircraft practicing instrument approaches are not automatically authorized to execute the missed approach procedure. This authorization must be specifically requested by the pilot and approved by the controller. Separation will not be provided unless the missed approach has been approved by ATC.

**f.** Except in an emergency, aircraft cleared to practice instrument approaches must not deviate from the approved procedure until cleared to do so by the controller.

**g.** At radar approach control locations when a full approach procedure (procedure turn, etc.,) cannot be

approved, pilots should expect to be vectored to a final approach course for a practice instrument approach which is compatible with the general direction of traffic at that airport.

**h.** When granting approval for a practice instrument approach, the controller will usually ask the pilot to report to the tower prior to or over the final approach fix inbound (nonprecision approaches) or over the outer marker or fix used in lieu of the outer marker inbound (precision approaches).

**i.** When authorization is granted to conduct practice instrument approaches to an airport with a tower, but where approved standard separation is not provided to aircraft conducting practice instrument approaches, the tower will approve the practice approach, instruct the aircraft to maintain VFR and issue traffic information, as required.

**j.** When an aircraft notifies a FSS providing Local Airport Advisory to the airport concerned of the intent to conduct a practice instrument approach and whether or not separation is to be provided, the pilot will be instructed to contact the appropriate facility on a specified frequency prior to initiating the approach. At airports where separation is not provided, the FSS will acknowledge the message and issue known traffic information but will neither approve or disapprove the approach.

**k.** Pilots conducting practice instrument approaches should be particularly alert for other aircraft operating in the local traffic pattern or in proximity to the airport.

#### **4-3-22. Option Approach**

The “Cleared for the Option” procedure will permit an instructor, flight examiner or pilot the option to make a touch-and-go, low approach, missed approach, stop-and-go, or full stop landing. This procedure can be very beneficial in a training situation in that neither the student pilot nor examinee would know what maneuver would be accomplished. The pilot should make a request for this procedure passing the final approach fix inbound on an instrument approach or entering downwind for a VFR traffic pattern. After ATC approval of the option, the pilot should inform ATC as soon as possible of any delay on the runway during their stop-and-go or full stop landing. The advantages of this procedure as a training aid are that it enables an instructor or examiner to obtain the reaction of a trainee or

examinee under changing conditions, the pilot would not have to discontinue an approach in the middle of the procedure due to student error or pilot proficiency requirements, and finally it allows more flexibility and economy in training programs. This procedure will only be used at those locations with an operational control tower and will be subject to ATC approval.

#### 4-3-23. Use of Aircraft Lights

a. Aircraft position lights are required to be lighted on aircraft operated on the surface and in flight from sunset to sunrise. In addition, aircraft equipped with an anti-collision light system are required to operate that light system during all types of operations (day and night). However, during any adverse meteorological conditions, the pilot-in-command may determine that the anti-collision lights should be turned off when their light output would constitute a hazard to safety (14 CFR Section 91.209). Supplementary strobe lights should be turned off on the ground when they adversely affect ground personnel or other pilots, and in flight when there are adverse reflection from clouds.

b. An aircraft anti-collision light system can use one or more rotating beacons and/or strobe lights, be colored either red or white, and have different (higher than minimum) intensities when compared to other aircraft. Many aircraft have both a rotating beacon and a strobe light system.

c. The FAA has a voluntary pilot safety program, Operation Lights On, to enhance the *see-and-avoid* concept. Pilots are encouraged to turn on their landing lights during takeoff; i.e., either after takeoff clearance has been received or when beginning takeoff roll. Pilots are further encouraged to turn on their landing lights when operating below 10,000 feet, day or night, especially when operating within 10 miles of any airport, or in conditions of reduced visibility and in areas where flocks of birds may be expected, i.e., coastal areas, lake areas, around refuse dumps, etc. Although turning on aircraft lights does enhance the *see-and-avoid* concept, pilots should not become complacent about keeping a sharp lookout for other aircraft. Not all aircraft are equipped with lights and some pilots may not have their lights turned on. Aircraft manufactur-

er's recommendations for operation of landing lights and electrical systems should be observed.

d. Prop and jet blast forces generated by large aircraft have overturned or damaged several smaller aircraft taxiing behind them. To avoid similar results, and in the interest of preventing upsets and injuries to ground personnel from such forces, the FAA recommends that air carriers and commercial operators turn on their rotating beacons anytime their aircraft engines are in operation. General aviation pilots using rotating beacon equipped aircraft are also encouraged to participate in this program which is designed to alert others to the potential hazard. Since this is a voluntary program, exercise caution and do not rely solely on the rotating beacon as an indication that aircraft engines are in operation.

e. Prior to commencing taxi, it is recommended to turn on navigation, position, anti-collision, and logo lights (if equipped). To signal intent to other pilots, consider turning on the taxi light when the aircraft is moving or intending to move on the ground, and turning it off when stopped or yielding to other ground traffic. Strobe lights should not be illuminated during taxi if they will adversely affect the vision of other pilots or ground personnel.

f. At the discretion of the pilot-in-command, all exterior lights should be illuminated when taxiing on or across any runway. This increases the conspicuity of the aircraft to controllers and other pilots approaching to land, taxiing, or crossing the runway. Pilots should comply with any equipment operating limitations and consider the effects of landing and strobe lights on other aircraft in their vicinity.

g. When entering the departure runway for takeoff or to "line up and wait," all lights, except for landing lights, should be illuminated to make the aircraft conspicuous to ATC and other aircraft on approach. Landing lights should be turned on when takeoff clearance is received or when commencing takeoff roll at an airport without an operating control tower.

#### 4-3-24. Flight Inspection/'Flight Check' Aircraft in Terminal Areas

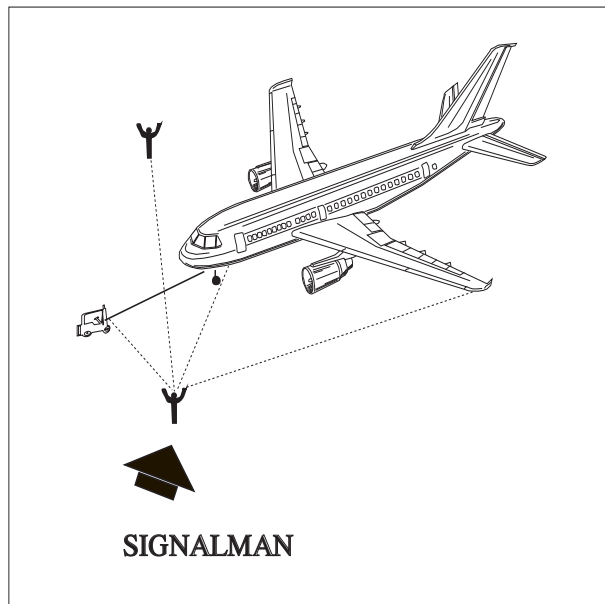
a. *Flight check* is a call sign used to alert pilots and air traffic controllers when a FAA aircraft is engaged in flight inspection/certification of NAVAIDs and flight procedures. Flight check aircraft fly preplanned high/low altitude flight patterns such as grids, orbits,

DME arcs, and tracks, including low passes along the full length of the runway to verify NAVAID performance.

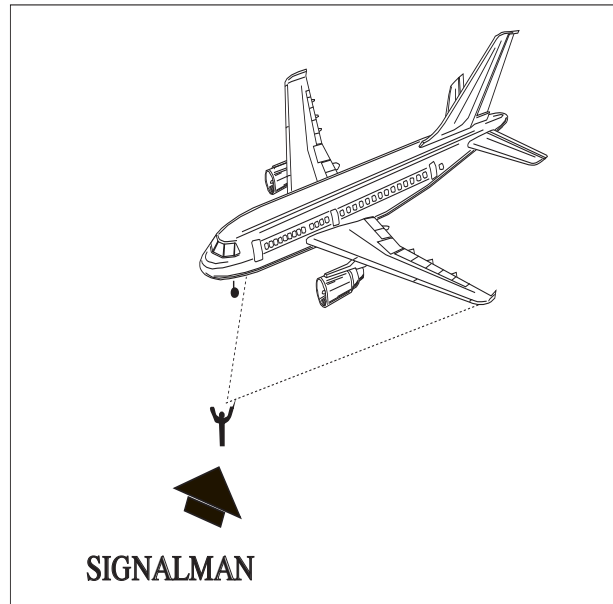
b. Pilots should be especially watchful and avoid the flight paths of any aircraft using the call sign “Flight Check.” These flights will normally receive special handling from ATC. Pilot patience and cooperation in allowing uninterrupted recordings can significantly help expedite flight inspections, minimize costly, repetitive runs, and reduce the burden on the U.S. taxpayer.

### 4-3-25. Hand Signals

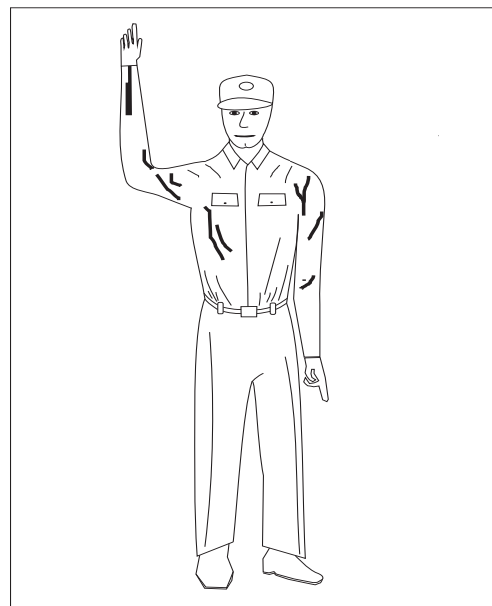
*FIG 4-3-11*  
**Signalman Directs Towing**



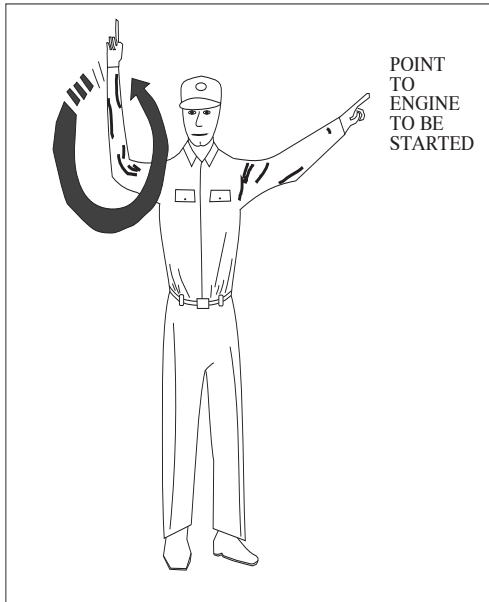
*FIG 4-3-12*  
**Signalman's Position**



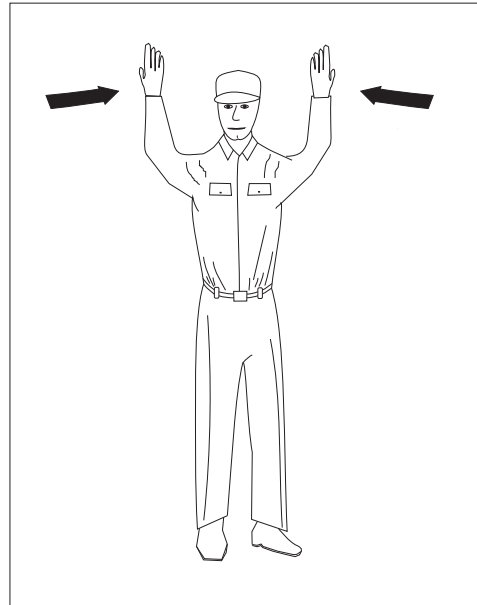
*FIG 4-3-13*  
**All Clear  
(O.K.)**



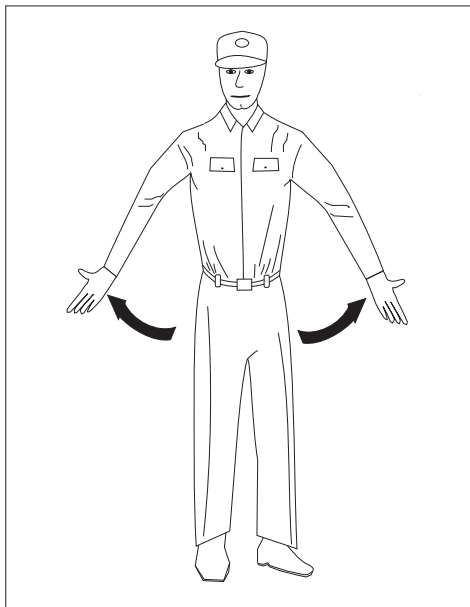
**FIG 4-3-14**  
**Start Engine**



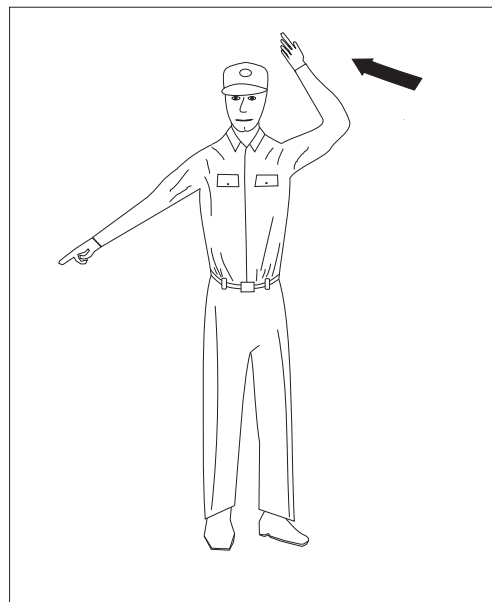
**FIG 4-3-16**  
**Proceed Straight Ahead**



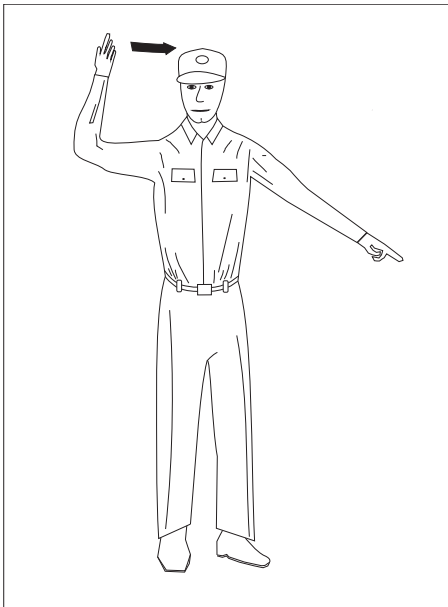
**FIG 4-3-15**  
**Pull Chocks**



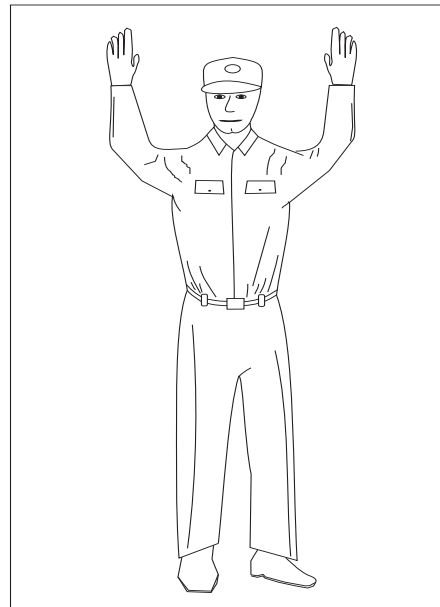
**FIG 4-3-17**  
**Left Turn**



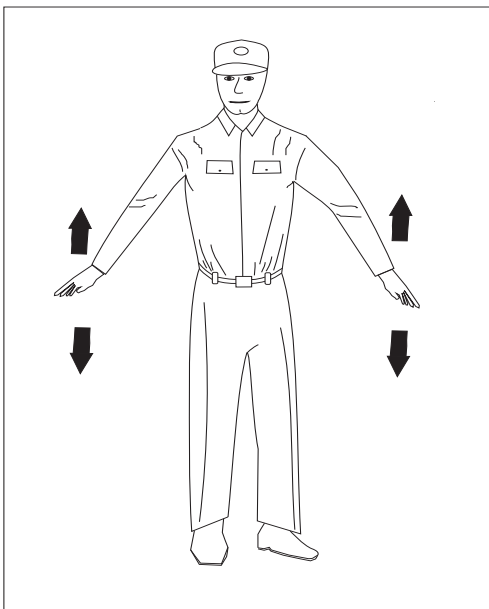
**FIG 4-3-18**  
**Right Turn**



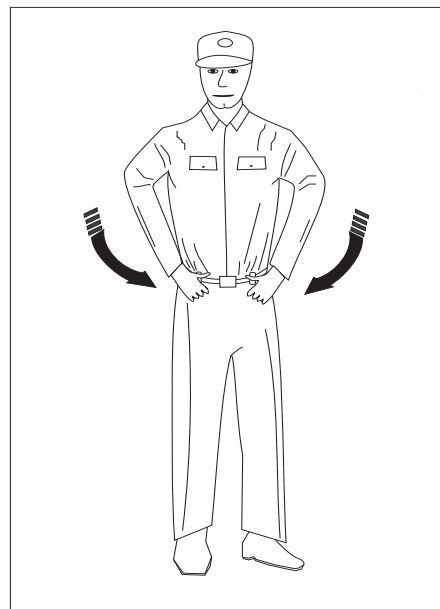
**FIG 4-3-20**  
**Flagman Directs Pilot**



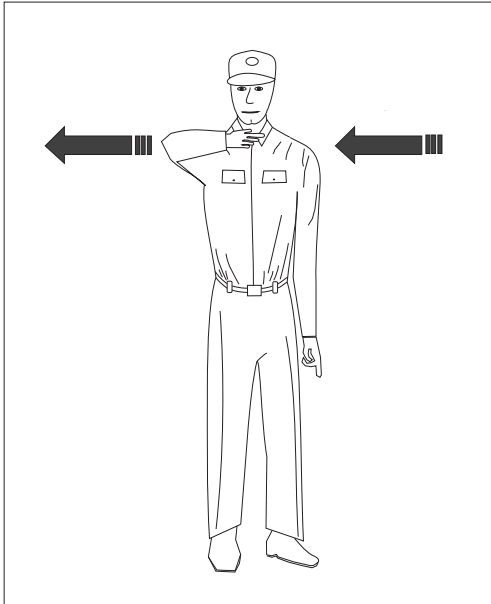
**FIG 4-3-19**  
**Slow Down**



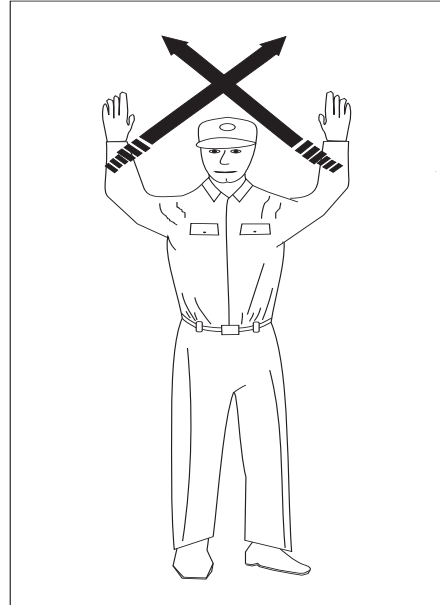
**FIG 4-3-21**  
**Insert Chocks**



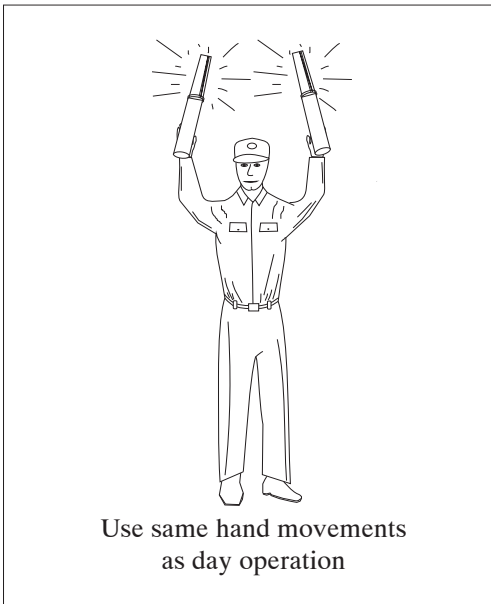
**FIG 4-3-22  
Cut Engines**



**FIG 4-3-24  
Stop**



**FIG 4-3-23  
Night Operation**



#### **4-3-26. Operations at Uncontrolled Airports With Automated Surface Observing System (ASOS)/Automated Weather Sensor System(AWSS)/Automated Weather Observing System (AWOS)**

a. Many airports throughout the National Airspace System are equipped with either ASOS, AWSS, or AWOS. At most airports with an operating control tower or human observer, the weather will be available to you in an Aviation Routine Weather Report (METAR) hourly or special observation format on the Automatic Terminal Information Service (ATIS) or directly transmitted from the controller/observer.

b. At uncontrolled airports that are equipped with ASOS/AWSS/AWOS with ground-to-air broadcast capability, the one-minute updated airport weather should be available to you within approximately 25 NM of the airport below 10,000 feet. The frequency for the weather broadcast will be published on sectional charts and in the Chart Supplement U.S. Some part-time towered airports may also broadcast the automated weather on their ATIS frequency during the hours that the tower is closed.

c. Controllers issue SVFR or IFR clearances based on pilot request, known traffic and reported weather, i.e., METAR/Nonroutine (Special) Aviation Weather Report (SPECI) observations, when they are available. Pilots have access to more current weather at uncontrolled ASOS/AWSS/AWOS airports than do the controllers who may be located several miles away. Controllers will rely on the pilot to determine the current airport weather from the ASOS/AWSS/AWOS. All aircraft arriving or departing an ASOS/AWSS/AWOS equipped uncontrolled airport should monitor the airport weather frequency to ascertain the status of the airspace. Pilots in Class E airspace must be alert for changing weather conditions which may affect the status of the airspace from IFR/VFR. If ATC service is required for IFR/SVFR approach/departure or requested for VFR service, the pilot should advise the controller that he/she has received the one-minute weather and state his/her intentions.

**EXAMPLE-**

*“I have the (airport) one-minute weather, request an ILS Runway 14 approach.”*

**REFERENCE-**

*AIM, Paragraph 7-1-12, Weather Observing Programs*



## Section 7. Operational Policy/Procedures for the Gulf of Mexico 50 NM Lateral Separation Initiative

### 4-7-1. Introduction and General Policies

a. Air traffic control (ATC) may apply 50 nautical mile (NM) lateral separation (i.e., lateral spacing) between airplanes authorized for Required Navigation Performance (RNP) 10 or RNP 4 operating in the Gulf of Mexico. 50 NM lateral separation may be applied in the following airspace:

1. Houston Oceanic Control Area (CTA)/Flight Information Region (FIR).

2. Gulf of Mexico portion of the Miami Oceanic CTA/FIR.

3. Monterrey CTA.

4. Merida High CTA within the Mexico FIR/UTA.

b. Within the Gulf of Mexico airspace described above, pairs of airplanes whose flight plans indicate approval for PBN and either RNP 10 or RNP 4 may be spaced by ATC at lateral intervals of 50 NM. ATC will space any airplane without RNP 10 or RNP 4 capability such that at least 90 NM lateral separation is maintained with other airplanes in the Miami Oceanic CTA, and at least 100 NM separation is maintained in the Houston, Monterrey, and Merida CTAs.

c. The reduced lateral separation allows more airplanes to fly on optimum routes/altitudes over the Gulf of Mexico.

d. 50 NM lateral separation is not applied on routes defined by ground navigation aids or on Gulf RNAV Routes Q100, Q102, or Q105.

e. Information useful for flight planning and operations over the Gulf of Mexico under this 50 NM lateral separation policy, as well as information on how to obtain RNP 10 or RNP 4 authorization, can be found in the West Atlantic Route System, Gulf of Mexico, and Caribbean Resource Guide for U.S. Operators located at:

[www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/afx/afs/afs400/afs470/media/WATRS.pdf](http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs470/media/WATRS.pdf)

f. Pilots should use Strategic Lateral Offset Procedures (SLOP) in the course of regular operations within the Gulf of Mexico CTAs. SLOP procedures and limitations are published in the U.S. Aeronautical Information Publication (AIP), ENR Section 7.1, General Procedures; Advisory Circular (AC) 91-70, Oceanic and Remote Continental Airspace Operations; and ICAO Document 4444, Procedures for Air Navigation Services – Air Traffic Management.

### 4-7-2. Accommodating Non-RNP 10 Aircraft

a. Operators not authorized for RNP 10 or RNP 4 may still file for any route and altitude within the Gulf of Mexico CTAs. However, clearance on the operator's preferred route and/or altitude will be provided as traffic allows for 90 or 100 NM lateral separation between the non-RNP 10 aircraft and any others. Priority will be given to RNP 10 or RNP 4 aircraft.

b. Operators of aircraft not authorized RNP 10 or RNP 4 must include the annotation "RMK/NON-RNP10" in Item 18 of their ATC flight plan.

c. Pilots of non-RNP 10 aircraft are to remind ATC of their RNP status; i.e., report "negative RNP 10" upon initial contact with ATC in each Gulf CTA.

d. Operators will likely benefit from the effort they invest to obtain RNP 10 or RNP 4 authorization, provided they are flying aircraft equipped to meet RNP 10 or RNP 4 standards.

### 4-7-3. Obtaining RNP 10 or RNP 4 Operational Authorization

a. For U.S. operators, AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace, provides the aircraft and operator qualification criteria for RNP 10 or RNP 4 authorizations. FAA personnel at flight standards district offices (FSDO) and certificate management offices (CMO) will use the guidance contained in

AC 90–105 to evaluate an operator’s application for RNP 10 or RNP 4 authorization. Authorization to conduct RNP operations in oceanic airspace is provided to all U.S. operators through issuance of Operations Specification (OpSpec), Management Specification (MSpec), or Letter of Authorization (LOA) B036, as applicable to the nature of the operation; for example, Part 121, Part 91, etc. Operators may wish to review FAA Order 8900.1, Flight Standards Information Management System, volume 3, chapter 18, section 4, to understand the specific criteria for issuing OpSpec, MSpec, and/or LOA B036.

**b.** The operator’s RNP 10 or RNP 4 authorization should include any equipment requirements and RNP 10 time limits (if operating solely inertial-based navigation systems), which must be observed when conducting RNP operations. RNP 4 requires tighter navigation and track maintenance accuracy than RNP 10.

#### **4–7–4. Authority for Operations with a Single Long-Range Navigation System**

Operators may be authorized to take advantage of 50 NM lateral separation in the Gulf of Mexico CTAs when equipped with only a single long-range navigation system. RNP 10 with a single long-range navigation system is authorized via OpSpec, MSpec, or LOA B054. Operators should contact their FSDO or CMO to obtain information on the specific requirements for obtaining B054. Volume 3, chapter 18, section 4 of FAA Order 8900.1 provides the qualification criteria to be used by FAA aviation safety inspectors in issuing B054.

#### **4–7–5. Flight Plan Requirements**

**a.** In order for an operator with RNP 10 or RNP 4 authorization to obtain 50 NM lateral separation in

the Gulf of Mexico CTAs, and therefore obtain preferred routing available to RNP authorized aircraft, the international flight plan form (FAA 7233–4) must be annotated as follows:

**1.** Item 10a (Equipment) must include the letter “R.”

**2.** Item 18 must include either “PBN/A1” for RNP 10 authorization or “PBN/L1” for RNP 4 authorization.

**b.** Indication of RNP 4 authorization implies the aircraft and pilots are also authorized RNP 10.

**c.** Chapter 5, section 1, of this manual includes information on all flight plan codes. RNP 10 has the same meaning and application as RNAV 10. They share the same code.

#### **4–7–6. Contingency Procedures**

Pilots operating under reduced lateral separation must be particularly familiar with, and prepared to rapidly implement, the standard contingency procedures specifically written for operations when outside ATC surveillance and direct VHF communications (for example, the oceanic environment). Specific procedures have been developed for weather deviations. Operators should ensure all flight crews operating in this type of environment have been provided the standard contingency procedures in a readily accessible format. The margin for error when operating at reduced separation mandates correct and expeditious application of the standard contingency procedures. These internationally accepted procedures are published in ICAO Document 4444, chapter 15. The procedures are also reprinted in the U.S. Aeronautical Information Publication (AIP), En Route (ENR) Section 7.3, Special Procedures for In-flight Contingencies in Oceanic Airspace; and AC 91–70.

NTAP .....	Notice To Airmen Publication
NW .....	Northwest
<b>O</b>	
OBSC .....	Obscured
OM .....	Outer Marker
OPR .....	Operate
ORIG .....	Original
<b>P</b>	
PAPI .....	Precision Approach Path Indicator
PARL .....	Parallel
PAX .....	Passenger/s
PCL .....	Pilot Controlled Lighting
PERM .....	Permanent
PJE .....	Parachute Jumping Activities
PLA .....	Practice Low Approach
PN .....	Prior Notice Required
PPR .....	Prior Permission Required
PT .....	Procedure Turn
<b>R</b>	
RAI .....	Runway Alignment Indicator
RCL .....	Runway Centerline
RCLL .....	Runway Centerline Light
REC .....	Receive/Receiver
RLLS .....	Runway Lead-in Light System
RNAV .....	Area Navigation
RVR .....	Runway Visual Range
RVRM .....	RVR Midpoint
RVRR .....	RVR Rollout
RVRT .....	RVR Touchdown
RWY .....	Runway
<b>S</b>	
S .....	South
SAA .....	Special Activity Airspace
SE .....	Southeast
SFC .....	Surface
SKED .....	Scheduled
SN .....	Snow
SR .....	Sunrise
SS .....	Sunset
SSALF .....	Simplified Short Approach Lighting System with Sequenced Flashers
SSALR .....	Simplified Short Approach Lighting System with Runway Alignment Indicator Lights
SSALS .....	Simplified Short Approach Lighting System
STAR .....	Standard Terminal Arrival
STD .....	Standard
SW .....	Southwest
<b>T</b>	
TACAN .....	Tactical Air Navigational Aid
TDZ .....	Touchdown Zone
TEMPO .....	Temporary
TFC .....	Traffic
TFR .....	Temporary Flight Restriction
TGL .....	Touch and Go Landings
THR .....	Threshold

TKOF .....	Takeoff
TODA .....	Take-off Distance Available
TORA .....	Take-off Run Available
TWR .....	Aerodrome Control Tower
TWY .....	Taxiway
<b>U</b>	
UNL .....	Unlimited
UNREL .....	Unreliable
<b>V</b>	
VASI .....	Visual Approach Slope Indicator
VFR .....	Visual Flight Rules
VHF .....	Very High Frequency
VIS .....	Visibility
VMC .....	Visual Meteorological Conditions
VOLMET .....	Meteorological Information for Aircraft in Flight
VOR .....	VHF Omni-Directional Radio Range
VORTAC .....	VOR and TACAN (collocated)
VOT .....	VOR Test Facility
<b>W</b>	
W .....	West
WAAS .....	Wide Area Augmentation System
WDI .....	Wind Direction Indicator
WPT .....	Waypoint
WX .....	Weather

**5-1-4. Flight Plan – VFR Flights**

a. Except for operations in or penetrating an ADIZ, a flight plan is not required for VFR flight.

*REFERENCE—*  
AIM, Chapter 5, Section 6, National Security and Interception Procedures

b. It is strongly recommended that a flight plan (for a VFR flight) be filed with an FAA FSS. This will ensure that you receive VFR Search and Rescue Protection.

*REFERENCE—*  
AIM, Paragraph 6-2-6, Search and Rescue, gives the proper method of filing a VFR flight plan.

c. To obtain maximum benefits from the flight plan program, flight plans should be filed directly with the nearest FSS. For your convenience, FSSs provide aeronautical and meteorological briefings while accepting flight plans. Radio may be used to file if no other means are available.

*NOTE—*  
Some states operate aeronautical communications facilities which will accept and forward flight plans to the FSS for further handling.

d. When a “stopover” flight is anticipated, it is recommended that a separate flight plan be filed for each “leg” when the stop is expected to be more than 1 hour duration.

**e.** Pilots are encouraged to give their departure times directly to the FSS serving the departure airport or as otherwise indicated by the FSS when the flight plan is filed. This will ensure more efficient flight plan service and permit the FSS to advise you of significant changes in aeronautical facilities or meteorological conditions. When a VFR flight plan is filed, it will be held by the FSS until 1 hour after the proposed departure time unless:

1. The actual departure time is received.
2. A revised proposed departure time is received.
3. At a time of filing, the FSS is informed that the proposed departure time will be met, but actual time cannot be given because of inadequate communications (assumed departures).

**f.** On pilot's request, at a location having an active tower, the aircraft identification will be forwarded by the tower to the FSS for reporting the actual departure time. This procedure should be avoided at busy airports.

**g.** Although position reports are not required for VFR flight plans, periodic reports to FAA FSSs along the route are good practice. Such contacts permit

significant information to be passed to the transiting aircraft and also serve to check the progress of the flight should it be necessary for any reason to locate the aircraft.

**EXAMPLE-**

1. *Bonanza 314K, over Kingfisher at (time), VFR flight plan, Tulsa to Amarillo.*

2. *Cherokee 5133J, over Oklahoma City at (time), Shreveport to Denver, no flight plan.*

**h.** Pilots not operating on an IFR flight plan and when in level cruising flight, are cautioned to conform with VFR cruising altitudes appropriate to the direction of flight.

**i.** When filing VFR flight plans, indicate aircraft equipment capabilities by appending the appropriate suffix to aircraft type in the same manner as that prescribed for IFR flight.

**REFERENCE-**

*AIM, Paragraph 5-1-8, Flight Plan- Domestic IFR Flights*

**j.** Under some circumstances, ATC computer tapes can be useful in constructing the radar history of a downed or crashed aircraft. In each case, knowledge of the aircraft's transponder equipment is necessary in determining whether or not such computer tapes might prove effective.

*FIG 5-1-1*  
**FAA Flight Plan**  
**Form 7233-1 (8-82)**

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED		SPECIALIST INITIALS	
<b>FLIGHT PLAN</b>		<input type="checkbox"/> STOPOVER						
<b>1. TYPE</b>	<b>2. AIRCRAFT IDENTIFICATION</b>	<b>3. AIRCRAFT TYPE/SPECIAL EQUIPMENT</b>	<b>4. TRUE AIRSPEED</b>	<b>5. DEPARTURE POINT</b>	<b>6. DEPARTURE TIME</b>		<b>7. CRUISING ALTITUDE</b>	
VFR IFR DVFR			KTS		PROPOSED (Z)	ACTUAL (Z)		
<b>8. ROUTE OF FLIGHT</b>								
<b>9. DESTINATION (Name of airport and city)</b>			<b>10. EST. TIME ENROUTE</b>		<b>11. REMARKS</b>			
			HOURS	MINUTES				
<b>12. FUEL ON BOARD</b>		<b>13. ALTERNATE AIRPORT(S)</b>		<b>14. PILOT'S NAME, ADDRESS &amp; TELEPHONE NUMBER &amp; AIRCRAFT HOME BASE</b>			<b>15. NUMBER ABOARD</b>	
HOURS	MINUTES							
				<b>17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)</b>				
<b>16. COLOR OF AIRCRAFT</b>			<small>CIVIL AIRCRAFT PILOTS, FAR 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.</small>					
FAA Form 7233-1 (8-82)			CLOSE VFR FLIGHT PLAN WITH _____			FSS ON ARRIVAL		

k. Flight Plan Form – (See FIG 5-1-1).

**l. Explanation of VFR Flight Plan Items.**

**1. Block 1.** Check the type flight plan. Check both the VFR and IFR blocks if composite VFR/IFR.

**2. Block 2.** Enter your complete aircraft identification including the prefix “N” if applicable.

**3. Block 3.** Enter the designator for the aircraft, or if unknown, consult an FSS briefer.

**4. Block 4.** Enter your true airspeed (TAS).

**5. Block 5.** Enter the departure airport identifier code, or if unknown, the name of the airport.

**6. Block 6.** Enter the proposed departure time in Coordinated Universal Time (UTC) (Z). If airborne, specify the actual or proposed departure time as appropriate.

**7. Block 7.** Enter the appropriate VFR altitude (to assist the briefer in providing weather and wind information).

**8. Block 8.** Define the route of flight by using NAVAID identifier codes and airways.

**9. Block 9.** Enter the destination airport identifier code, or if unknown, the airport name.

**NOTE-**

*Include the city name (or even the state name) if needed for clarity.*

**10. Block 10.** Enter your estimated time en route in hours and minutes.

**11. Block 11.** Enter only those remarks that may aid in VFR search and rescue, such as planned stops en route or student cross country, or remarks pertinent to the clarification of other flight plan information, such as the radiotelephony (call sign) associated with a designator filed in Block 2, if the radiotelephony is new, has changed within the last 60 days, or is a special FAA-assigned temporary radiotelephony. Items of a personal nature are not accepted.

**12. Block 12.** Specify the fuel on board in hours and minutes.

**13. Block 13.** Specify an alternate airport if desired.

**14. Block 14.** Enter your complete name, address, and telephone number. Enter sufficient information to identify home base, airport, or operator.

**NOTE–**

*This information is essential in the event of search and rescue operations.*

**15. Block 15.** Enter total number of persons on board (POB) including crew.

**16. Block 16.** Enter the predominant colors.

**17. Block 17.** Record the FSS name for closing the flight plan. If the flight plan is closed with a different FSS or facility, state the recorded FSS name that would normally have closed your flight plan.

**NOTE–**

**1. Optional–** record a destination telephone number to assist search and rescue contact should you fail to report or cancel your flight plan within 1/2 hour after your estimated time of arrival (ETA).

**2.** The information transmitted to the destination FSS will consist only of flight plan blocks 2, 3, 9, and 10. Estimated time en route (ETE) will be converted to the correct ETA.

### **5–1–5. Operational Information System (OIS)**

**a.** The FAA’s Air Traffic Control System Command Center (ATCSCC) maintains a website with near real–time National Airspace System (NAS) status information. NAS operators are encouraged to access the website at <http://www.fly.faa.gov> prior to filing their flight plan.

**b.** The website consolidates information from advisories. An advisory is a message that is disseminated electronically by the ATCSCC that contains information pertinent to the NAS.

**1.** Advisories are normally issued for the following items:

- (a) Ground Stops.
- (b) Ground Delay Programs.

(c) Route Information.

(d) Plan of Operations.

(e) Facility Outages and Scheduled Facility Outages.

(f) Volcanic Ash Activity Bulletins.

(g) Special Traffic Management Programs.

**2.** This list is not all–inclusive. Any time there is information that may be beneficial to a large number of people, an advisory may be sent. Additionally, there may be times when an advisory is not sent due to workload or the short length of time of the activity.

**3.** Route information is available on the website and in specific advisories. Some route information, subject to the 56–day publishing cycle, is located on the “OIS” under “Products,” Route Management Tool (RMT), and “What’s New” Playbook. The RMT and Playbook contain routings for use by Air Traffic and NAS operators when they are coordinated “real–time” and are then published in an ATCSCC advisory.

**4.** Route advisories are identified by the word “Route” in the header; the associated action is required (RQD), recommended (RMD), planned (PLN), or for your information (FYI). Operators are expected to file flight plans consistent with the Route RQD advisories.

**5.** Electronic System Impact Reports are on the intranet at <http://www.atcsc.faa.gov/ois/> under “System Impact Reports.” This page lists scheduled outages/events/projects that significantly impact the NAS; for example, runway closures, air shows, and construction projects. Information includes anticipated delays and traffic management initiatives (TMI) that may be implemented.

### **5–1–6. Flight Plan– Defense VFR (DVFR) Flights**

VFR flights (except DOD or law enforcement flights) into an ADIZ are required to file DVFR flight plans for security purposes. Detailed ADIZ procedures are found in Section 6, National Security and Interception Procedures, of this chapter. (See 14 CFR Part 99, Security Control of Air Traffic)

**(h)** Plan additional route description waypoints as required to ensure accurate navigation via the filed route of flight. Navigation is the pilot's responsibility unless ATC assistance is requested.

**(i)** Plan the route of flight so as to avoid prohibited and restricted airspace by 3 NM unless permission has been obtained to operate in that airspace and the appropriate ATC facilities are advised.

**NOTE—**

*To be approved for use in the National Airspace System, RNAV equipment must meet system availability, accuracy, and airworthiness standards. For additional information and guidance on RNAV equipment requirements, see Advisory Circular (AC) 20–138, Airworthiness Approval of Positioning and Navigation Systems, and AC 90–100, U.S. Terminal and En Route Area Navigation (RNAV) Operations.*

**3.** Pilots of aircraft equipped with latitude/longitude coordinate navigation capability, independent of VOR/TACAN references, may file for random RNAV routes at and above FL 390 within the conterminous U.S. using the following procedures.

**(a)** File airport-to-airport flight plans prior to departure.

**(b)** File the appropriate RNAV capability certification suffix in the flight plan.

**(c)** Plan the random route portion of the flight to begin and end over published departure/arrival transition fixes or appropriate navigation aids for airports without published transition procedures. The use of preferred departure and arrival routes, such as DP and STAR where established, is recommended.

**(d)** Plan the route of flight so as to avoid prohibited and restricted airspace by 3 NM unless permission has been obtained to operate in that airspace and the appropriate ATC facility is advised.

**(e)** Define the route of flight after the departure fix, including each intermediate fix (turnpoint) and the arrival fix for the destination airport in terms of latitude/longitude coordinates plotted to the nearest minute or in terms of Navigation Reference System (NRS) waypoints. For latitude/longitude filing the arrival fix must be identified by

both the latitude/longitude coordinates and a fix identifier.

**EXAMPLE—**

*MIA<sup>1</sup> SRQ<sup>2</sup> 3407/10615<sup>3</sup> 3407/11546 TNP<sup>4</sup> LAX<sup>5</sup>*

<sup>1</sup> *Departure airport.*

<sup>2</sup> *Departure fix.*

<sup>3</sup> *Intermediate fix (turning point).*

<sup>4</sup> *Arrival fix.*

<sup>5</sup> *Destination airport.*

*or*

*ORD<sup>1</sup> IOW<sup>2</sup> KP49G<sup>3</sup> KD34U<sup>4</sup> KL16O<sup>5</sup> OAL<sup>6</sup> MOD2<sup>7</sup> SFO<sup>8</sup>*

<sup>1</sup> *Departure airport.*

<sup>2</sup> *Transition fix (pitch point).*

<sup>3</sup> *Minneapolis ARTCC waypoint.*

<sup>4</sup> *Denver ARTCC Waypoint.*

<sup>5</sup> *Los Angeles ARTCC waypoint (catch point).*

<sup>6</sup> *Transition fix.*

<sup>7</sup> *Arrival.*

<sup>8</sup> *Destination airport.*

**(f)** Record latitude/longitude coordinates by four figures describing latitude in degrees and minutes followed by a solidus and five figures describing longitude in degrees and minutes.

**(g)** File at FL 390 or above for the random RNAV portion of the flight.

**(h)** Fly all routes/route segments on Great Circle tracks.

**(i)** Make any inflight requests for random RNAV clearances or route amendments to an en route ATC facility.

**e.** Flight Plan Form— See FIG 5–1–2.

**f. Explanation of IFR Flight Plan Items.**

**1. Block 1.** Check the type flight plan. Check both the VFR and IFR blocks if composite VFR/IFR.

**2. Block 2.** Enter your complete aircraft identification including the prefix “N” if applicable.

**3. Block 3.** Enter the designator for the aircraft, followed by a slant(/), and the transponder or DME equipment code letter; e.g., C–182/U. Heavy aircraft, add prefix “H” to aircraft type; example: H/DC10/U. Consult an FSS briefer for any unknown elements.

FIG 5-1-2  
**FAA Flight Plan**  
**Form 7233-1 (8-82)**

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR			TIME STARTED	SPECIALIST INITIALS	
<b>FLIGHT PLAN</b>		<input type="checkbox"/> STOPOVER					
<b>1. TYPE</b>	<b>2. AIRCRAFT IDENTIFICATION</b>	<b>3. AIRCRAFT TYPE/SPECIAL EQUIPMENT</b>	<b>4. TRUE AIRSPEED</b>	<b>5. DEPARTURE POINT</b>	<b>6. DEPARTURE TIME</b>		<b>7. CRUISING ALTITUDE</b>
VFR			KTS		PROPOSED (Z)	ACTUAL (Z)	
IFR							
DVFR							
<b>8. ROUTE OF FLIGHT</b>							
<b>9. DESTINATION (Name of airport and city)</b>			<b>10. EST. TIME ENROUTE</b>		<b>11. REMARKS</b>		
			HOURS	MINUTES			
<b>12. FUEL ON BOARD</b>		<b>13. ALTERNATE AIRPORT(S)</b>		<b>14. PILOT'S NAME, ADDRESS &amp; TELEPHONE NUMBER &amp; AIRCRAFT HOME BASE</b>			<b>15. NUMBER ABOARD</b>
HOURS	MINUTES			<b>17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)</b>			
<b>16. COLOR OF AIRCRAFT</b>		<small>CIVIL AIRCRAFT PILOTS, FAR 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.</small>					
FAA Form 7233-1 (8-82)		<b>CLOSE VFR FLIGHT PLAN WITH _____</b>				<b>FSS ON ARRIVAL</b>	

**4. Block 4.** Enter your computed true airspeed (TAS).

**NOTE-**  
 If the average TAS changes plus or minus 5 percent or 10 knots, whichever is greater, advise ATC.

**5. Block 5.** Enter the departure airport identifier code (or the airport name, city and state, if the identifier is unknown).

**NOTE-**  
 Use of identifier codes will expedite the processing of your flight plan.

**6. Block 6.** Enter the proposed departure time in Coordinated Universal Time (UTC) (Z). If airborne, specify the actual or proposed departure time as appropriate.

**7. Block 7.** Enter the requested en route altitude or flight level.

**NOTE-**  
 Enter only the initial requested altitude in this block. When more than one IFR altitude or flight level is desired along the route of flight, it is best to make a subsequent request direct to the controller.

**8. Block 8.** Define the route of flight by using NAVAID identifier codes (or names if the code is unknown), airways, jet routes, and waypoints (for RNAV).

**NOTE-**  
 Use NAVAIDs or waypoints to define direct routes and radials/bearings to define other unpublished routes.

**9. Block 9.** Enter the destination airport identifier code (or name if the identifier is unknown).

**10. Block 10.** Enter your estimated time en route based on latest forecast winds.



*TBL 5-1-4*  
**Aircraft COM, NAV, and Approach Equipment Qualifiers**

INSERT one letter as follows:

N if no COM/NAV/approach aid equipment for the route to be flown is carried, or the equipment is unserviceable,

(OR)

S if standard COM/NAV/approach aid equipment for the route to be flown is carried and serviceable (see Note 1),

(AND/OR)

INSERT one or more of the following letters to indicate the COM/NAV/approach aid equipment available and serviceable:

**NOTE-**

*The capabilities described below comprise the following elements:*

- a. Presence of relevant serviceable equipment on board the aircraft.*
- b. Equipment and capabilities commensurate with flight crew qualifications.*
- c. Where applicable, authorization from the appropriate authority.*

A	GBAS landing system	L	ILS
B	LPV (APV with SBAS)	M1	ATC RTF SATCOM (INMARSAT)
C	LORAN C	M2	ATC RTF (MTSAT)
D	DME	M3	ATC RTF (Iridium)
E1	FMC WPR ACARS	O	VOR
E2	D-FIS ACARS	P1	CPDLC RCP 400 (See Note 7.)
E3	PDC ACARS	P2	CPDLC RCP 240 (See Note 7.)
F	ADF	P3	SATVOICE RCP 400 (See Note 7.)
G	(GNSS) (See Note 2.)	P4- P9	Reserved for RCP
H	HF RTF	R	PBN approved (See Note 4.)
I	Inertial navigation	T	TACAN
J1	CPDLC ATN VDL Mode 2 (See Note 3.)	U	UHF RTF
J2	CPDLC FANS 1/A HF DL	V	VHF RTF
J3	CPDLC FANS 1/A VDL Mode 4	W	RVSM approved
J4	CPDLC FANS 1/A VDL Mode 2	X	MNPS approved/North Atlantic (NAT) High Level Airspace (HLA) approved
J5	CPDLC FANS 1/A SATCOM (INMARSAT)	Y	VHF with 8.33 kHz channel spacing capability
J6	CPDLC FANS 1/A SATCOM (MTSAT)	Z	Other equipment carried or other capabilities (See Note 5.)
J7	CPDLC FANS 1/A SATCOM (Iridium)		

**NOTE-**

- 1.** *If the letter S is used, standard equipment is considered to be VHF RTF, VOR, and ILS within U.S. domestic airspace.*
- 2.** *If the letter G is used, the types of external GNSS augmentation, if any, are specified in Item 18 following the indicator NAV/ and separated by a space.*
- 3.** *See RTCA/EUROCAE Interoperability Requirements Standard For ATN Baseline 1 (ATN B1 INTEROP Standard – DO-280B/ED-110B) for data link services air traffic control clearance and information/air traffic control communications management/air traffic control microphone check.*
- 4.** *If the letter R is used, the performance-based navigation levels that are authorized must be specified in Item 18 following the indicator PBN/. For further details, see Paragraph 5-1-9 b 8, Item 18 (c) and (d).*

- 5. If the letter Z is used, specify in Item 18 the other equipment carried, preceded by COM/, DAT/, and/or NAV/, as appropriate.
- 6. Information on navigation capability is provided to ATC for clearance and routing purposes.
- 7. Guidance on the application of performance-based communication, which prescribes RCP to an air traffic service in a specific area, is contained in the Performance-Based Communication and Surveillance (PBCS) Manual (Doc 9869).

**TBL 5-1-5**

**Aircraft Surveillance Equipment, Including Designators for Transponder, ADS-B, ADS-C, and Capabilities**

<p><i>INSERT N</i> if no surveillance equipment for the route to be flown is carried, or the equipment is unserviceable,  OR  <i>INSERT</i> one or more of the following descriptors, to a maximum of 20 characters, to describe the serviceable surveillance equipment and/or capabilities on board:</p>	
<b>SSR Modes A and C</b>	
A	Transponder - Mode A (4 digits – 4096 codes)
C	Transponder - Mode A (4 digits – 4096 codes) and Mode C
<b>SSR Mode S</b>	
E	Transponder - Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability
H	Transponder - Mode S, including aircraft identification, pressure-altitude and enhanced surveillance capability
I	Transponder - Mode S, including aircraft identification, but no pressure-altitude capability
L	Transponder - Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS B) and enhanced surveillance capability
P	Transponder - Mode S, including pressure-altitude, but no aircraft identification capability
S	Transponder - Mode S, including both pressure-altitude and aircraft identification capability
X	Transponder - Mode S with neither aircraft identification nor pressure-altitude capability
<p><b>NOTE-</b>  <i>Enhanced surveillance capability is the ability of the aircraft to down-link aircraft derived data via a Mode S transponder.</i></p>	
<b>Followed by one or more of the following codes if the aircraft has ADS-B capability:</b>	
B1	ADS-B with dedicated 1090 MHz ADS-B “out” capability
B2	ADS-B with dedicated 1090 MHz ADS-B “out” and “in” capability
U1	ADS-B “out” capability using UAT
U2	ADS-B “out” and “in” capability using UAT
V1	ADS-B “out” capability using VDL Mode 4
V2	ADS-B “out” and “in” capability using VDL Mode 4
<p><b>NOTE-</b>  <i>File no more than one code for each type of capability; for example, file B1 or B2, but not both.</i></p>	
<b>Followed by one or more of the following codes if the aircraft has ADS-C capability:</b>	
D1	ADS-C with FANS 1/A capabilities
G1	ADS-C with ATN capabilities

**EXAMPLE-**

- 1. SDGW/SB1U1 {VOR, ILS, VHF, DME, GNSS, RVSM, Mode S transponder, ADS-B 1090 Extended Squitter out, ADS-B UAT out}
- 2. S/C {VOR, ILS, VHF, Mode C transponder}

	RNP SPECIFICATIONS
L1	RNP 4
O1	Basic RNP 1 all permitted sensors
O2	Basic RNP 1 GNSS
O3	Basic RNP 1 DME/DME
O4	Basic RNP 1 DME/DME/IRU
S1	RNP APCH
S2	RNP APCH with BARO-VNAV
T1	RNP AR APCH with RF (special authorization required)
T2	RNP AR APCH without RF (special authorization required)

**NOTE-**

Combinations of alphanumeric characters not indicated above are reserved.

(d) NAV/ Significant data related to navigation equipment, other than as specified in PBN/.

(1) When Performance Based Navigation Capability has been filed in PBN/, if PBN routing is desired for only some segment(s) of the flight then that information can be conveyed by inserting the character “Z” in Item 10 and “NAV/RNV” in field 18 followed by the appropriate RNAV accuracy value(s) per the following:

[a] To be assigned an RNAV 1 SID, insert the characters “D1”.

[b] To be assigned an RNAV 1 STAR, insert the characters “A1”.

[c] To be assigned en route extensions and/or RNAV PTP, insert the characters “E2”.

[d] To prevent assignment of an RNAV route or procedure, insert a numeric value of “0” for the segment of the flight. Alternatively, you may simply remove the segment of the flight indicator and numeric value from the character string.

**EXAMPLE-**

- NAV/RNVD1 or NAV/RNVD1E0A0 (Same meaning)
- NAV/RNVA1 or NAV/RNVD0E0A1 (Same meaning)
- NAV/RNVE2 or NAV/RNVD0E2A0 (Same meaning)
- NAV/RNVD1A1 or NAV/RNVD1E0A1 (Same meaning)
- NAV/RNVD1E2A1

**NOTE-**

- Route assignments are predicated on NAV/ data over PBN/ data in ERAS.

2. Aircraft certification requirements for RNAV operations within U.S. airspace are defined in AC 20-138, Airworthiness Approval of Positioning and Navigation Systems, and AC 90-100, U.S. Terminal and En Route Area Navigation (RNAV) Operations.

(2) Operators should file their maximum capabilities in order to qualify for the most advanced procedures.

(e) COM/ Indicate communications capabilities not specified in Item 10a, when requested by an air navigation service provider.

(f) DAT/ Indicate data applications or capabilities not specified in Item 10a, when requested by an Air Navigation Service Provider.

(g) SUR/ Indicate surveillance capabilities not specified in Item 10b, when requested by an Air Navigation Service Provider.

(1) If ADS-B capability filed in Item 10 is compliant with RTCA DO-260B, include the item “260B” in SUR/. If ADS-B capability filed in Item 10 is compliant with RTCA DO-282B, include the item “282B” in SUR/.

**EXAMPLE-**

- SUR/260B
- SUR/260B 282B

(2) When Required Surveillance Performance (RSP) Capability has been filed in SUR/, this can be conveyed by inserting the character “Z” in Item 10 and “SUR/” in field 18 followed by the appropriate RSP performance per the following:

[a] For RSP 180 – flight plan RSP180

[b] For RSP 400 – flight plan RSP400

**EXAMPLE-**

- SUR/ RSP180
- SUR/ RSP400
- SUR/ RSP180 RSP400

(h) DEP/ Insert the non-ICAO identifier, or fix/radial/distance from navaid, or latitude/longitude, if ZZZZ is inserted in Item 13. Optionally, append the name of the departure point.

**EXAMPLE-**

- DEP/T23 ALBANY MUNI
- DEP/T23
- DEP/UKW197011 TICK HOLLR RANCH
- DEP/4620N07805W

(i) DEST/ Insert the non-ICAO identifier, or fix/radial/distance from navaid, or latitude/longitude, if ZZZZ is inserted in Item 16. Optionally, append the name of the destination point.

**EXAMPLE-**

1. DEST/T23 ALBANY MUNI
2. DEST/PIE335033 LEXI DUNES
3. DEST/4620N07805W

(j) DOF/ The date of flight departure in a six figure format (YYMMDD, where YY equals the year, MM equals the month, and DD equals the day). The FAA will not accept flight plans filed with Date of Flight resulting in more than a day in advance.

(k) REG/ The registration markings of the aircraft, if different from the aircraft identification in Item 7. Note that the FAA uses this information in monitoring of RVSM and ADS-B performance.

(l) EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times to such points or FIR boundaries.

**EXAMPLE-**

EET/KZLA0745 KZAB0830

(m) SEL/ SELCAL code.

(n) TYP/ Insert the type of aircraft if ZZZZ was entered in Item 9. If necessary, insert the number and type(s) of aircraft in a formation.

**EXAMPLE-**

1. TYP/Homebuilt
2. TYP/2 P51 B17 B24

(o) CODE/ Aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) when required by the appropriate ATS authority. Include CODE/ when ADS-B capability is filed in Item 10.

**EXAMPLE-**

"F00001" is the lowest aircraft address contained in the specific block administered by ICAO.

(p) DLE/ En route delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four figure time in hours and minutes (hhmm).

**EXAMPLE-**

DLE/MDG0030

(q) OPR/ Name of the operator, if not obvious from the aircraft identification in Item 7.

(r) ORGN/ The originator's 8-letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority. The FAA does not require ORGN/ information.

**NOTE-**

In some areas, flight plan reception centers may insert the ORGN/ identifier and originator's AFTN address automatically.

(s) PER/ Aircraft performance data, indicated by a single letter as specified in the Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS, Doc 8168), Volume I - Flight Procedures, if so prescribed by the appropriate ATS authority. Note that the FAA does not require PER/ information.

(t) ALTN/ Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16.

**EXAMPLE-**

1. ALTN/F35 POSSUM KINGDOM
2. ALTN/TCC233016 LAZY S RANCH

(u) RALT/ ICAO 4-letter indicator(s) for en-route alternate(s), as specified in Doc 7910, Location Indicators, or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

(v) TALT/ ICAO 4-letter indicator(s) for take-off alternate, as specified in Doc 7910, Location Indicators, or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

(w) RIF/ The route details to the revised destination aerodrome, followed by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.

**EXAMPLE-**

1. RIF/DTA HEC KLAX
2. RIF/ESP G94 CLA YPPH

(x) RMK/ Any other plain-language remarks when required by the ATC or deemed necessary.

**EXAMPLE–****1. RMK/NRP****2. RMK/DRVSN**

(y) RVR/ The minimum RVR requirement of the flight in meters. This item is defined by Eurocontrol, not ICAO. The FAA does not require or use this item, but will accept it in a flight plan.

**NOTE–**

*This provision is detailed in the European Regional Supplementary Procedures (EUR SUPPs, Doc 7030), Chapter 2.*

(z) RFP/ Q followed by a digit to indicate the sequence of the replacement flight plan being submitted. This item is defined by Eurocontrol, not ICAO. The FAA will not use this item, but will accept it in a flight plan.

**NOTE–**

*This provision is detailed in the European Regional Supplementary Procedures (EUR SUPPs, Doc 7030), chapter 2.*

**9. Item 19. Supplementary Information****NOTE–**

*Item 19 data must be included when completing FAA Form 7233–4. This information will be retained by the facility/organization that transmits the flight plan to Air Traffic Control (ATC), for Search and Rescue purposes, but it will not be transmitted to ATC as part of the FPL.*

(a) E/ (ENDURANCE). Insert 4–digits group giving the fuel endurance in hours and minutes.

(b) P/ (PERSONS ON BOARD). Insert the total number of persons (passengers and crew) on board.

(c) Emergency and survival equipment

(1) R/ (RADIO).

[a] Cross out “UHF” if frequency 243.0 MHz is not available.

[b] Cross out “VHF” frequency 121.5 MHz is not available.

[c] Cross out “ELBA” if emergency locator transmitter (ELT) is not available.

(2) S/ (SURVIVAL EQUIPMENT).

[a] Cross out “POLAR” if polar survival equipment is not carried.

[b] Cross out “DESERT” if desert survival equipment is not carried.

[c] Cross out “MARITIME” if maritime survival equipment is not carried.

[d] Cross out J if “JUNGLE” survival equipment is not carried.

(3) J/ (JACKETS).

[a] Cross out “LIGHT” if life jackets are not equipped with lights.

[b] Cross out “FLUORES” if life jackets are not equipped with fluorescein.

[c] Cross out “UHF” or “VHF” or both as in R/ above to indicate radio capability of jackets, if any.

(4) D/ (DINGHIES).

[a] NUMBER. Cross out indicators “NUMBER” and “CAPACITY” if no dinghies are carried, or insert number of dinghies carried; and

[b] CAPACITY. Insert total capacity, in persons, of all dinghies carried; and

[c] COVER. Cross out indicator “COVER” if dinghies are not covered; and

[d] COLOR. Insert color of dinghies if carried.

(5) A/ (AIRCRAFT COLOR AND MARKINGS). Insert color of aircraft and significant markings.

(6) N/ (REMARKS). Cross out indicator N if no remarks, or indicate any other survival equipment carried and any other remarks regarding survival equipment.

(7) C/ (PILOT). Insert name of pilot–in–command.

**5–1–10. IFR Operations to High Altitude Destinations**

a. Pilots planning IFR flights to airports located in mountainous terrain are cautioned to consider the necessity for an alternate airport even when the forecast weather conditions would technically relieve them from the requirement to file one.

**REFERENCE–**

*14 CFR Section 91.167.*

*AIM, Paragraph 4–1–19, Tower En Route Control (TEC)*

**b.** The FAA has identified three possible situations where the failure to plan for an alternate airport when flying IFR to such a destination airport could result in a critical situation if the weather is less than forecast and sufficient fuel is not available to proceed to a suitable airport.

**1.** An IFR flight to an airport where the Minimum Descent Altitudes (MDAs) or landing visibility minimums for *all instrument approaches* are higher than the forecast weather minimums specified in 14 CFR Section 91.167(b). For example, there are 3 high altitude airports in the U.S. with approved instrument approach procedures where all of the MDAs are greater than 2,000 feet and/or the landing visibility minimums are greater than 3 miles (Bishop, California; South Lake Tahoe, California; and Aspen–Pitkin Co./Sardy Field, Colorado). In the case of these airports, it is possible for a pilot to elect, on the basis of forecasts, not to carry sufficient fuel to get to an alternate when the ceiling and/or visibility is actually lower than that necessary to complete the approach.

**2.** A small number of other airports in mountainous terrain have MDAs which are slightly (100 to 300 feet) below 2,000 feet AGL. In situations where there is an option as to whether to plan for an alternate, pilots should bear in mind that just a slight worsening of the weather conditions from those forecast could place the airport below the published IFR landing minimums.

**3.** An IFR flight to an airport which requires special equipment; i.e., DME, glide slope, etc., in order to make the available approaches to the lowest minimums. Pilots should be aware that all other minimums on the approach charts may require weather conditions better than those specified in 14 CFR Section 91.167(b). An inflight equipment malfunction could result in the inability to comply with the published approach procedures or, again, in the position of having the airport below the published IFR landing minimums for all remaining instrument approach alternatives.

### **5–1–11. Flights Outside the U.S. and U.S. Territories**

**a.** When conducting flights, particularly extended flights, outside the U.S. and its territories, full account should be taken of the amount and quality of air navigation services available in the airspace to be

traversed. Every effort should be made to secure information on the location and range of navigational aids, availability of communications and meteorological services, the provision of air traffic services, including alerting service, and the existence of search and rescue services.

**b.** Pilots should remember that there is a need to continuously guard the VHF emergency frequency 121.5 MHz when on long over-water flights, except when communications on other VHF channels, equipment limitations, or cockpit duties prevent simultaneous guarding of two channels. Guarding of 121.5 MHz is particularly critical when operating in proximity to Flight Information Region (FIR) boundaries, for example, operations on Route R220 between Anchorage and Tokyo, since it serves to facilitate communications with regard to aircraft which may experience in-flight emergencies, communications, or navigational difficulties.

#### **REFERENCE–**

*ICAO Annex 10, Vol II, Paras 5.2.2.1.1.1 and 5.2.2.1.1.2.*

**c.** The filing of a flight plan, always good practice, takes on added significance for extended flights outside U.S. airspace and is, in fact, usually required by the laws of the countries being visited or overflown. It is also particularly important in the case of such flights that pilots leave a complete itinerary and schedule of the flight with someone directly concerned and keep that person advised of the flight's progress. If serious doubt arises as to the safety of the flight, that person should first contact the appropriate FSS. Round Robin Flight Plans to Mexico are not accepted.

**d.** All pilots should review the foreign airspace and entry restrictions published in the IFIM during the flight planning process. Foreign airspace penetration without official authorization can involve both danger to the aircraft and the imposition of severe penalties and inconvenience to both passengers and crew. A flight plan on file with ATC authorities does not necessarily constitute the prior permission required by certain other authorities. The possibility of fatal consequences cannot be ignored in some areas of the world.

**e.** Current NOTAMs for foreign locations must also be reviewed. The publication Notices to Airmen, Domestic/International, published biweekly, contains considerable information pertinent to foreign flight. Current foreign NOTAMs are also available

from the U.S. International NOTAM Office in Washington, D.C., through any local FSS.

f. When customs notification is required, it is the responsibility of the pilot to arrange for customs notification in a timely manner. The following guidelines are applicable:

1. When customs notification is required on flights to Canada and Mexico and a predeparture flight plan cannot be filed or an advise customs message (ADCUS) cannot be included in a predeparture flight plan, call the nearest en route domestic or International FSS as soon as radio communication can be established and file a VFR or DVFR flight plan, as required, and include as the last item the advise customs information. The station with which such a flight plan is filed will forward it to the appropriate FSS who will notify the customs office responsible for the destination airport.

2. If the pilot fails to include ADCUS in the radioed flight plan, it will be assumed that other arrangements have been made and FAA will not advise customs.

3. The FAA assumes no responsibility for any delays in advising customs if the flight plan is given too late for delivery to customs before arrival of the aircraft. **It is still the pilot's responsibility to give timely notice even though a flight plan is given to FAA.**

4. Air Commerce Regulations of the Treasury Department's Customs Service require all private aircraft arriving in the U.S. via:

(a) The U.S./Mexican border or the Pacific Coast from a foreign place in the Western Hemisphere south of 33 degrees north latitude and between 97 degrees and 120 degrees west longitude; or

(b) The Gulf of Mexico and Atlantic Coasts from a foreign place in the Western Hemisphere south of 30 degrees north latitude, must furnish a notice of arrival to the Customs service at the nearest designated airport. This notice may be furnished directly to Customs by:

(1) Radio through the appropriate FAA Flight Service Station.

(2) Normal FAA flight plan notification procedures (a flight plan filed in Mexico does not

meet this requirement due to unreliable relay of data); or

(3) Directly to the district Director of Customs or other Customs officer at place of first intended landing but must be furnished at least 1 hour prior to crossing the U.S./Mexican border or the U.S. coastline.

(c) This notice will be valid as long as actual arrival is within 15 minutes of the original ETA, otherwise a new notice must be given to Customs. Notices will be accepted up to 23 hours in advance. Unless an exemption has been granted by Customs, private aircraft are required to make first landing in the U.S. at one of the following designated airports nearest to the point of border of coastline crossing:

### Designated Airports

#### ARIZONA

Bisbee Douglas Intl Airport  
Douglas Municipal Airport  
Nogales Intl Airport  
Tucson Intl Airport  
Yuma MCAS–Yuma Intl Airport

#### CALIFORNIA

Calexico Intl Airport  
Brown Field Municipal Airport (San Diego)

#### FLORIDA

Fort Lauderdale Executive Airport  
Fort Lauderdale/Hollywood Intl Airport  
Key West Intl Airport (Miami Intl Airport)  
Opa Locka Airport (Miami)  
Kendall–Tamiami Executive Airport (Miami)  
St. Lucie County Intl Airport (Fort Pierce)  
Tampa Intl Airport  
Palm Beach Intl Airport (West Palm Beach)

#### LOUISIANA

New Orleans Intl Airport (Moisant Field)  
New Orleans Lakefront Airport

#### NEW MEXICO

Las Cruces Intl Airport

#### NORTH CAROLINA

New Hanover Intl Airport (Wilmington)

#### TEXAS

Brownsville/South Padre Island Intl Airport

Corpus Christi Intl Airport  
 Del Rio Intl Airport  
 Eagle Pass Municipal Airport  
 El Paso Intl Airport  
 William P. Hobby Airport (Houston)  
 Laredo Intl Airport  
 McAllen Miller Intl Airport  
 Presidio Lely Intl Airport

### 5-1-12. Change in Flight Plan

**a.** In addition to altitude or flight level, destination and/or route changes, increasing or decreasing the speed of an aircraft constitutes a change in a flight plan. Therefore, at any time the average true airspeed at cruising altitude between reporting points varies or is expected to vary from that given in the flight plan by *plus or minus 5 percent, or 10 knots, whichever is greater*; ATC should be advised.

**b.** All changes to existing flight plans should be completed more than 46 minutes prior to the proposed departure time. Changes must be made with the initial flight plan service provider. If the initial flight plan's service provider is unavailable, filers may contact an ATC facility or FSS to make the necessary revisions. Any revision 46 minutes or less from the proposed departure time must be coordinated through an ATC facility or FSS.

### 5-1-13. Change in Proposed Departure Time

**a.** To prevent computer saturation in the en route environment, parameters have been established to delete proposed departure flight plans which have not been activated. Most centers have this parameter set so as to delete these flight plans a minimum of 2 hours after the proposed departure time or Expect Departure Clearance Time (EDCT). To ensure that a flight plan remains active, pilots whose actual departure time will be delayed 2 hours or more beyond their filed departure time, are requested to notify ATC of their new proposed departure time.

**b.** Due to traffic saturation, ATC personnel frequently will be unable to accept these revisions via radio. It is recommended that you forward these revisions to a flight plan service provider or FSS.

### 5-1-14. Closing VFR/DVFR Flight Plans

A pilot is responsible for ensuring that his/her VFR or DVFR flight plan is canceled. You should close your flight plan with the nearest FSS, or if one is not available, you may request any ATC facility to relay your cancellation to the FSS. Control towers do not automatically close VFR or DVFR flight plans since they do not know if a particular VFR aircraft is on a flight plan. If you fail to report or cancel your flight plan within  $1/2$  hour after your ETA, search and rescue procedures are started.

#### REFERENCE-

14 CFR Section 91.153.

14 CFR Section 91.169.

### 5-1-15. Canceling IFR Flight Plan

**a.** 14 CFR Sections 91.153 and 91.169 include the statement "When a flight plan has been activated, the pilot-in-command, upon canceling or completing the flight under the flight plan, must notify an FAA Flight Service Station or ATC facility."

**b.** An IFR flight plan may be canceled at any time the flight is operating in VFR conditions outside Class A airspace by pilots stating "CANCEL MY IFR FLIGHT PLAN" to the controller or air/ground station with which they are communicating. Immediately after canceling an IFR flight plan, a pilot should take the necessary action to change to the appropriate air/ground frequency, VFR radar beacon code and VFR altitude or flight level.

**c.** ATC separation and information services will be discontinued, including radar services (where applicable). Consequently, if the canceling flight desires VFR radar advisory service, the pilot must specifically request it.

#### NOTE-

*Pilots must be aware that other procedures may be applicable to a flight that cancels an IFR flight plan within an area where a special program, such as a designated TRSA, Class C airspace, or Class B airspace, has been established.*

**d.** If a DVFR flight plan requirement exists, the pilot is responsible for filing this flight plan to replace the canceled IFR flight plan. If a subsequent IFR operation becomes necessary, a new IFR flight plan must be filed and an ATC clearance obtained before operating in IFR conditions.

**e.** If operating on an IFR flight plan to an airport with a functioning control tower, the flight plan is automatically closed upon landing.



f. If operating on an IFR flight plan to an airport where there is no functioning control tower, the pilot must initiate cancellation of the IFR flight plan. This can be done after landing if there is a functioning FSS or other means of direct communications with ATC. In the event there is no FSS and/or air/ground communications with ATC is not possible below a certain altitude, the pilot should, weather conditions permitting, cancel the IFR flight plan while still airborne and able to communicate with ATC by radio. This will not only save the time and expense of canceling the flight plan by telephone but will quickly release the airspace for use by other aircraft.

### 5-1-16. RNAV and RNP Operations

a. During the pre-flight planning phase the availability of the navigation infrastructure required for the intended operation, including any non-RNAV contingencies, must be confirmed for the period of intended operation. Availability of the onboard navigation equipment necessary for the route to be flown must be confirmed.

b. If a pilot determines a specified RNP level cannot be achieved, revise the route or delay the operation until appropriate RNP level can be ensured.

c. The onboard navigation database must be current and appropriate for the region of intended operation and must include the navigation aids, waypoints, and coded terminal airspace procedures for the departure, arrival and alternate airfields.

d. During system initialization, pilots of aircraft equipped with a Flight Management System or other RNAV-certified system, must confirm that the navigation database is current, and verify that the aircraft position has been entered correctly. Flight crews should crosscheck the cleared flight plan against charts or other applicable resources, as well as the navigation system textual display and the aircraft map display. This process includes confirmation of the waypoints sequence, reasonableness of track angles and distances, any altitude or speed constraints, and identification of fly-by or fly-over waypoints. A procedure must not be used if validity of the navigation database is in doubt.

e. Prior to commencing takeoff, the flight crew must verify that the RNAV system is operating

correctly and the correct airport and runway data have been loaded.

f. During the pre-flight planning phase RAIM prediction must be performed if TSO-C129() equipment is used to solely satisfy the RNAV and RNP requirement. GPS RAIM availability must be confirmed for the intended route of flight (route and time) using current GPS satellite information. In the event of a predicted, continuous loss of RAIM of more than five (5) minutes for any part of the intended flight, the flight should be delayed, canceled, or re-routed where RAIM requirements can be met. Operators may satisfy the predictive RAIM requirement through any one of the following methods:

1. Operators may monitor the status of each satellite in its plane/slot position, by accounting for the latest GPS constellation status (for example, NOTAMs or NANUs), and compute RAIM availability using model-specific RAIM prediction software;

2. Operators may use the Service Availability Prediction Tool (SAPT) on the FAA en route and terminal RAIM prediction website;

3. Operators may contact a Flight Service Station (not DUATS) to obtain non-precision approach RAIM;

4. Operators may use a third party interface, incorporating FAA/VOLPE RAIM prediction data without altering performance values, to predict RAIM outages for the aircraft's predicted flight path and times;

5. Operators may use the receiver's installed RAIM prediction capability (for TSO-C129a/Class A1/B1/C1 equipment) to provide non-precision approach RAIM, accounting for the latest GPS constellation status (for example, NOTAMs or NANUs). Receiver non-precision approach RAIM should be checked at airports spaced at intervals not to exceed 60 NM along the RNAV 1 procedure's flight track. "Terminal" or "Approach" RAIM must be available at the ETA over each airport checked; or,

6. Operators not using model-specific software or FAA/VOLPE RAIM data will need FAA operational approval.

**NOTE-**

*If TSO-C145/C146 equipment is used to satisfy the RNAV and RNP requirement, the pilot/operator need not perform the prediction if WAAS coverage is confirmed to be*

*available along the entire route of flight. Outside the U.S. or in areas where WAAS coverage is not available, operators using TSO-C145/C146 receivers are required to check GPS RAIM availability.*

### **5-1-17. Cold Temperature Operations**

Pilots should begin planning for operating into airports with cold temperatures during the preflight planning phase. Instrument approach charts will contain a snowflake symbol and a temperature when cold temperature correction must be applied. Pilots operating into airports requiring cold temperature corrections should request the lowest forecast temperature at the airport for departure and arrival times. If the temperature is forecast to be at or below any published cold temperature restriction, calculate an altitude correction for the appropriate segment(s)

and/or review procedures for operating automatic cold temperature compensating systems, as applicable. The pilot is responsible to calculate and apply the corrections to the affected segment(s) when the actual reported temperature is at or below any published cold temperature restriction, or pilots with automatic cold temperature compensating systems must ensure the system is on and operating on each designated segment. Advise ATC when intending to apply cold temperature correction and of the amount of correction required on initial contact (or as soon as possible) for the intermediate segment and/or the published missed approach. This information is required for ATC to provide aircraft appropriate vertical separation between known traffic.

**REFERENCE-**

*AIM, Paragraph 7-2-3, Altimeter Errors*

*AIM TBL 7-2-3, ICAO Cold Temperature Error*

## Section 2. Departure Procedures

### 5–2–1. Pre-taxi Clearance Procedures

**a.** Certain airports have established pre-taxi clearance programs whereby pilots of departing instrument flight rules (IFR) aircraft may elect to receive their IFR clearances before they start taxiing for takeoff. The following provisions are included in such procedures:

- 1.** Pilot participation is not mandatory.
- 2.** Participating pilots call clearance delivery or ground control not more than 10 minutes before proposed taxi time.
- 3.** IFR clearance (or delay information, if clearance cannot be obtained) is issued at the time of this initial call-up.
- 4.** When the IFR clearance is received on clearance delivery frequency, pilots call ground control when ready to taxi.
- 5.** Normally, pilots need not inform ground control that they have received IFR clearance on clearance delivery frequency. Certain locations may, however, require that the pilot inform ground control of a portion of the routing or that the IFR clearance has been received.
- 6.** If a pilot cannot establish contact on clearance delivery frequency or has not received an IFR clearance before ready to taxi, the pilot should contact ground control and inform the controller accordingly.

**b.** Locations where these procedures are in effect are indicated in the Chart Supplement U.S.

### 5–2–2. Automated Pre–Departure Clearance Procedures

**a.** Many airports in the National Airspace System are equipped with the Terminal Data Link System (TDLS) that includes the Pre–Departure Clearance (PDC) and Controller Pilot Data Link Communication–Departure Clearance (CPDLC–DCL) functions. Both the PDC and CPDLC–DCL functions automate the Clearance Delivery operations in the ATCT for participating users. Both functions display IFR clearances from the ARTCC to the ATCT. The Clearance Delivery controller in the ATCT can append local departure information and transmit the clearance via

data link to participating airline/service provider computers for PDC. The airline/service provider will then deliver the clearance via the Aircraft Communications Addressing and Reporting System (ACARS) or a similar data link system, or for non-data link equipped aircraft, via a printer located at the departure gate. For CPDLC–DCL, the departure clearance is uplinked from the ATCT via the Future Air Navigation System (FANS) to the aircraft avionics and requires a response from the flight crew. Both PDC and CPDLC–DCL reduce frequency congestion, controller workload, and are intended to mitigate delivery/read back errors.

**b.** Both services are available only to participating aircraft that have subscribed to the service through an approved service provider.

**c.** In all situations, the pilot is encouraged to contact clearance delivery if a question or concern exists regarding an automated clearance. Due to technical reasons, the following limitations/differences exist between the two services:

#### 1. PDC

**(a)** Aircraft filing multiple flight plans are limited to one PDC clearance per departure airport within an 18–hour period. Additional clearances will be delivered verbally.

**(b)** If the clearance is revised or modified prior to delivery, it will be rejected from PDC and the clearance will need to be delivered verbally.

**(c)** No acknowledgment of receipt or read back is required for a PDC.

#### 2. CPDLC–DCL

**(a)** No limitation to the number of clearances received.

**(b)** Allows delivery of revised flight data, including revised departure clearances.

**(c)** A response from the flight crew is required.

**(d)** Requires a logon to the FAA National Single Data Authority – KUSA – utilizing the ATC FANS application.

**(e)** To be eligible, operators must have received CPDLC/FANS authorization from the

responsible civil aviation authority, and file appropriate equipment information in ICAO field 10a and in the ICAO field 18 DAT (Other Data Applications) of the flight plan.

### 5-2-3. Taxi Clearance

Pilots on IFR flight plans should communicate with the control tower on the appropriate ground control or clearance delivery frequency, prior to starting engines, to receive engine start time, taxi and/or clearance information.

### 5-2-4. Line Up and Wait (LUAW)

**a.** Line up and wait is an air traffic control (ATC) procedure designed to position an aircraft onto the runway for an imminent departure. The ATC instruction “LINE UP AND WAIT” is used to instruct a pilot to taxi onto the departure runway and line up and wait.

**EXAMPLE-**

*Tower: “N234AR Runway 24L, line up and wait.”*

**b.** This ATC instruction is not an authorization to takeoff. In instances where the pilot has been instructed to line up and wait and has been advised of a reason/condition (wake turbulence, traffic on an intersecting runway, etc.) or the reason/condition is clearly visible (another aircraft that has landed on or is taking off on the same runway), and the reason/condition is satisfied, the pilot should expect an imminent takeoff clearance, unless advised of a delay. If you are uncertain about any ATC instruction or clearance, contact ATC immediately.

**c.** If a takeoff clearance is not received within a reasonable amount of time after clearance to line up and wait, ATC should be contacted.

**EXAMPLE-**

*Aircraft: Cessna 234AR holding in position Runway 24L.*

*Aircraft: Cessna 234AR holding in position Runway 24L at Bravo.*

**NOTE-**

*FAA analysis of accidents and incidents involving aircraft holding in position indicate that two minutes or more elapsed between the time the instruction was issued to line up and wait and the resulting event (for example, land-over or go-around). Pilots should consider the length of time that they have been holding in position whenever they*

*HAVE NOT been advised of any expected delay to determine when it is appropriate to query the controller.*

**REFERENCE-**

*Advisory Circulars 91-73A, Part 91 and Part 135 Single-Pilot Procedures during Taxi Operations, and 120-74A, Parts 91, 121, 125, and 135 Flightcrew Procedures during Taxi Operations*

**d.** Situational awareness during line up and wait operations is enhanced by monitoring ATC instructions/clearances issued to other aircraft. Pilots should listen carefully if another aircraft is on frequency that has a similar call sign and pay close attention to communications between ATC and other aircraft. If you are uncertain of an ATC instruction or clearance, query ATC immediately. Care should be taken to not inadvertently execute a clearance/instruction for another aircraft.

**e.** Pilots should be especially vigilant when conducting line up and wait operations at night or during reduced visibility conditions. They should scan the full length of the runway and look for aircraft on final approach or landing roll out when taxiing onto a runway. ATC should be contacted anytime there is a concern about a potential conflict.

**f.** When two or more runways are active, aircraft may be instructed to “LINE UP AND WAIT” on two or more runways. When multiple runway operations are being conducted, it is important to listen closely for your call sign and runway. Be alert for similar sounding call signs and acknowledge all instructions with your call sign. When you are holding in position and are not sure if the takeoff clearance was for you, ask ATC before you begin takeoff roll. ATC prefers that you confirm a takeoff clearance rather than mistake another aircraft’s clearance for your own.

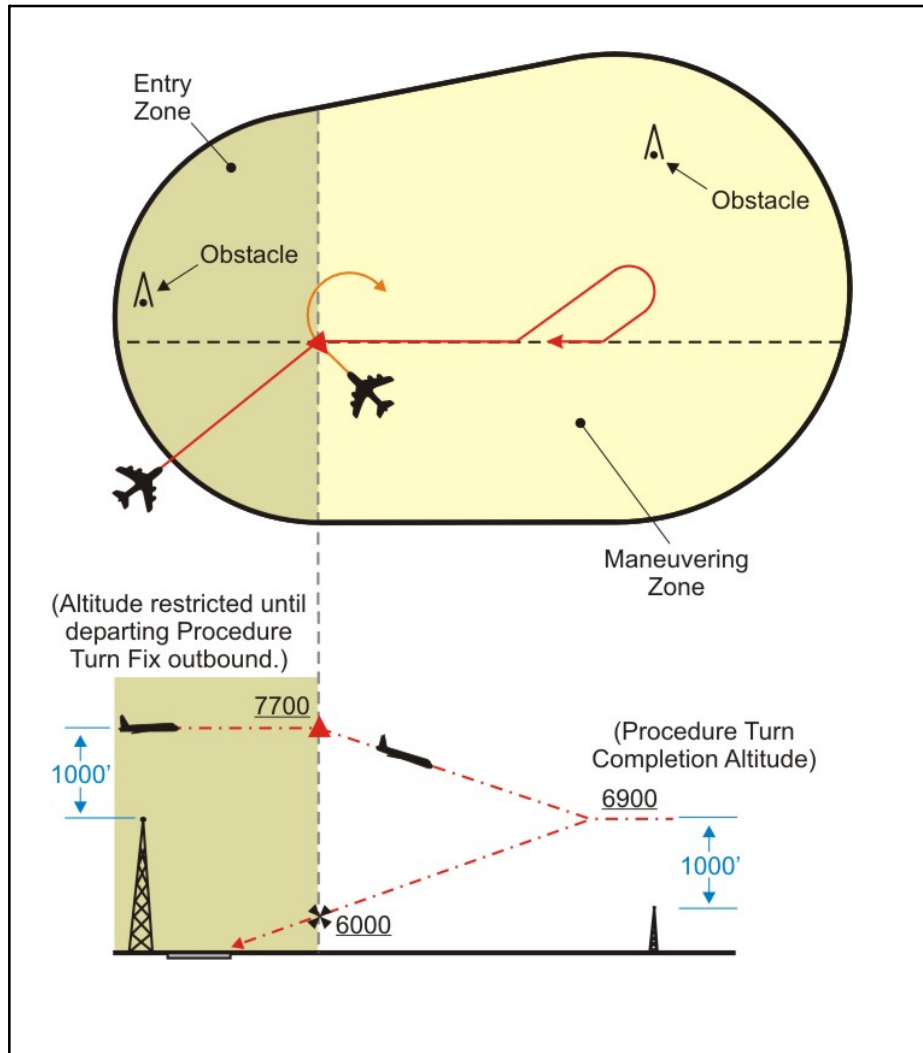
**g.** When ATC issues intersection “line up and wait” and takeoff clearances, the intersection designator will be used. If ATC omits the intersection designator, call ATC for clarification.

**EXAMPLE-**

*Aircraft: “Cherokee 234AR, Runway 24L at November 4, line up and wait.”*

**h.** If landing traffic is a factor during line up and wait operations, ATC will inform the aircraft in position of the closest traffic within 6 flying miles requesting a full-stop, touch-and-go, stop-and-go, or an unrestricted low approach to the same runway. Pilots should take care to note the position of landing traffic. ATC will also advise the landing traffic when an aircraft is authorized to “line up and wait” on the same runway.

FIG 5-4-18



3. When the approach procedure involves a procedure turn, a maximum speed of not greater than 200 knots (IAS) should be observed from first overhauling the course reversal IAF through the procedure turn maneuver to ensure containment within the obstruction clearance area. Pilots should begin the outbound turn immediately after passing the procedure turn fix. The procedure turn maneuver must be executed within the distance specified in the profile view. The normal procedure turn distance is 10 miles. This may be reduced to a minimum of 5 miles where only Category A or helicopter aircraft are to be operated or increased to as much as 15 miles to accommodate high performance aircraft.

4. A teardrop procedure or penetration turn may be specified in some procedures for a required course reversal. The teardrop procedure consists of departure from an initial approach fix on an outbound course followed by a turn toward and intercepting the inbound course at or prior to the intermediate fix or point. Its purpose is to permit an aircraft to reverse direction and lose considerable altitude within reasonably limited airspace. Where no fix is available to mark the beginning of the intermediate segment, it must be assumed to commence at a point 10 miles prior to the final approach fix. When the facility is located on the airport, an aircraft is considered to be on final approach upon completion of the penetration turn. However, the final approach segment begins on the final approach course 10 miles from the facility.

5. A holding pattern in lieu of procedure turn may be specified for course reversal in some procedures. In such cases, the holding pattern is established over an intermediate fix or a final approach fix. The holding pattern distance or time specified in the profile view must be observed. For a hold-in-lieu-of-PT, the holding pattern direction must be flown as depicted and the specified leg length/timing must not be exceeded. Maximum holding airspeed limitations as set forth for all holding patterns apply. The holding pattern maneuver is completed when the aircraft is established on the inbound course after executing the appropriate entry. If cleared for the approach prior to returning to the holding fix, and the aircraft is at the prescribed altitude, additional circuits of the holding pattern are not necessary nor expected by ATC. If pilots elect to make additional circuits to lose excessive altitude or to become better established on course, it is their responsibility to so advise ATC upon receipt of their approach clearance.

**NOTE—**

*Some approach charts have an arrival holding pattern depicted at the IAF using a “thin line” holding symbol. It is charted where holding is frequently required prior to starting the approach procedure so that detailed holding instructions are not required. The arrival holding pattern is not authorized unless assigned by Air Traffic Control. Holding at the same fix may also be depicted on the en route chart. A hold-in-lieu of procedure turn is depicted by a “thick line” symbol, and is part of the instrument approach procedure as described in paragraph 5-4-9. (See U. S. Terminal Procedures booklets page E1 for both examples.)*

6. A procedure turn is not required when an approach can be made directly from a specified intermediate fix to the final approach fix. In such cases, the term “NoPT” is used with the appropriate course and altitude to denote that the procedure turn is not required. If a procedure turn is desired, and when cleared to do so by ATC, descent below the procedure turn altitude should not be made until the aircraft is established on the inbound course, since some NoPT altitudes may be lower than the procedure turn altitudes.

**b. Limitations on Procedure Turns**

1. In the case of a radar initial approach to a final approach fix or position, or a timed approach from a holding fix, or where the procedure specifies NoPT, no pilot may make a procedure turn unless, when final approach clearance is received, the pilot so advises

ATC and a clearance is received to execute a procedure turn.

2. When a teardrop procedure turn is depicted and a course reversal is required, this type turn must be executed.

3. When a holding pattern replaces a procedure turn, the holding pattern must be followed, except when RADAR VECTORING is provided or when NoPT is shown on the approach course. The recommended entry procedures will ensure the aircraft remains within the holding pattern’s protected airspace. As in the procedure turn, the descent from the minimum holding pattern altitude to the final approach fix altitude (when lower) may not commence until the aircraft is established on the inbound course. Where a holding pattern is established in-lieu-of a procedure turn, the maximum holding pattern airspeeds apply.

**REFERENCE—**

*AIM, Paragraph 5-3-8 j2, Holding*

4. The absence of the procedure turn barb in the plan view indicates that a procedure turn is not authorized for that procedure.

**5-4-10. Timed Approaches from a Holding Fix**

**a. TIMED APPROACHES** may be conducted when the following conditions are met:

1. A control tower is in operation at the airport where the approaches are conducted.

2. Direct communications are maintained between the pilot and the center or approach controller until the pilot is instructed to contact the tower.

3. If more than one missed approach procedure is available, none require a course reversal.

4. If only one missed approach procedure is available, the following conditions are met:

(a) Course reversal is not required; and,

(b) Reported ceiling and visibility are equal to or greater than the highest prescribed circling minimums for the IAP.

5. When cleared for the approach, pilots must not execute a procedure turn. (14 CFR Section 91.175.)

**b.** Although the controller will not specifically state that “timed approaches are in use,” the assigning

*and plans to fly level for 30 seconds outbound before starting the turn back to the fix on final approach. If the winds were negligible at flight altitude, this procedure would bring the pilot inbound across the fix precisely at the specified time of 12:07. However, if expecting headwind on final approach, the pilot should shorten the 30 second outbound course somewhat, knowing that the wind will carry the aircraft away from the fix faster while outbound and decrease the ground speed while returning to the fix. On the other hand, compensating for a tailwind on final approach, the pilot should lengthen the calculated 30 second outbound heading somewhat, knowing that the wind would tend to hold the aircraft closer to the fix while outbound and increase the ground speed while returning to the fix.*

#### **5-4-11. Radar Approaches**

**a.** The only airborne radio equipment required for radar approaches is a functioning radio transmitter and receiver. The radar controller vectors the aircraft to align it with the runway centerline. The controller continues the vectors to keep the aircraft on course until the pilot can complete the approach and landing by visual reference to the surface. There are two types of radar approaches: Precision (PAR) and Surveillance (ASR).

**b.** A radar approach may be given to any aircraft upon request and may be offered to pilots of aircraft in distress or to expedite traffic, however, an ASR might not be approved unless there is an ATC operational requirement, or in an unusual or emergency situation. Acceptance of a PAR or ASR by a pilot does not waive the prescribed weather minimums for the airport or for the particular aircraft operator concerned. The decision to make a radar approach when the reported weather is below the established minimums rests with the pilot.

**c.** PAR and ASR minimums are published on separate pages in the FAA Terminal Procedures Publication (TPP).

**1. Precision Approach (PAR).** A PAR is one in which a controller provides highly accurate navigational guidance in azimuth and elevation to a pilot. Pilots are given headings to fly, to direct them to, and keep their aircraft aligned with the extended centerline of the landing runway. They are told to anticipate glidepath interception approximately 10 to 30 seconds before it occurs and when to start descent. The published Decision Height will be given only if the pilot requests it. If the aircraft is observed to deviate above or below the glidepath, the pilot is given the relative amount of deviation by use of terms “slightly” or “well” and is expected to adjust the aircraft’s rate of descent/ascent to return to the glidepath. Trend information is also issued with respect to the elevation of the aircraft and may be modified by the terms “rapidly” and “slowly”; e.g., “well above glidepath, coming down rapidly.”

Range from touchdown is given at least once each mile. If an aircraft is observed by the controller to proceed outside of specified safety zone limits in azimuth and/or elevation and continue to operate outside these prescribed limits, the pilot will be directed to execute a missed approach or to fly a specified course unless the pilot has the runway environment (runway, approach lights, etc.) in sight. Navigational guidance in azimuth and elevation is provided the pilot until the aircraft reaches the published Decision Height (DH). Advisory course and glidepath information is furnished by the controller until the aircraft passes over the landing threshold, at which point the pilot is advised of any deviation from the runway centerline. Radar service is automatically terminated upon completion of the approach.

**2. Surveillance Approach (ASR).** An ASR is one in which a controller provides navigational guidance in azimuth only. The pilot is furnished headings to fly to align the aircraft with the extended centerline of the landing runway. Since the radar information used for a surveillance approach is considerably less precise than that used for a precision approach, the accuracy of the approach will not be as great and higher minimums will apply. Guidance in elevation is not possible but the pilot will be advised when to commence descent to the Minimum Descent Altitude (MDA) or, if appropriate, to an intermediate step-down fix Minimum Crossing Altitude and subsequently to the prescribed MDA. In addition, the pilot will be advised of the location of the Missed Approach Point (MAP) prescribed for the procedure and the aircraft’s position each mile on final from the runway, airport or heliport or MAP, as appropriate. If requested by the pilot, recommended altitudes will be issued at each mile, based on the descent gradient established for the procedure, down to the last mile that is at or above the MDA. Normally, navigational guidance will be provided until the aircraft reaches the MAP. Controllers will terminate guidance and instruct the pilot to execute a missed approach unless at the MAP the pilot has the runway,

airport or heliport in sight or, for a helicopter point-in-space approach, the prescribed visual reference with the surface is established. Also, if, at any time during the approach the controller considers that safe guidance for the remainder of the approach cannot be provided, the controller will terminate guidance and instruct the pilot to execute a missed approach. Similarly, guidance termination and missed approach will be effected upon pilot request and, for civil aircraft only, controllers may terminate guidance when the pilot reports the runway, airport/heliport or visual surface route (point-in-space approach) in sight or otherwise indicates that continued guidance is not required. Radar service is automatically terminated at the completion of a radar approach.

**NOTE-**

1. The published MDA for straight-in approaches will be issued to the pilot before beginning descent. When a surveillance approach will terminate in a circle-to-land maneuver, the pilot must furnish the aircraft approach category to the controller. The controller will then provide the pilot with the appropriate MDA.

2. ASR APPROACHES ARE NOT AVAILABLE WHEN AN ATC FACILITY IS USING CENRAP.

3. **NO-GYRO Approach.** This approach is available to a pilot under radar control who experiences circumstances wherein the directional gyro or other stabilized compass is inoperative or inaccurate. When this occurs, the pilot should so advise ATC and request a No-Gyro vector or approach. Pilots of aircraft not equipped with a directional gyro or other stabilized compass who desire radar handling may also request a No-Gyro vector or approach. The pilot should make all turns at standard rate and should execute the turn immediately upon receipt of instructions. For example, "TURN RIGHT," "STOP TURN." When a surveillance or precision approach is made, the pilot will be advised after the aircraft has been turned onto final approach to make turns at half standard rate.

### 5-4-12. Radar Monitoring of Instrument Approaches

a. PAR facilities operated by the FAA and the military services at some joint-use (civil and

military) and military installations monitor aircraft on instrument approaches and issue radar advisories to the pilot when weather is below VFR minimums (1,000 and 3), at night, or when requested by a pilot. This service is provided only when the PAR Final Approach Course coincides with the final approach of the navigational aid and only during the operational hours of the PAR. The radar advisories serve only as a secondary aid since the pilot has selected the navigational aid as the primary aid for the approach.

b. Prior to starting final approach, the pilot will be advised of the frequency on which the advisories will be transmitted. If, for any reason, radar advisories cannot be furnished, the pilot will be so advised.

c. Advisory information, derived from radar observations, includes information on:

1. Passing the final approach fix inbound (nonprecision approach) or passing the outer marker or fix used in lieu of the outer marker inbound (precision approach).

**NOTE-**

At this point, the pilot may be requested to report sighting the approach lights or the runway.

2. Trend advisories with respect to elevation and/or azimuth radar position and movement will be provided.

**NOTE-**

Whenever the aircraft nears the PAR safety limit, the pilot will be advised that the aircraft is well above or below the glidepath or well left or right of course. Glidepath information is given only to those aircraft executing a precision approach, such as ILS. Altitude information is not transmitted to aircraft executing other than precision approaches because the descent portions of these approaches generally do not coincide with the depicted PAR glidepath.

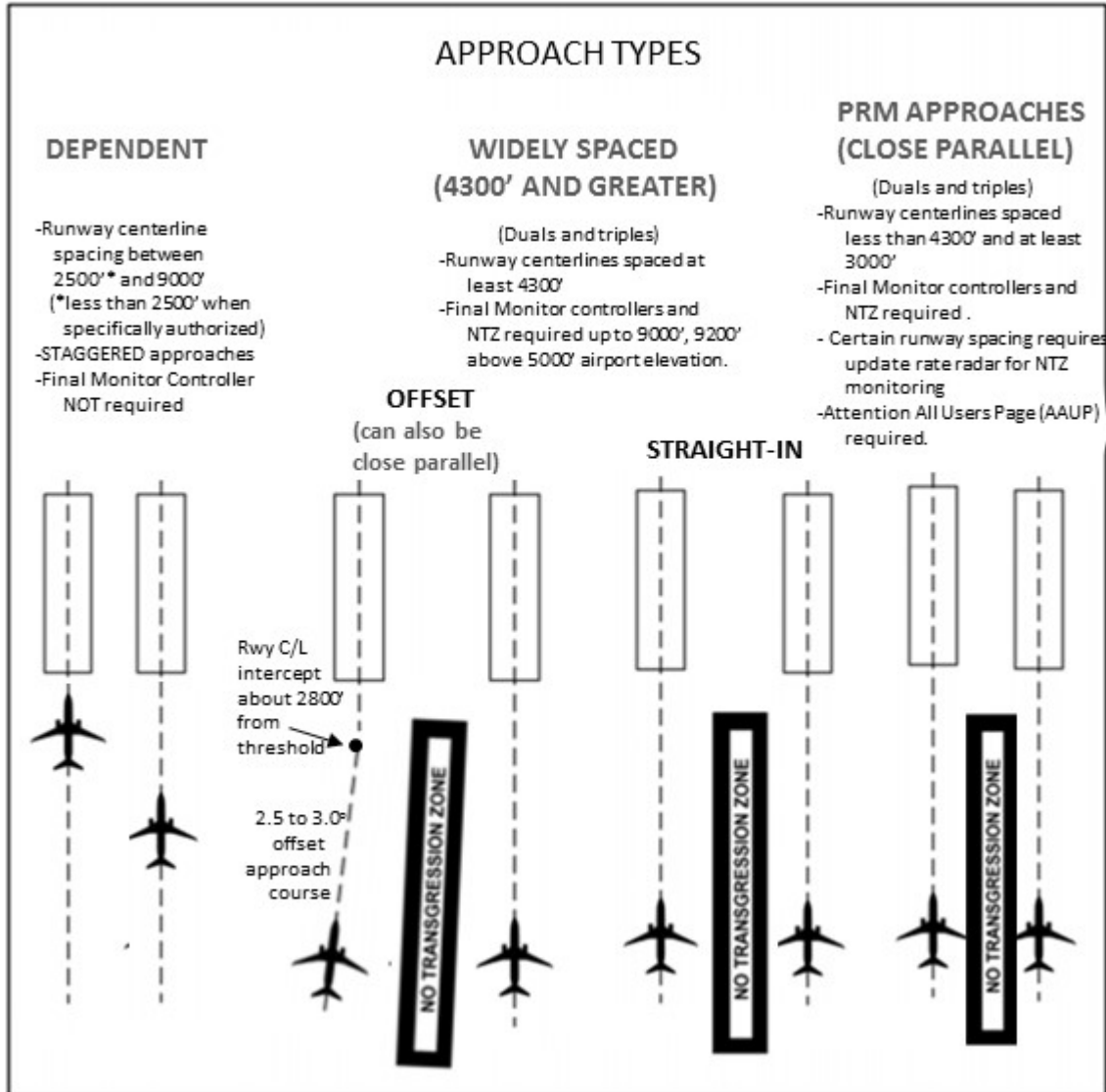
3. If, after repeated advisories, the aircraft proceeds outside the PAR safety limit or if a radical deviation is observed, the pilot will be advised to execute a missed approach unless the prescribed visual reference with the surface is established.

d. Radar service is automatically terminated upon completion of the approach.



**5-4-13. Simultaneous Approaches to Parallel Runways**

*FIG 5-4-20*  
**Simultaneous Approaches**  
 (Approach Courses Parallel and Offset between 2.5 and 3.0 degrees)



a. ATC procedures permit ILS/RNAV/GLS instrument approach operations to dual or triple parallel runway configurations. ILS/RNAV/GLS approaches to parallel runways are grouped into three classes: Simultaneous Dependent Approaches; Simultaneous Independent Approaches; and Simultaneous Close Parallel PRM Approaches. RNAV approach procedures that are approved for simultaneous operations require GPS as the sensor for position updating. VOR/DME, DME/DME and IRU RNAV updating is not authorized. The classification of a parallel runway approach procedure is dependent on adjacent parallel runway centerline separation, ATC procedures, and airport ATC final approach radar monitoring and communications capabilities. At some airports, one or more approach courses may be offset up to 3 degrees. ILS approaches with offset localizer configurations result in loss of Category II/III capabilities and an increase in decision altitude/height (50').

b. Depending on weather conditions, traffic volume, and the specific combination of runways being utilized for arrival operations, a runway may be used for different types of simultaneous operations, including closely spaced dependent or independent approaches. Pilots should ensure that they understand the type of operation that is being conducted, and ask ATC for clarification if necessary.

c. Parallel approach operations demand heightened pilot situational awareness. A thorough Approach Procedure Chart review should be conducted with, as a minimum, emphasis on the following approach chart information: name and number of the approach, localizer frequency, inbound localizer/azimuth course, glideslope/glidepath intercept altitude, glideslope crossing altitude at the final approach fix, decision height, missed approach instructions, special notes/procedures, and the assigned runway location/proximity to adjacent runways. Pilots are informed by ATC or through the ATIS that simultaneous approaches are in use.

d. The close proximity of adjacent aircraft conducting simultaneous independent approaches, especially simultaneous close parallel PRM ap-

proaches mandates strict pilot compliance with all ATC clearances. ATC assigned airspeeds, altitudes, and headings must be complied with in a timely manner. Autopilot coupled approaches require pilot knowledge of procedures necessary to comply with ATC instructions. Simultaneous independent approaches, particularly simultaneous close parallel PRM approaches necessitate precise approach course tracking to minimize final monitor controller intervention, and unwanted No Transgression Zone (NTZ) penetration. In the unlikely event of a breakout, ATC will not assign altitudes lower than the minimum vectoring altitude. Pilots should notify ATC immediately if there is a degradation of aircraft or navigation systems.

e. Strict radio discipline is mandatory during simultaneous independent and simultaneous close parallel PRM approach operations. This includes an alert listening watch and the avoidance of lengthy, unnecessary radio transmissions. Attention must be given to proper call sign usage to prevent the inadvertent execution of clearances intended for another aircraft. Use of abbreviated call signs must be avoided to preclude confusion of aircraft with similar sounding call signs. Pilots must be alert to unusually long periods of silence or any unusual background sounds in their radio receiver. A stuck microphone may block the issuance of ATC instructions on the tower frequency by the final monitor controller during simultaneous independent and simultaneous close parallel PRM approaches. In the case of PRM approaches, the use of a second frequency by the monitor controller mitigates the "stuck mike" or other blockage on the tower frequency.

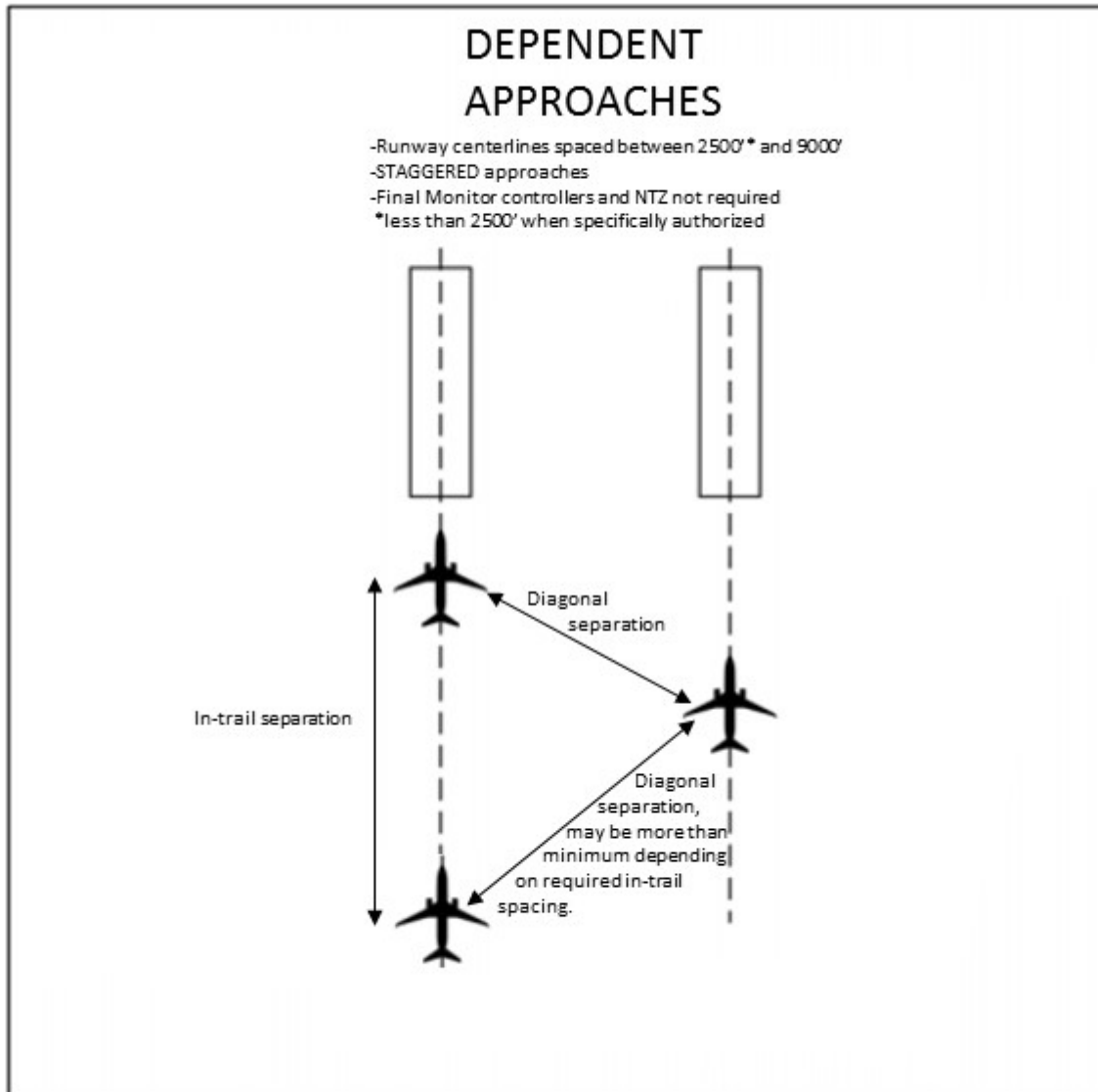
**REFERENCE—**

*AIM, Chapter 4, Section 2, Radio Communications Phraseology and Techniques, gives additional communications information.*

f. Use of Traffic Collision Avoidance Systems (TCAS) provides an additional element of safety to parallel approach operations. Pilots should follow recommended TCAS operating procedures presented in approved flight manuals, original equipment manufacturer recommendations, professional newsletters, and FAA publications.

### 5-4-14. Simultaneous Dependent Approaches

*FIG 5-4-21*  
**Simultaneous Approaches**  
**(Parallel Runways and Approach Courses)**



**a.** Simultaneous dependent approaches are an ATC procedure permitting approaches to airports having parallel runway centerlines separated by at least 2,500 feet up to 9,000 feet. Integral parts of a total system are ILS or other system providing approach navigation, radar, communications, ATC procedures, and required airborne equipment. RNAV equipment in the aircraft or GLS equipment on the ground and in the aircraft may replace the required airborne and ground based ILS equipment. Although non-precision minimums may be published, pilots must only use those procedures specifically authorized by chart note. For example, the chart note “LNAV NA during simultaneous operations,” requires vertical guidance. When given a choice, pilots should always fly a precision approach whenever possible.

**b.** A simultaneous dependent approach differs from a simultaneous independent approach in that, the minimum distance between parallel runway centerlines may be reduced; there is no requirement for radar monitoring or advisories; and a staggered separation of aircraft on the adjacent final course is required.

**c.** A minimum of 1.0 NM radar separation (diagonal) is required between successive aircraft on the adjacent final approach course when runway centerlines are at least 2,500 feet but no more than 3,600 feet apart. A minimum of 1.5 NM radar separation (diagonal) is required between successive aircraft on the adjacent final approach course when runway centerlines are more than 3,600 feet but no more than 8,300 feet apart. When runway centerlines are more than 8,300 feet but no more than 9,000 feet apart a minimum of 2 NM diagonal radar separation is provided. Aircraft on the same final approach course within 10 NM of the runway end are provided a minimum of 3 NM radar separation, reduced to 2.5 NM in certain circumstances. In addition, a minimum of 1,000 feet vertical or a minimum of three miles radar separation is provided between aircraft during turn on to the parallel final approach course.

**d.** Whenever parallel approaches are in use, pilots are informed by ATC or via the ATIS that approaches to both runways are in use. The charted IAP also notes

which runways may be used simultaneously. In addition, the radar controller will have the interphone capability of communicating with the tower controller where separation responsibility has not been delegated to the tower.

**NOTE-**

*ATC will not specifically identify these operations as being dependent when advertised on the ATIS.*

**EXAMPLE-**

*Simultaneous ILS Runway 19 right and ILS Runway 19 left in use.*

**e.** At certain airports, simultaneous dependent approaches are permitted to runways spaced less than 2,500 feet apart. In this case, ATC will provide no less than the minimum authorized diagonal separation with the leader always arriving on the same runway. The trailing aircraft is permitted reduced diagonal separation, instead of the single runway separation normally utilized for runways spaced less than 2,500 feet apart. For wake turbulence mitigation reasons:

**1.** Reduced diagonal spacing is only permitted when certain aircraft wake category pairings exist; typically when the leader is either in the large or small wake turbulence category, and

**2.** All aircraft must descend on the glideslope from the altitude at which they were cleared for the approach during these operations.

When reduced separation is authorized, the IAP briefing strip indicates that simultaneous operations require the use of vertical guidance and that the pilot should maintain last assigned altitude until intercepting the glideslope. No special pilot training is required to participate in these operations.

**NOTE-**

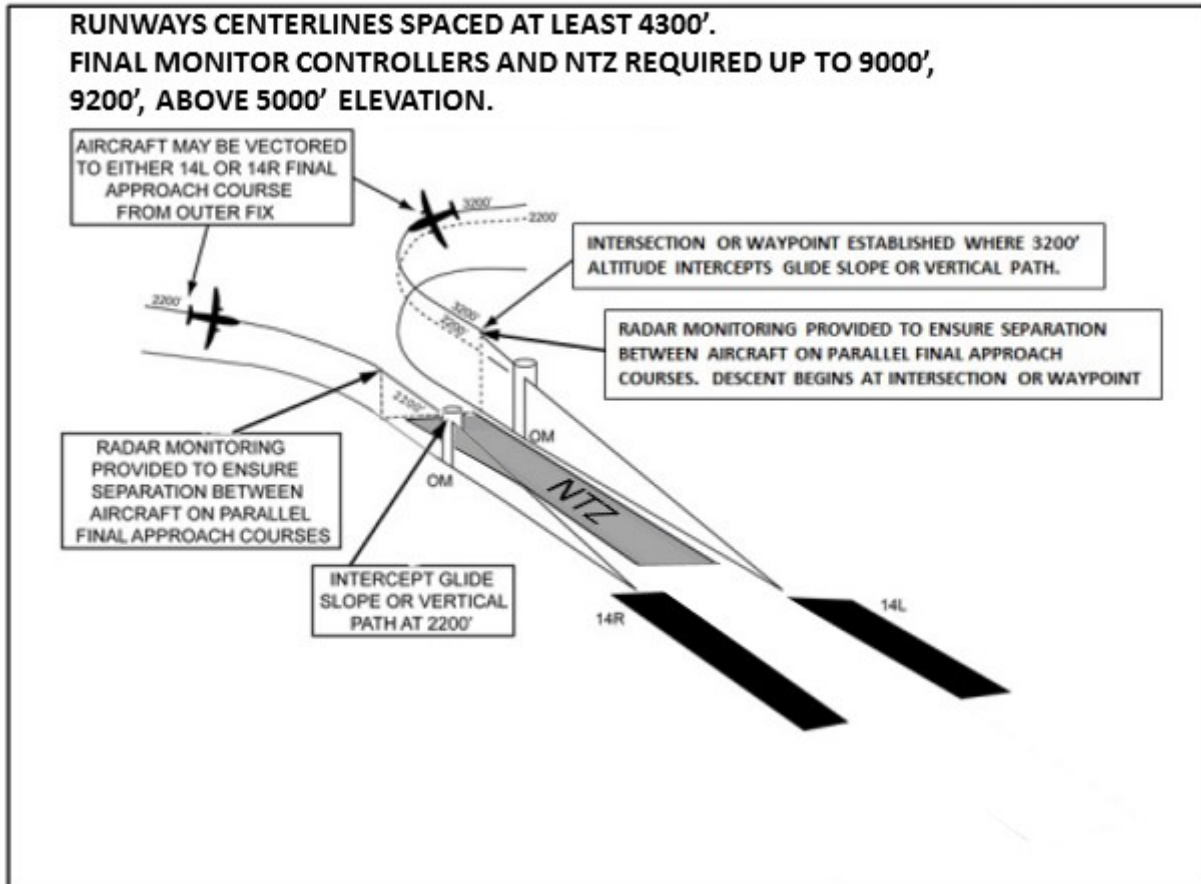
*Either simultaneous dependent approaches with reduced separation or SOIA PRM approaches may be conducted to Runways 28R and 28L at KSFO spaced 750 feet apart, depending on weather conditions and traffic volume. Pilots should use caution so as not to confuse these operations. Plan for SOIA procedures only when ATC assigns a PRM approach or the ATIS advertises PRM approaches are in use. KSFO is the only airport where both procedures are presently conducted.*

**REFERENCE-**

*AIM, Paragraph 5-4-16, Simultaneous Close Parallel PRM Approaches and Simultaneous Offset Instrument Approaches (SOIA)*

## 5-4-15. Simultaneous Independent ILS/RNAV/GLS Approaches

FIG 5-4-22  
Simultaneous Independent ILS/RNAV/GLS Approaches



**a. System.** An approach system permitting simultaneous approaches to parallel runways with centerlines separated by at least 4,300 feet. Separation between 4,300 and 9,000 feet (9,200' for airports above 5,000') utilizing NTZ final monitor controllers. Simultaneous independent approaches require NTZ radar monitoring to ensure separation between aircraft on the adjacent parallel approach course. Aircraft position is tracked by final monitor controllers who will issue instructions to aircraft observed deviating from the assigned final approach course. Staggered radar separation procedures are not utilized. Integral parts of a total system are radar, communications, ATC procedures, and ILS or other required airborne equipment. A chart note identifies that the approach is authorized for simultaneous use.

When simultaneous operations are in use, it will be

advertised on the ATIS. When advised that simultaneous approaches are in use, pilots must advise approach control immediately of malfunctioning or inoperative receivers, or if a simultaneous approach is not desired. Although non-precision minimums may be published, pilots must only use those procedures specifically authorized by chart note. For example, the chart note "LNAV NA during simultaneous operations," requires vertical guidance. When given a choice, pilots should always fly a precision approach whenever possible.

**NOTE-**

ATC does not use the word *independent* or *parallel* when advertising these operations on the ATIS.

**EXAMPLE-**

*Simultaneous ILS Runway 24 left and ILS Runway 24 right approaches in use.*

**b. Radar Services.** These services are provided for each simultaneous independent approach.

**1.** During turn on to parallel final approach, aircraft are normally provided 3 miles radar separation or a minimum of 1,000 feet vertical separation. The assigned altitude must be maintained until intercepting the glidepath, unless cleared otherwise by ATC. Aircraft will not be vectored to intercept the final approach course at an angle greater than thirty degrees.

**NOTE–**

*Some simultaneous operations permit the aircraft to track an RNAV course beginning on downwind and continuing in a turn to intercept the final approach course. In this case, separation with the aircraft on the adjacent final approach course is provided by the monitor controller with reference to an NTZ.*

**2.** The final monitor controller will have the capability of overriding the tower controller on the tower frequency.

**3.** Pilots will be instructed to contact the tower frequency prior to the point where NTZ monitoring begins.

**4.** Aircraft observed to overshoot the turn-on or to continue on a track which will penetrate the NTZ will be instructed to return to the correct final approach course immediately. The final monitor controller may cancel the approach clearance, and issue missed approach or other instructions to the deviating aircraft.

**PHRASEOLOGY–**

*“(Aircraft call sign) YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO THE FINAL APPROACH COURSE,”*

*or*

*“(aircraft call sign) TURN (left/right) AND RETURN TO THE FINAL APPROACH COURSE.”*

**5.** If a deviating aircraft fails to respond to such instructions or is observed penetrating the NTZ, the aircraft on the adjacent final approach course (if threatened), will be issued a breakout instruction.

**PHRASEOLOGY–**

*“TRAFFIC ALERT (aircraft call sign) TURN (left/right) IMMEDIATELY HEADING (degrees), (climb/descend) AND MAINTAIN (altitude).”*

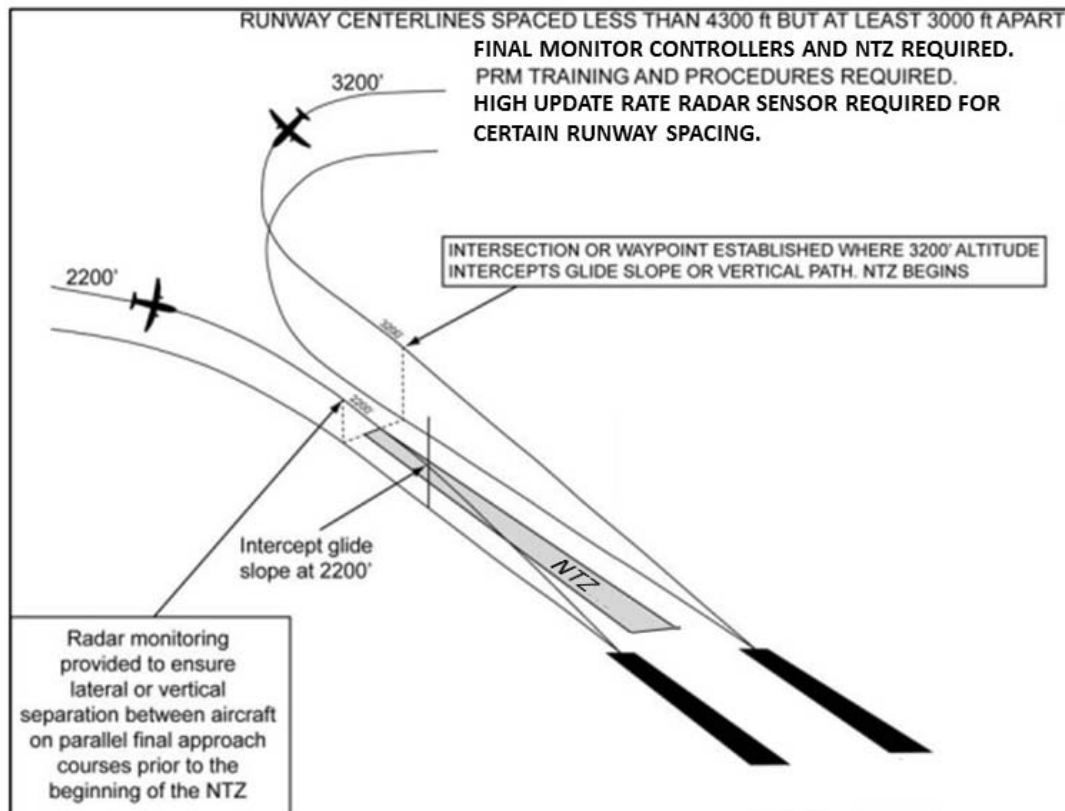
**6.** Radar monitoring will automatically be terminated when visual separation is applied, the aircraft reports the approach lights or runway in sight, or the aircraft is 1 NM or less from the runway threshold. Final monitor controllers will not advise pilots when radar monitoring is terminated.

**NOTE–**

*Simultaneous independent approaches conducted to runways spaced greater than 9,000 feet (or 9,200’ at airports above 5,000’) do not require an NTZ. However, from a pilot’s perspective, the same alerts relative to deviating aircraft will be provided by ATC as are provided when an NTZ is being monitored. Pilots may not be aware as to whether or not an NTZ is being monitored.*

## 5-4-16. Simultaneous Close Parallel PRM Approaches and Simultaneous Offset Instrument Approaches (SOIA)

FIG 5-4-23  
PRM Approaches  
Simultaneous Close Parallel



### a. System.

1. PRM is an acronym for the high update rate Precision Runway Monitor surveillance system which is required to monitor the No Transgression Zone (NTZ) for specific parallel runway separations used to conduct simultaneous close parallel approaches. PRM is also published in the title as part of the approach name for IAPs used to conduct Simultaneous Close Parallel approaches. "PRM" alerts pilots that specific airborne equipment, training, and procedures are applicable.

Because Simultaneous Close Parallel PRM approaches are independent, the NTZ and normal operating zone (NOZ) airspace between the final approach courses is monitored by two monitor controllers, one for each approach course. The NTZ monitoring system (final monitor aid) consists of a high resolution ATC radar display with automated tracking software which provides monitor controllers with aircraft identification, position, speed, and a

ten-second projected position, as well as visual and aural NTZ penetration alerts. A PRM high update rate surveillance sensor is a component of this system only for specific runway spacing. Additional procedures for simultaneous independent approaches are described in Paragraph 5-4-15, Simultaneous Independent ILS/RNAV/GLS Approaches.

2. Simultaneous Close Parallel PRM approaches, whether conducted utilizing a high update rate PRM surveillance sensor or not, must meet all of the following requirements: pilot training, PRM in the approach title, NTZ monitoring utilizing a final monitor aid, radar display, publication of an AAUP, and use of a secondary PRM communications frequency. PRM approaches are depicted on a separate IAP titled (Procedure type) PRM Rwy XXX (Simultaneous Close Parallel or Close Parallel).

#### NOTE-

ATC does not use the word "independent" when advertising these operations on the ATIS.

**EXAMPLE–**

*Simultaneous ILS PRM Runway 33 left and ILS PRM Runway 33 right approaches in use.*

(a) The pilot may request to conduct a different type of PRM approach to the same runway other than the one that is presently being used; for example, RNAV instead of ILS. However, pilots must always obtain ATC approval to conduct a different type of approach. Also, in the event of the loss of ground-based NAVAIDS, the ATIS may advertise other types of PRM approaches to the affected runway or runways.

(b) The Attention All Users Page (AAUP) will address procedures for conducting PRM approaches.

**b. Requirements and Procedures.** Besides system requirements and pilot procedures as identified in subparagraph a1 above, all pilots must have completed special training before accepting a clearance to conduct a PRM approach.

**1. Pilot Training Requirement.** Pilots must complete special pilot training, as outlined below, before accepting a clearance for a simultaneous close parallel PRM approach.

(a) For operations under 14 CFR Parts 121, 129, and 135, pilots must comply with FAA-approved company training as identified in their Operations Specifications. Training includes the requirement for pilots to view the FAA training slide presentation, “Precision Runway Monitor (PRM) Pilot Procedures.” Refer to [https://www.faa.gov/training\\_testing/training/prm/](https://www.faa.gov/training_testing/training/prm/) or search key words “FAA PRM” for additional information and to view or download the slide presentation.

(b) For operations under Part 91:

(1) Pilots operating transport category aircraft must be familiar with PRM operations as contained in this section of the AIM. In addition, pilots operating transport category aircraft must view the slide presentation, “Precision Runway Monitor (PRM) Pilot Procedures.” Refer to [https://www.faa.gov/training\\_testing/training/prm/](https://www.faa.gov/training_testing/training/prm/) or search key words “FAA PRM” for additional information and to view or download the slide presentation.

(2) Pilots *not* operating transport category aircraft must be familiar with PRM and SOIA

operations as contained in this section of the AIM. The FAA strongly recommends that pilots *not* involved in transport category aircraft operations view the FAA training slide presentation, “Precision Runway Monitor (PRM) Pilot Procedures.” Refer to [https://www.faa.gov/training\\_testing/training/prm/](https://www.faa.gov/training_testing/training/prm/) or search key words “FAA PRM” for additional information and to view or download the slide presentation.

**NOTE–**

*Depending on weather conditions, traffic volume, and the specific combination of runways being utilized for arrival operations, a runway may be used for different types of simultaneous operations, including closely spaced dependent or independent approaches. Use PRM procedures only when the ATIS advertises their use. For other types of simultaneous approaches, see paragraphs 5–4–14 and 5–4–15.*

**c. ATC Directed Breakout.** An ATC directed “breakout” is defined as a vector off the final approach course of a threatened aircraft in response to another aircraft penetrating the NTZ.

**d. Dual Communications.** The aircraft flying the PRM approach must have the capability of enabling the pilot/s to listen to two communications frequencies simultaneously. To avoid blocked transmissions, each runway will have two frequencies, a primary and a PRM monitor frequency. The tower controller will transmit on both frequencies. The monitor controller’s transmissions, if needed, will override both frequencies. Pilots will **ONLY** transmit on the tower controller’s frequency, but will listen to both frequencies. Select the PRM monitor frequency audio only when instructed by ATC to contact the tower. The volume levels should be set about the same on both radios so that the pilots will be able to hear transmissions on the PRM frequency if the tower is blocked. Site-specific procedures take precedence over the general information presented in this paragraph. Refer to the AAUP for applicable procedures at specific airports.

**e. Radar Services.**

**1.** During turn on to parallel final approach, aircraft will be provided 3 miles radar separation or a minimum of 1,000 feet vertical separation. The assigned altitude must be maintained until intercepting the glideslope/glidepath, unless cleared otherwise by ATC. Aircraft will not be vectored to intercept the final approach course at an angle greater than thirty degrees.



2. The final monitor controller will have the capability of overriding the tower controller on the tower frequency as well as transmitting on the PRM frequency.

3. Pilots will be instructed to contact the tower frequency prior to the point where NTZ monitoring begins. Pilots will begin monitoring the secondary PRM frequency at that time (see Dual VHF Communications Required below).

4. To ensure separation is maintained, and in order to avoid an imminent situation during PRM approaches, pilots must immediately comply with PRM monitor controller instructions.

5. Aircraft observed to overshoot the turn or to continue on a track which will penetrate the NTZ will be instructed to return to the correct final approach course immediately. The final monitor controller may cancel the approach clearance, and issue missed approach or other instructions to the deviating aircraft.

**PHRASEOLOGY–**

*“(Aircraft call sign) YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO THE FINAL APPROACH COURSE,”*

*or*

*“(Aircraft call sign) TURN (left/right) AND RETURN TO THE FINAL APPROACH COURSE.”*

6. If a deviating aircraft fails to respond to such instructions or is observed penetrating the NTZ, the aircraft on the adjacent final approach course (if threatened) will be issued a breakout instruction.

**PHRASEOLOGY–**

*“TRAFFIC ALERT (aircraft call sign) TURN (left/right) IMMEDIATELY HEADING (degrees), (climb/descend) AND MAINTAIN (altitude).”*

7. Radar monitoring will automatically be terminated when visual separation is applied, or the

aircraft reports the approach lights or runway in sight or within 1 NM of the runway threshold. Final monitor controllers will not advise pilots when radar monitoring is terminated.

**f. Attention All Users Page (AAUP).** At airports that conduct PRM operations, the AAUP informs pilots under the “General” section of information relative to all the PRM approaches published at a specific airport, and this section must be briefed in its entirety. Under the “Runway Specific” section, only items relative to the runway to be used for landing need be briefed. (See FIG 5–4–24.) A single AAUP is utilized for multiple PRM approach charts at the same airport, which are listed on the AAUP. The requirement for informing ATC if the pilot is unable to accept a PRM clearance is also presented. The “General” section of AAUP addresses the following:

1. Review of the procedure for executing a climbing or descending breakout;

2. Breakout phraseology beginning with the words, “Traffic Alert;”

3. Descending on the glideslope/glidepath meets all crossing restrictions;

4. Briefing the PRM approach also satisfies the non-PRM approach briefing of the same type of approach to the same runway; and

5. Description of the dual communications procedure.

The “Runway Specific” section of the AAUP addresses those issues which only apply to certain runway ends that utilize PRM approaches. There may be no Runway Specific procedures, a single item applicable to only one runway end, or multiple items for a single or multiple runway end/s. Examples of SOIA runway specific procedures are as follows:

*FIG 5-4-24*  
**PRM Attention All Users Page (AAUP)**

15288 PRM APPROACH AAUP	AL 166 (FAA)	USA INTL (USA) USA CITY
<p style="text-align: center;"><b><u>ATTENTION ALL USERS PAGE (AAUP)</u></b>  <b>(PRM CLOSE PARALLEL)</b></p> <p>Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ATC facility as soon as practical, but at least 120 miles from destination.</p> <p style="text-align: center;">ILS PRM or LOC PRM RwyS 10R, 10C, 28L, 28C  RNAV (GPS) PRM RWYS 10R, 10C, 28L, 28C</p> <p><b>General</b></p> <ul style="list-style-type: none"> <li>- Review procedure for executing a climbing and descending PRM breakout.</li> <li>- Breakout phraseology: "TRAFFIC ALERT (call sign) TURN (left/right) IMMEDIATELY HEADING (degrees) CLIMB/DESCEND AND MAINTAIN (altitude)."</li> <li>- All breakouts: Hand flown, initiate immediately.</li> <li>- Descending on the glideslope/glidepath ensures compliance with any charted crossing restrictions.</li> <li>- Dual VHF COMM: When assigned or planning a specific PRM approach, tune a second receiver to the PRM monitor frequency or, if silent, other active frequency (i.e., ATIS), set the volume, retune the PRM frequency if necessary, then deselect the audio. When directed by ATC, immediately switch to the tower frequency and select the secondary radio audio to ON.</li> <li>- If later assigned the same runway, non-PRM approach, consider it briefed provided the same minimums are utilized. PRM related chart notes and frequency no longer apply.</li> <li>- TCAS during breakout: Follow TCAS climb/descend if it differs from ATC, while executing the breakout turn.</li> </ul> <p><b>Runway Specific</b></p> <ul style="list-style-type: none"> <li>- Runway 10R: Exit at taxiway Tango whenever practical.</li> </ul>		
PRM APPROACH AAUP	41°59'N-87°54'W	USA INTL (USA) USA CITY

**g. Simultaneous Offset Instrument Approach (SOIA).**

1. SOIA is a procedure used to conduct simultaneous approaches to runways spaced less than 3,000 feet, but at least 750 feet apart. The SOIA procedure utilizes a straight-in PRM approach to one runway, and a PRM offset approach with glides-

lope/glidepath to the adjacent runway. In SOIA operations, aircraft are paired, with the aircraft conducting the straight-in PRM approach always positioned slightly ahead of the aircraft conducting the offset PRM approach.

2. The straight-in PRM approach plates used in SOIA operations are identical to other straight-in

PRM approach plates, with an additional note, which provides the separation between the two runways used for simultaneous SOIA approaches. The offset PRM approach plate displays the required notations for closely spaced approaches as well as depicts the visual segment of the approach.

**3.** Controllers monitor the SOIA PRM approaches in exactly the same manner as is done for other PRM approaches. The procedures and system requirements for SOIA PRM approaches are identical with those used for simultaneous close parallel PRM approaches until near the offset PRM approach missed approach point (MAP), where visual acquisition of the straight-in aircraft by the aircraft conducting the offset PRM approach occurs. Since SOIA PRM approaches are identical to other PRM approaches (except for the visual segment in the offset approach), an understanding of the procedures for conducting PRM approaches is essential before conducting a SOIA PRM operation.

**4.** In SOIA, the approach course separation (instead of the runway separation) meets established close parallel approach criteria. (See FIG 5-4-25 for the generic SOIA approach geometry.) A visual segment of the offset PRM approach is established between the offset MAP and the runway threshold. Aircraft transition in visual conditions from the offset course, beginning at the offset MAP, to align with the runway and can be stabilized by 500 feet above ground level (AGL) on the extended runway centerline. A cloud ceiling for the approach is established so that the aircraft conducting the offset approach has nominally at least 30 seconds or more to acquire the leading straight-in aircraft prior to reaching the offset MAP. If visual acquisition is not accomplished prior to crossing the offset MAP, a missed approach must be executed.

**5.** Flight Management System (FMS) coding of the offset RNAV PRM and GLS PRM approaches in a SOIA operation is different than other RNAV and GLS approach coding in that it does not match the initial missed approach procedure published on the charted IAP. In the SOIA design of the offset approach, lateral course guidance terminates at the

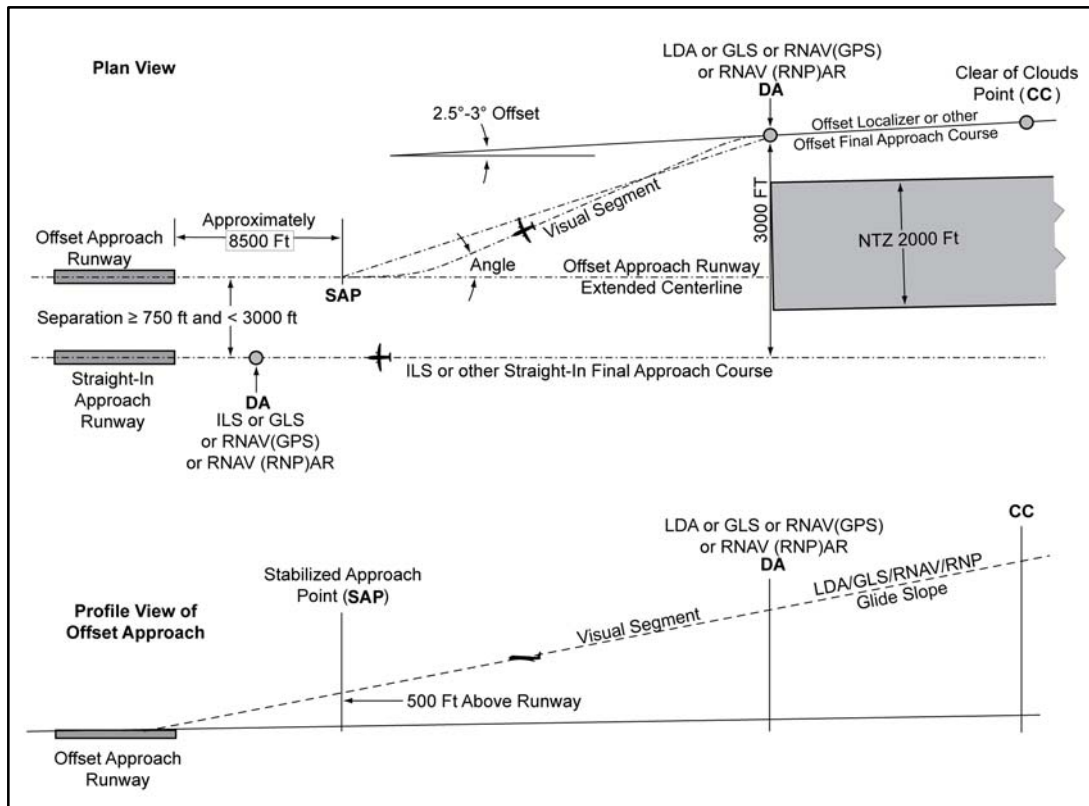
fictitious threshold point (FTP), which is an extension of the final approach course beyond the offset MAP to a point near the runway threshold. The FTP is designated in the approach coding as the MAP so that vertical guidance is available to the pilot to the runway threshold, just as vertical guidance is provided by the offset LDA glideslope. No matter what type of offset approach is being conducted, reliance on lateral guidance is discontinued at the charted MAP and replaced by visual maneuvering to accomplish runway alignment.

**(a)** As a result of this approach coding, when executing a missed approach at and after passing the charted offset MAP, a heading must initially be flown (either hand-flown or using autopilot “heading mode”) before engaging LNAV. If the pilot engages LNAV immediately, the aircraft may continue to track toward the FTP instead of commencing a turn toward the missed approach holding fix. Notes on the charted IAP and in the AAUP make specific reference to this procedure.

**(b)** Some FMSs do not code waypoints inside of the FAF as part of the approach. Therefore, the depicted MAP on the charted IAP may not be included in the offset approach coding. Pilots utilizing those FMSs may identify the location of the waypoint by noting its distance from the FTP as published on the charted IAP. In those same FMSs, the straight-in SOIA approach will not display a waypoint inside the PFAF. The same procedures may be utilized to identify an uncoded waypoint. In this case, the location is determined by noting its distance from the runway waypoint or using an authorized distance as published on the charted IAP.

**(c)** Because the FTP is coded as the MAP, the FMS map display will depict the initial missed approach course as beginning at the FTP. This depiction does not match the charted initial missed approach procedure on the IAP. Pilots are reminded that charted IAP guidance is to be followed, not the map display. Once the aircraft completes the initial turn when commencing a missed approach, the remainder of the procedure coding is standard and can be utilized as with any other IAP.

FIG 5-4-25  
SOIA Approach Geometry



**NOTE –**

**SAP** The stabilized approach point is a design point along the extended centerline of the intended landing runway on the glide slope/glide path at 500 feet above the runway threshold elevation. It is used to verify a sufficient distance is provided for the visual maneuver after the offset course approach DA to permit the pilots to conform to approved, stabilized approach criteria. The SAP is not published on the IAP.

**Offset Course DA** The point along the LDA, or other offset course, where the course separation with the adjacent ILS, or other straight-in course, reaches the minimum distance permitted to conduct closely spaced approaches. Typically that minimum distance will be 3,000 feet without the use of high update radar; with high update radar, course separation of less than 3,000 ft may be used when validated by a safety study. The altitude of the glide slope/glide path at that point determines the offset course approach decision altitude and is where the NTZ terminates. Maneuvering inside the DA is done in visual conditions.

**Visual Segment Angle** Angle, as determined by the SOIA design tool, formed by the extension of the straight segment of the calculated flight track (between the offset course MAP/DA and the SAP) and the extended runway centerline. The size of the angle is dependent on the aircraft approach categories (Category D or only selected categories/speeds) that are authorized to use the offset course approach and the spacing between the runways.

**Visibility** Distance from the offset course approach DA to runway threshold in statute mile.

**Procedure** *The aircraft on the offset course approach must see the runway-landing environment and, if ATC has advised that traffic on the straight-in approach is a factor, the offset course approach aircraft must visually acquire the straight-in approach aircraft and report it in sight to ATC prior to reaching the DA for the offset course approach.*

**CC** *The Clear of Clouds point is the position on the offset final approach course where aircraft first operate in visual meteorological conditions below the ceiling, when the actual weather conditions are at, or near, the minimum ceiling for SOIA operations. Ceiling is defined by the Aeronautical Information Manual.*

**6.** SOIA PRM approaches utilize the same dual communications procedures as do other PRM approaches.

**NOTE–**

*At KSFO, pilots conducting SOIA operations select the monitor frequency audio when communicating with the final radar controller, not the tower controller as is customary. In this special case, the monitor controller's transmissions, if required, override the final controller's frequency. This procedure is addressed on the AAUP.*

(a) SOIA utilizes the same AAUP format as do other PRM approaches. The minimum weather conditions that are required are listed. Because of the more complex nature of instructions for conducting SOIA approaches, the “Runway Specific” items are more numerous and lengthy.

(b) Examples of SOIA offset runway specific notes:

(1) Aircraft must remain on the offset course until passing the offset MAP prior to maneuvering to align with the centerline of the offset approach runway.

(2) Pilots are authorized to continue past the offset MAP to align with runway centerline when:

[a] the straight-in approach traffic is in sight and is expected to remain in sight,

[b] ATC has been advised that “traffic is in sight.” (ATC is not required to acknowledge this transmission),

[c] the runway environment is in sight. Otherwise, a missed approach must be executed. Between the offset MAP and the runway threshold, pilots conducting the offset PRM approach must not pass the straight-in aircraft and are responsible for separating themselves visually from traffic conducting the straight-in PRM approach to the adjacent runway, which means maneuvering the aircraft as necessary to avoid that traffic until landing, and

providing wake turbulence avoidance, if applicable. Pilots maintaining visual separation should advise ATC, as soon as practical, if visual contact with the aircraft conducting the straight-in PRM approach is lost and execute a missed approach unless otherwise instructed by ATC.

(c) Examples of SOIA straight-in runway specific notes:

(1) To facilitate the offset aircraft in providing wake mitigation, pilots should descend on, not above, the glideslope/glidepath.

(2) Conducting the straight-in approach, pilots should be aware that the aircraft conducting the offset approach will be approaching from the right/left rear and will be operating in close proximity to the straight-in aircraft.

**7. Recap.**

The following are differences between widely spaced simultaneous approaches (at least 4,300 feet between the runway centerlines) and Simultaneous PRM close parallel approaches which are of importance to the pilot:

(a) **Runway Spacing.** Prior to PRM simultaneous close parallel approaches, most ATC-directed breakouts were the result of two aircraft in-trail on the same final approach course getting too close together. Two aircraft going in the same direction did not mandate quick reaction times. With PRM closely spaced approaches, two aircraft could be alongside each other, navigating on courses that are separated by less than 4,300 feet and as close as 3,000 feet. In the unlikely event that an aircraft “blunders” off its course and makes a worst case turn of 30 degrees toward the adjacent final approach course, closing speeds of 135 feet per second could occur that constitute the need for quick reaction. A blunder has to be recognized by the monitor controller, and breakout instructions issued to the endangered aircraft. The pilot will not have any warning that a

breakout is imminent because the blundering aircraft will be on another frequency. It is important that, when a pilot receives breakout instructions, the assumption is made that a blundering aircraft is about to (or has penetrated the NTZ) and is heading toward his/her approach course. The pilot must initiate a breakout as soon as safety allows. While conducting PRM approaches, pilots must maintain an increased sense of awareness in order to immediately react to an ATC (breakout) instruction and maneuver (as instructed by ATC) away from a blundering aircraft.

**(b) Communications.** Dual VHF communications procedures should be carefully followed. One of the assumptions made that permits the safe conduct of PRM approaches is that there will be no blocked communications.

**(c) Hand-flown Breakouts.** The use of the autopilot is encouraged while flying a PRM approach, but the autopilot must be disengaged in the rare event that a breakout is issued. Simulation studies of breakouts have shown that a hand-flown breakout can be initiated consistently faster than a breakout performed using the autopilot.

**(d) TCAS.** The ATC breakout instruction is the primary means of conflict resolution. TCAS, if installed, provides another form of conflict resolution in the unlikely event other separation standards would fail. TCAS is not required to conduct a closely spaced approach.

The TCAS provides only vertical resolution of aircraft conflicts, while the ATC breakout instruction provides both vertical and horizontal guidance for conflict resolutions. Pilots should always immediately follow the TCAS Resolution Advisory (RA), whenever it is received. Should a TCAS RA be received before, during, or after an ATC breakout instruction is issued, the pilot should follow the RA, even if it conflicts with the climb/descent portion of the breakout maneuver. If following an RA requires deviating from an ATC clearance, the pilot must advise ATC as soon as practical. While following an RA, it is extremely important that the pilot also comply with the turn portion of the ATC breakout instruction unless the pilot determines safety to be a factor. Adhering to these procedures assures the pilot that acceptable “breakout” separation margins will always be provided, even in the face of a normal procedural or system failure.

#### 5-4-17. Simultaneous Converging Instrument Approaches

**a.** ATC may conduct instrument approaches simultaneously to converging runways; i.e., runways having an included angle from 15 to 100 degrees, at airports where a program has been specifically approved to do so.

**b.** The basic concept requires that dedicated, separate standard instrument approach procedures be developed for each converging runway included. These approaches can be identified by the letter “V” in the title; for example, “ILS V Rwy 17 (CONVERGING)”. Missed Approach Points must be at least 3 miles apart and missed approach procedures ensure that missed approach protected airspace does not overlap.

**c.** Other requirements are: radar availability, nonintersecting final approach courses, precision approach capability for each runway and, if runways intersect, controllers must be able to apply visual separation as well as intersecting runway separation criteria. Intersecting runways also require minimums of at least 700 foot ceilings and 2 miles visibility. Straight in approaches and landings must be made.

**d.** Whenever simultaneous converging approaches are in use, aircraft will be informed by the controller as soon as feasible after initial contact or via ATIS. Additionally, the radar controller will have direct communications capability with the tower controller where separation responsibility has not been delegated to the tower.

#### 5-4-18. RNP AR Instrument Approach Procedures

These procedures require authorization analogous to the special authorization required for Category II or III ILS procedures. Authorization required (AR) procedures are to be conducted by aircrews meeting special training requirements in aircraft that meet the specified performance and functional requirements.

##### **a. Unique characteristics of RNP AR Approaches**

**1. RNP value.** Each published line of minima has an associated RNP value. The indicated value defines the lateral and vertical performance requirements. A minimum RNP type is documented as part of the RNP AR authorization for each operator and may vary depending on aircraft configuration or

operational procedures (e.g., GPS inoperative, use of flight director vice autopilot).

**2. Curved path procedures.** Some RNP approaches have a curved path, also called a radius-to-a-fix (RF) leg. Since not all aircraft have the capability to fly these arcs, pilots are responsible for knowing if they can conduct an RNP approach with an arc or not. Aircraft speeds, winds and bank angles have been taken into consideration in the development of the procedures.

**3. RNP required for extraction or not.** Where required, the missed approach procedure may use RNP values less than RNP-1. The reliability of the navigation system has to be very high in order to conduct these approaches. Operation on these procedures generally requires redundant equipment, as no single point of failure can cause loss of both approach and missed approach navigation.

**4. Non-standard speeds or climb gradients.** RNP AR approaches are developed based on standard approach speeds and a 200 ft/NM climb gradient in the missed approach. Any exceptions to these standards will be indicated on the approach procedure, and the operator should ensure they can comply with any published restrictions before conducting the operation.

**5. Temperature Limits.** For aircraft using barometric vertical navigation (without temperature compensation) to conduct the approach, low and high-temperature limits are identified on the procedure. Cold temperatures reduce the glidepath angle while high temperatures increase the glidepath angle. Aircraft using baro VNAV with temperature compensation or aircraft using an alternate means for vertical guidance (e.g., SBAS) may disregard the temperature restrictions. The charted temperature limits are evaluated for the final approach segment only. Regardless of charted temperature limits or temperature compensation by the FMS, the pilot may need to manually compensate for cold temperature on minimum altitudes and the decision altitude.

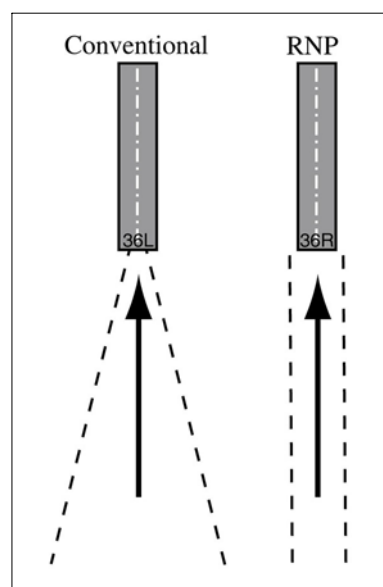
**6. Aircraft size.** The achieved minimums may be dependent on aircraft size. Large aircraft may require higher minimums due to gear height and/or wingspan. Approach procedure charts will be annotated with applicable aircraft size restrictions.

## b. Types of RNP AR Approach Operations

**1. RNP Stand-alone Approach Operations.** RNP AR procedures can provide access to runways regardless of the ground-based NAVAID infrastructure, and can be designed to avoid obstacles, terrain, airspace, or resolve environmental constraints.

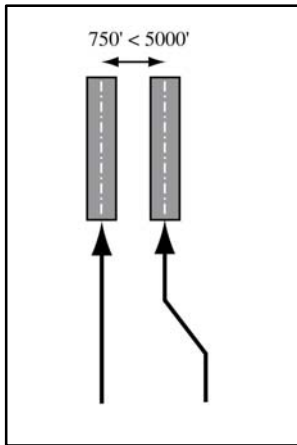
**2. RNP Parallel Approach (RPA) Operations.** RNP AR procedures can be used for parallel approaches where the runway separation is adequate (See FIG 5-4-26). Parallel approach procedures can be used either simultaneously or as stand-alone operations. They may be part of either independent or dependent operations depending on the ATC ability to provide radar monitoring.

FIG 5-4-26



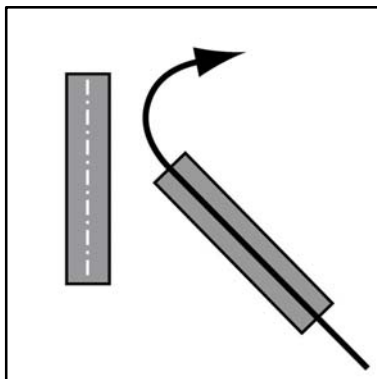
**3. RNP Parallel Approach Runway Transitions (RPAT) Operations.** RPAT approaches begin as a parallel IFR approach operation using simultaneous independent or dependent procedures. (See FIG 5-4-27). Visual separation standards are used in the final segment of the approach after the final approach fix, to permit the RPAT aircraft to transition in visual conditions along a predefined lateral and vertical path to align with the runway centerline.

FIG 5-4-27



**4. RNP Converging Runway Operations.** At airports where runways converge, but may or may not intersect, an RNP AR approach can provide a precise curved missed approach path that conforms to aircraft separation minimums for simultaneous operations (See FIG 5-4-28). By flying this curved missed approach path with high accuracy and containment provided by RNP, dual runway operations may continue to be used to lower ceiling and visibility values than currently available. This type of operation allows greater capacity at airports where it can be applied.

FIG 5-4-28



**5-4-19. Side-step Maneuver**

a. ATC may authorize a standard instrument approach procedure which serves either one of parallel runways that are separated by 1,200 feet or

less followed by a straight-in landing on the adjacent runway.

b. Aircraft that will execute a side-step maneuver will be cleared for a specified approach procedure and landing on the adjacent parallel runway. Example, “cleared ILS runway 7 left approach, side-step to runway 7 right.” Pilots are expected to commence the side-step maneuver as soon as possible after the runway or runway environment is in sight. Compliance with minimum altitudes associated with stepdown fixes is expected even after the side-step maneuver is initiated.

**NOTE-**

*Side-step minima are flown to a Minimum Descent Altitude (MDA) regardless of the approach authorized.*

c. Landing minimums to the adjacent runway will be based on nonprecision criteria and therefore higher than the precision minimums to the primary runway, but will normally be lower than the published circling minimums.

**5-4-20. Approach and Landing Minimums**

a. **Landing Minimums.** The rules applicable to landing minimums are contained in 14 CFR Section 91.175. TBL 5-4-1 may be used to convert RVR to ground or flight visibility. For converting RVR values that fall between listed values, use the next higher RVR value; do not interpolate. For example, when converting 1800 RVR, use 2400 RVR with the resultant visibility of 1/2 mile.

b. **Obstacle Clearance.** Final approach obstacle clearance is provided from the start of the final segment to the runway or missed approach point, whichever occurs last. Side-step obstacle protection is provided by increasing the width of the final approach obstacle clearance area.

TBL 5-4-1  
RVR Value Conversions

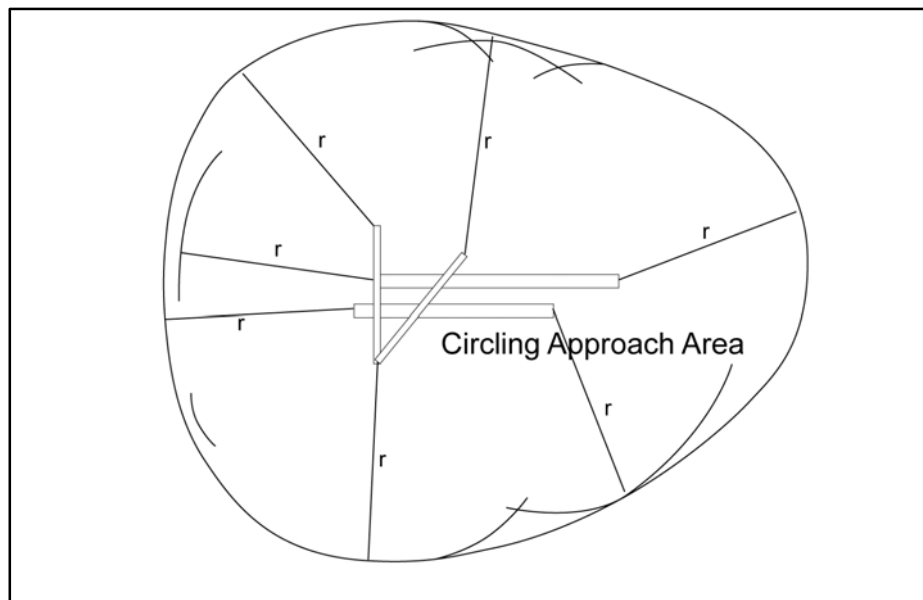
RVR	Visibility (statute miles)
1600	1/4
2400	1/2
3200	5/8
4000	3/4
4500	7/8
5000	1
6000	1 1/4



1. Circling approach protected areas are defined by the tangential connection of arcs drawn from each runway end (see FIG 5-4-29). Circling approach protected areas developed prior to late 2012 used fixed radius distances, dependent on aircraft approach category, as shown in the table on page B2 of the U.S. TPP. The approaches using standard circling approach areas can be identified by the absence of the “negative C” symbol on the circling line of minima. Circling approach protected areas developed after late 2012 use the radius distance shown in the table on page B2 of the U.S. TPP, dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the “negative C” symbol on the circling line of minima (see FIG 5-4-30). Because of obstacles near the airport, a portion of the circling

area may be restricted by a procedural note; for example, “Circling NA E of RWY 17-35.” Obstacle clearance is provided at the published minimums (MDA) for the pilot who makes a straight-in approach, side-steps, or circles. Once below the MDA the pilot must see and avoid obstacles. Executing the missed approach after starting to maneuver usually places the aircraft beyond the MAP. The aircraft is clear of obstacles when at or above the MDA while inside the circling area, but simply joining the missed approach ground track from the circling maneuver may not provide vertical obstacle clearance once the aircraft exits the circling area. Additional climb inside the circling area may be required before joining the missed approach track. See Paragraph 5-4-21, Missed Approach, for additional considerations when starting a missed approach at other than the MAP.

FIG 5-4-29  
Final Approach Obstacle Clearance



**NOTE-**

*Circling approach area radii vary according to approach category and MSL circling altitude due to TAS changes – see FIG 5-4-30.*

FIG 5-4-30

**Standard and Expanded Circling Approach Radii in the U.S. TPP**

**STANDARD CIRCLING APPROACH MANEUVERING RADIUS**

Circling approach protected areas developed prior to late 2012 used the radius distances shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category. The approaches using standard circling approach areas can be identified by the absence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
All Altitudes	1.3	1.5	1.7	2.3	4.5

**C EXPANDED CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS**

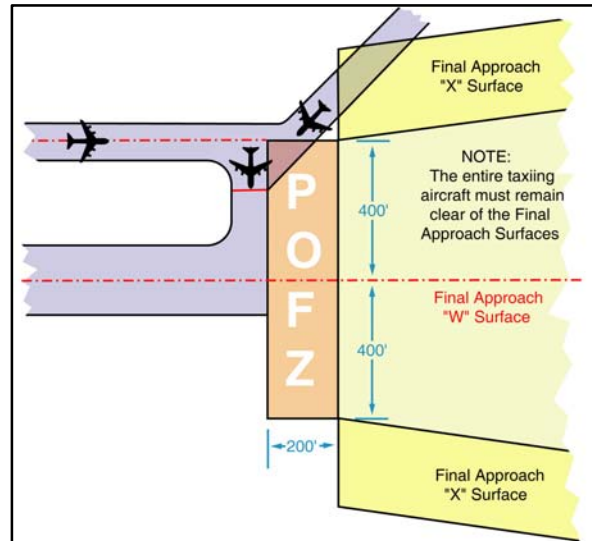
Circling approach protected areas developed after late 2012 use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

**2. Precision Obstacle Free Zone (POFZ).** A volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline. The POFZ is 200 feet (60m) long and 800 feet (240m) wide. The POFZ must be clear when an aircraft on a vertically guided final approach is within 2 nautical miles of the runway threshold and the official weather observation is a ceiling below 250 feet or visibility less than 3/4 statute mile (SM) (or runway visual range below 4,000 feet). If the POFZ is not clear, the MINIMUM authorized height above touchdown (HAT) and visibility is 250 feet and 3/4 SM. The POFZ is considered clear even if the wing of the aircraft holding on a taxiway waiting for runway clearance penetrates the POFZ; however, neither the fuselage nor the tail may infringe on the POFZ. The POFZ is applicable at all runway ends including displaced thresholds.

FIG 5-4-31

**Precision Obstacle Free Zone (POFZ)**



**c. Straight-in Minimums** are shown on the IAP when the final approach course is within 30 degrees of the runway alignment (15 degrees for GPS IAPs) and a normal descent can be made from the IFR altitude shown on the IAP to the runway surface. When either the normal rate of descent or the runway alignment factor of 30 degrees (15 degrees for GPS IAPs) is exceeded, a straight-in minimum is not published and a circling minimum applies. The fact that a straight-in minimum is not published does not preclude pilots from landing straight-in if they have the active runway in sight and have sufficient time to make a normal approach for landing. Under such conditions and when ATC has cleared them for landing on that runway, pilots are not expected to circle even though only circling minimums are published. If they desire to circle, they should advise ATC.

**d. Side-Step Maneuver Minimums.** Landing minimums for a side-step maneuver to the adjacent runway will normally be higher than the minimums to the primary runway.

**e. Published Approach Minimums.** Approach minimums are published for different aircraft categories and consist of a minimum altitude (DA, DH, MDA) and required visibility. These minimums are determined by applying the appropriate TERPS criteria. When a fix is incorporated in a nonprecision final segment, two sets of minimums may be published: one for the pilot that is able to identify the fix, and a second for the pilot that cannot. Two sets of minimums may also be published when a second altimeter source is used in the procedure. When a nonprecision procedure incorporates both a step-down fix in the final segment and a second altimeter source, two sets of minimums are published to account for the stepdown fix and a note addresses minimums for the second altimeter source.

**f. Circling Minimums.** In some busy terminal areas, ATC may not allow circling and circling minimums will not be published. Published circling minimums provide obstacle clearance when pilots remain within the appropriate area of protection. Pilots should remain at or above the circling altitude

until the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers. Circling may require maneuvers at low altitude, at low airspeed, and in marginal weather conditions. Pilots must use sound judgment, have an in-depth knowledge of their capabilities, and fully understand the aircraft performance to determine the exact circling maneuver since weather, unique airport design, and the aircraft position, altitude, and airspeed must all be considered. The following basic rules apply:

1. Maneuver the shortest path to the base or downwind leg, as appropriate, considering existing weather conditions. There is no restriction from passing over the airport or other runways.

2. It should be recognized that circling maneuvers may be made while VFR or other flying is in progress at the airport. Standard left turns or specific instruction from the controller for maneuvering must be considered when circling to land.

3. At airports without a control tower, it may be desirable to fly over the airport to observe wind and turn indicators and other traffic which may be on the runway or flying in the vicinity of the airport.

**REFERENCE—**

*AC 90-66A, Recommended Standards Traffic patterns for Aeronautical Operations at Airports without Operating Control Towers.*

4. The missed approach point (MAP) varies depending upon the approach flown. For vertically guided approaches, the MAP is at the decision altitude/decision height. Non-vertically guided and circling procedures share the same MAP and the pilot determines this MAP by timing from the final approach fix, by a fix, a NAVAID, or a waypoint. Circling from a GLS, an ILS without a localizer line of minima or an RNAV (GPS) approach without an LNAV line of minima is prohibited.

**g. Instrument Approach at a Military Field.** When instrument approaches are conducted by civil aircraft at military airports, they must be conducted in accordance with the procedures and minimums approved by the military agency having jurisdiction over the airport.

### 5-4-21. Missed Approach

**a.** When a landing cannot be accomplished, advise ATC and, upon reaching the missed approach point defined on the approach procedure chart, the pilot must comply with the missed approach instructions for the procedure being used or with an alternate missed approach procedure specified by ATC.

**b.** Obstacle protection for missed approach is predicated on the missed approach being initiated at the decision altitude/height (DA/H) or at the missed approach point and not lower than minimum descent altitude (MDA). A climb gradient of at least 200 feet per nautical mile is required, (except for Copter approaches, where a climb of at least 400 feet per nautical mile is required), unless a higher climb gradient is published in the notes section of the approach procedure chart. When higher than standard climb gradients are specified, the end point of the non-standard climb will be specified at either an altitude or a fix. Pilots must preplan to ensure that the aircraft can meet the climb gradient (expressed in feet per nautical mile) required by the procedure in the event of a missed approach, and be aware that flying at a higher than anticipated ground speed increases the climb rate requirement (feet per minute). Tables for the conversion of climb gradients (feet per nautical mile) to climb rate (feet per minute), based on ground speed, are included on page D1 of the U.S. Terminal Procedures booklets. Reasonable buffers are provided for normal maneuvers. However, no consideration is given to an abnormally early turn. Therefore, when an early missed approach is executed, pilots should, unless otherwise cleared by ATC, fly the IAP as specified on the approach plate to the missed approach point at or above the MDA or DH before executing a turning maneuver.

**c.** If visual reference is lost while circling-to-land from an instrument approach, the missed approach specified for that particular procedure must be followed (unless an alternate missed approach procedure is specified by ATC). To become established on the prescribed missed approach course, the pilot should make an initial climbing turn toward the landing runway and continue the turn until established on the missed approach course. Inasmuch as the circling maneuver may be accomplished in more than one direction, different patterns will be required to become established on the prescribed missed approach course, depending on the aircraft

position at the time visual reference is lost. Adherence to the procedure will help assure that an aircraft will remain laterally within the circling and missed approach obstruction clearance areas. Refer to paragraph h concerning vertical obstruction clearance when starting a missed approach at other than the MAP. (See FIG 5-4-32.)

**d.** 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. (See FIG 5-4-33.)

**e.** Some locations may have a preplanned alternate missed approach procedure for use in the event the primary NAVAID used for the missed approach procedure is unavailable. To avoid confusion, the alternate missed approach instructions are not published on the chart. However, the alternate missed approach holding pattern will be depicted on the instrument approach chart for pilot situational awareness and to assist ATC by not having to issue detailed holding instructions. The alternate missed approach may be based on NAVAIDs not used in the approach procedure or the primary missed approach. When the alternate missed approach procedure is implemented by NOTAM, it becomes a mandatory part of the procedure. The NOTAM will specify both the textual instructions and any additional equipment requirements necessary to complete the procedure. Air traffic may also issue instructions for the alternate missed approach when necessary, such as when the primary missed approach NAVAID fails during the approach. Pilots may reject an ATC clearance for an alternate missed approach that requires equipment not necessary for the published approach procedure when the alternate missed approach is issued after beginning the approach. However, when the alternate missed approach is issued prior to beginning the approach the pilot must either accept the entire procedure (including the alternate missed approach), request a different approach procedure, or coordinate with ATC for alternative action to be taken, i.e., proceed to an alternate airport, etc.

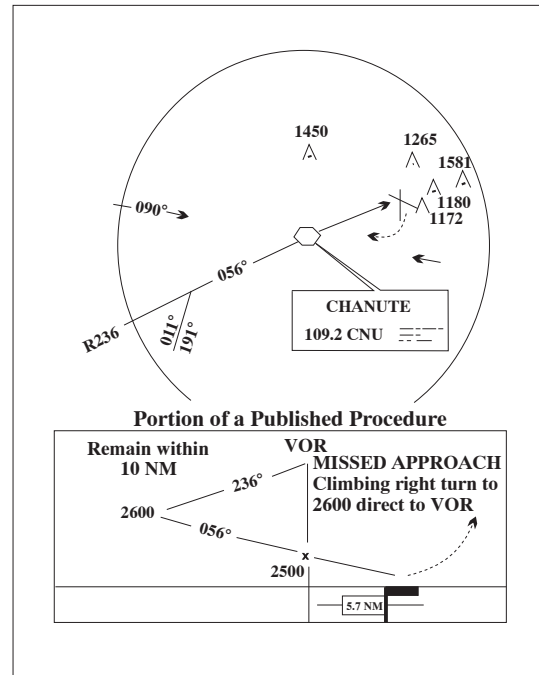
**f.** When approach has been missed, request clearance for specific action; i.e., to alternative airport, another approach, etc.

**g.** Pilots must ensure that they have climbed to a safe altitude prior to proceeding off the published missed approach, especially in nonradar environments. Abandoning the missed approach prior to reaching the published altitude may not provide

adequate terrain clearance. Additional climb may be required after reaching the holding pattern before proceeding back to the IAF or to an alternate.

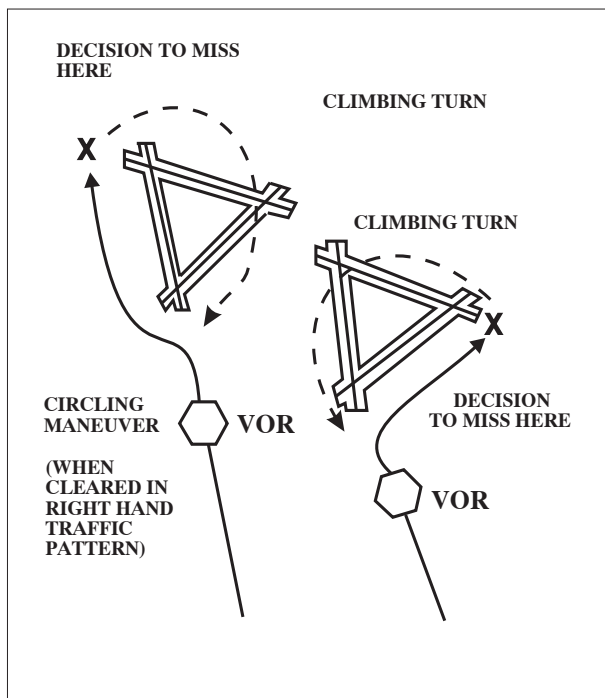
**h.** A clearance for an instrument approach procedure includes a clearance to fly the published missed approach procedure, unless otherwise instructed by ATC. The published missed approach procedure provides obstacle clearance only when the missed approach is conducted on the missed approach segment from or above the missed approach point, and assumes a climb rate of 200 feet/NM or higher, as published. If the aircraft initiates a missed approach at a point other than the missed approach point (see paragraph 5-4-5b), from below MDA or DA (H), or on a circling approach, obstacle clearance is not necessarily provided by following the published missed approach procedure, nor is separation assured from other air traffic in the vicinity.

**FIG 5-4-33**  
**Missed Approach**



**FIG 5-4-32**

**Circling and Missed Approach Obstruction Clearance Areas**



In the event a balked (rejected) landing occurs at a position other than the published missed approach point, the pilot should contact ATC as soon as possible to obtain an amended clearance. If unable to contact ATC for any reason, the pilot should attempt to re-intercept a published segment of the missed approach and comply with route and altitude instructions. If unable to contact ATC, and in the pilot's judgment it is no longer appropriate to fly the published missed approach procedure, then consider either maintaining visual conditions if practicable and reattempt a landing, or a circle-climb over the airport. Should a missed approach become necessary when operating to an airport that is not served by an operating control tower, continuous contact with an air traffic facility may not be possible. In this case, the pilot should execute the appropriate go-around/missed approach procedure without delay and contact ATC when able to do so.

Prior to initiating an instrument approach procedure, the pilot should assess the actions to be taken in the event of a balked (rejected) landing beyond the missed approach point or below the MDA or DA (H) considering the anticipated weather conditions and available aircraft performance. 14 CFR 91.175(e) authorizes the pilot to fly an appropriate missed approach procedure that ensures obstruction clear-

ance, but it does not necessarily consider separation from other air traffic. The pilot must consider other factors such as the aircraft's geographical location with respect to the prescribed missed approach point, direction of flight, and/or minimum turning altitudes in the prescribed missed approach procedure. The pilot must also consider aircraft performance, visual climb restrictions, charted obstacles, published obstacle departure procedure, takeoff visual climb requirements as expressed by nonstandard takeoff minima, other traffic expected to be in the vicinity, or other factors not specifically expressed by the approach procedures.

#### **5-4-22. Use of Enhanced Flight Vision Systems (EFVS) on Instrument Approaches**

**a. Introduction.** An EFVS uses a head-up display (HUD), or an equivalent display that is a head-up presentation, to combine flight information, flight symbology, navigation guidance, and a real-time image of the external scene to the pilot on one display. Imaging sensors, which may be based on forward-looking infrared (FLIR), millimeter wave radiometry, millimeter wave radar, low-level light intensification, or other real-time imaging technologies produce a real-time image of the outside scene. During an instrument approach, an EFVS can enable a pilot to see the approach lights, visual references associated with the runway environment, and other objects or features that might not be visible using natural vision alone. Combining the flight information, navigation guidance, and sensor imagery on a HUD (or equivalent display) allows the pilot to continue looking forward along the flightpath throughout the entire approach, landing, and rollout.

An EFVS operation is an operation in which visibility conditions require an EFVS to be used in lieu of natural vision to perform an approach or landing, determine enhanced flight visibility, identify required visual references, or conduct a rollout. There are two types of EFVS operations:

1. EFVS operations to touchdown and rollout.
2. EFVS operations to 100 feet above the touchdown zone elevation (TDZE).

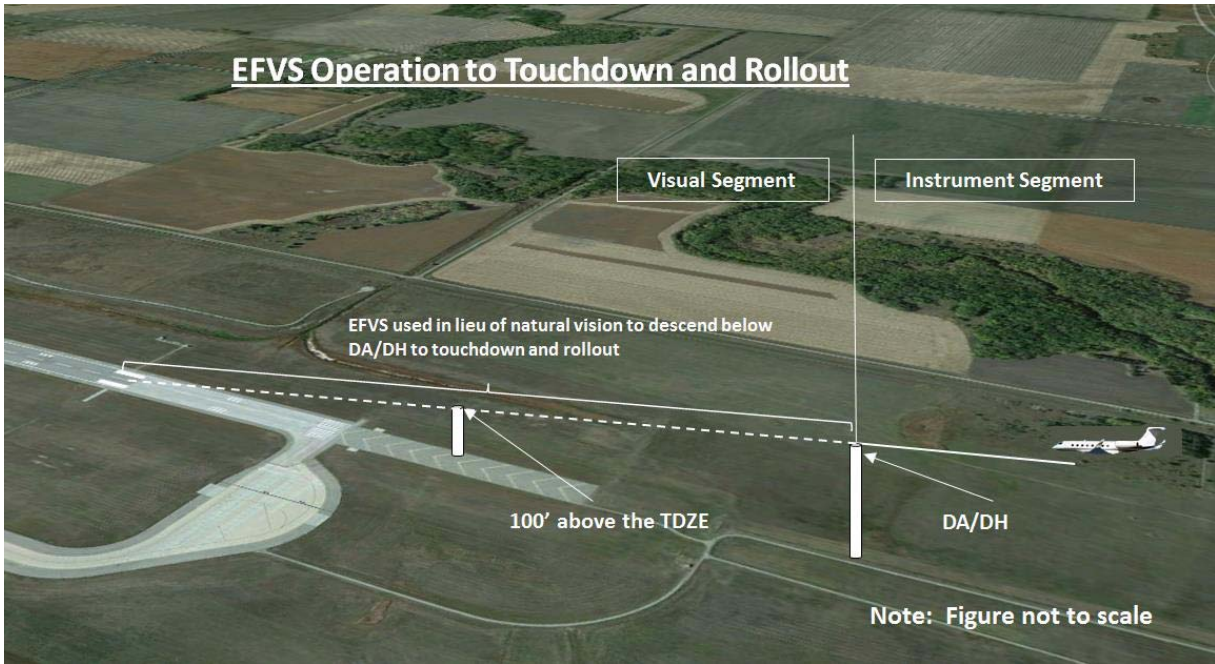
**b. EFVS Operations to Touchdown and Rollout.** An EFVS operation to touchdown and rollout is

an operation in which the pilot uses the enhanced vision imagery provided by an EFVS in lieu of natural vision to descend below DA or DH to touchdown and rollout. (See FIG 5-4-34.) These operations may be conducted only on Standard Instrument Approach Procedures (SIAP) or special IAPs that have a DA or DH (for example, precision or APV approach). An EFVS operation to touchdown and rollout may not be conducted on an approach that has circling minimums. The regulations for EFVS operations to touchdown and rollout can be found in 14 CFR § 91.176(a).

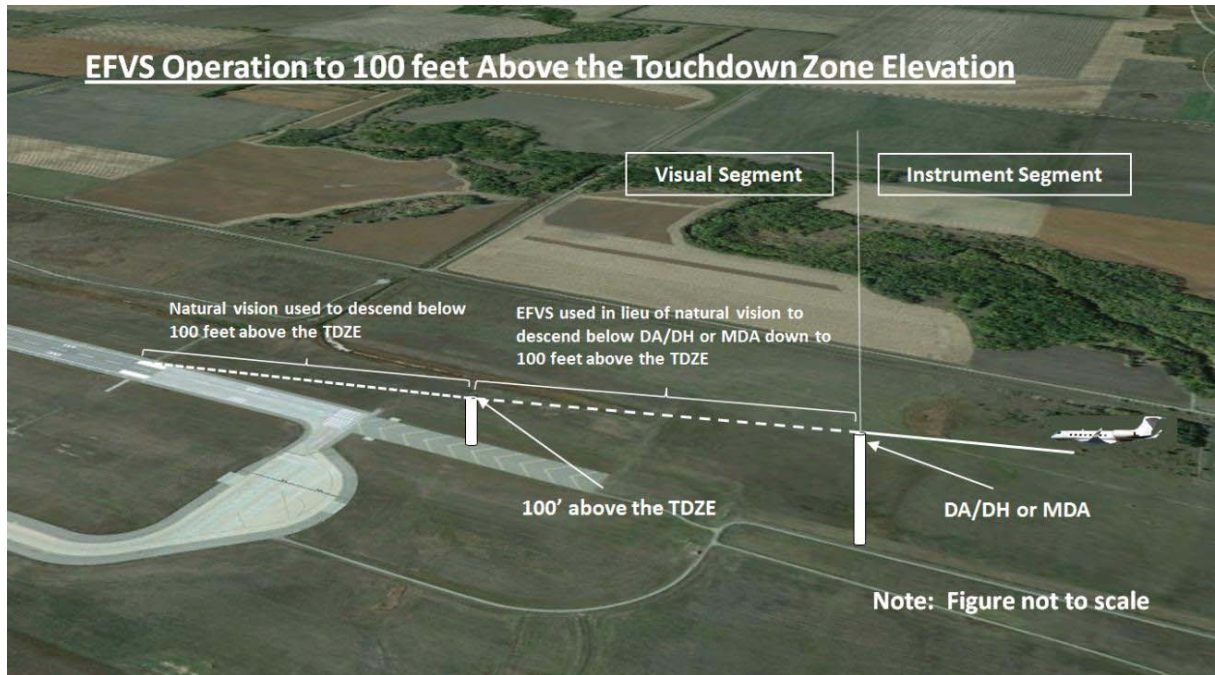
**c. EFVS Operations to 100 Feet Above the TDZE.** An EFVS operation to 100 feet above the TDZE is an operation in which the pilot uses the enhanced vision imagery provided by an EFVS in lieu of natural vision to descend below DA/DH or MDA down to 100 feet above the TDZE. (See FIG 5-4-35.) Natural vision must be used to descend below 100 feet above the TDZE to touchdown. These operations may be conducted on SIAPs or special IAPs that have a DA/DH or MDA. An EFVS operation to 100 feet above the TDZE may not be conducted on an approach that has circling minimums. The regulations for EFVS operations to 100 feet above the TDZE can be found in 14 CFR § 91.176(b).

**d. EFVS Equipment Requirements.** An EFVS that is installed on a U.S.-registered aircraft and is used to conduct EFVS operations must conform to an FAA-type design approval (i.e., a type certificate (TC), amended TC, or supplemental type certificate (STC)). A foreign-registered aircraft used to conduct EFVS operations that does not have an FAA-type design approval must be equipped with an EFVS that has been approved by either the State of the Operator or the State of Registry to meet the requirements of ICAO Annex 6. Equipment requirements for an EFVS operation to touchdown and rollout can be found in 14 CFR § 91.176(a)(1), and the equipment requirements for an EFVS operation to 100 feet above the TDZE can be found in 14 CFR § 91.176(b)(1). An operator can determine the eligibility of their aircraft to conduct EFVS operations by referring to the Airplane Flight Manual, Airplane Flight Manual Supplement, Rotorcraft Flight Manual, or Rotorcraft Flight Manual Supplement as applicable.

**FIG 5-4-34**  
**EFVS Operation to Touchdown and Rollout**  
[Photo provided by Google Earth]



**FIG 5-4-35**  
**EFVS Operation to 100 ft Above the TDZE**  
[Photo provided by Google Earth]



**e. Operating Requirements.** Any operator who conducts EFVS operations to touchdown and rollout must have an OpSpec, MSpec, or LOA that specifically authorizes those operations. An operator's authorization to conduct EFVS operations to touchdown and rollout specifies a visibility minimum for the operation. Parts 91K, 121, 125, 129, and 135 operators who conduct EFVS operations to 100 feet above the TDZE must have an OpSpec, MSpec, or LOA that specifically authorizes the operation. Part 91 operators (other than 91K operators) are not required to have an LOA to conduct EFVS operations to 100 feet in the United States. Any operator conducting an EFVS operation during an authorized Category II or III operation must have an OpSpec, MSpec, or LOA authorizing EFVS operations during Category II or Category III operations.

**f.** Currently, EFVS operations in rotorcraft can only be conducted on IAPs that are flown to a runway. Instrument approach criteria, procedures, and appropriate visual references have not yet been developed for straight-in landing operations below DA/DH or MDA under IFR to heliports or platforms. An EFVS cannot be used in lieu of natural vision to descend below published minimums on copter approaches to a point in space (PinS) followed by a "proceed visual flight rules (VFR)" visual segment, or on approaches designed to a specific landing site using a "proceed visually" visual segment.

**g.** A pilot who conducts EFVS operations must receive ground and flight training specific to the EFVS operation to be conducted. The training must be obtained from an authorized training provider under a training program approved by the FAA. Additionally, recent flight experience and proficiency or competency check requirements apply to EFVS operations. These requirements are addressed in 14 CFR §§ 61.66, 91.1065, 121.441, Appendix F to Part 121, 125.287, and 135.293.

**h. Enhanced Flight Visibility and Visual Reference Requirements.** To descend below DA/DH or MDA during EFVS operations under 14 CFR § 91.176(a) or (b), a pilot must make a determination that the enhanced flight visibility observed by using an EFVS is not less than what is prescribed by the IAP being flown. In addition, the visual references required in 14 CFR § 91.176(a) or (b) must be distinctly visible and identifiable to the pilot using the EFVS. The determination of enhanced

flight visibility is a separate action from that of identifying required visual references, and is different from ground-reported visibility. Even though the reported visibility or the visibility observed using natural vision may be less, as long as the EFVS provides the required enhanced flight visibility and a pilot meets all of the other requirements, the pilot can continue descending below DA/DH or MDA using the EFVS. Suitable enhanced flight visibility is necessary to ensure the aircraft is in a position to continue the approach and land. It is important to understand that using an EFVS does not result in obtaining lower minima with respect to the visibility or the DA/DH or MDA specified in the IAP. An EFVS simply provides another means of operating in the visual segment of an IAP. The DA/DH or MDA and the visibility value specified in the IAP to be flown do not change.

**i. Flight Planning and Beginning or Continuing an Approach Under IFR.** 14 CFR Parts 121, 125, and 135 prohibit dispatching a flight, releasing a flight, taking off under IFR, or beginning or continuing an approach when weather conditions are less than the authorized minimums. A Part 121, 125, or 135 operator's OpSpec or LOA for EFVS operations authorizes a visibility for dispatching or releasing a flight and for beginning or continuing an approach. These operational minimums are based on the demonstrated performance of the EFVS. Once a pilot reaches DA/DH or MDA, the pilot conducts the EFVS operation in accordance with 14 CFR § 91.176(a) or (b) and their authorization to conduct EFVS operations.

**j. Missed Approach Considerations.** A missed approach after passing the DA/DH, or beyond the missed approach point (MAP), involves additional risk until established on the published missed approach segment. Initiating a go-around after passing the published MAP may result in loss of obstacle clearance. As with any approach, pilot planning should include contingencies between the published MAP and touchdown with reference to obstacle clearance, aircraft performance, and alternate escape plans.

**k. Light Emitting Diode (LED) Airport Lighting Impact on EFVS Operations.** Incandescent lamps have been replaced with LEDs at some airports in threshold lights, taxiway edge lights, taxiway centerline lights, low intensity runway edge lights, windcone lights, beacons, and some obstruction



lighting. Additionally, there are plans to replace incandescent lamps with LEDs in approach lighting systems. Pilots should be aware that LED lights cannot be sensed by infrared-based EFVSs. Further, the FAA does not currently collect or disseminate information about where LED lighting is installed.

**l. Other Vision Systems.** An Enhanced Vision System (EVS) does not meet the requirements of an EFVS. An EVS may present the sensor image on a head-down display and may not be able to present the image and flight symbology in the same scale and alignment as the outside view. An EVS can also use a HUD as its display element, yet still not meet the regulatory requirements for an EFVS. While an EVS that uses a head-down display or HUD may provide situation awareness to the pilot, it does not meet the operating requirements for an EFVS. Consequently, a pilot cannot use an EVS in lieu of natural vision to descend below DA/DH or MDA. Unlike an EFVS, a Synthetic Vision System (SVS) or Synthetic Vision Guidance System (SVGS) does not provide a real-time sensor image of the outside scene and also does not meet the equipment requirements for EFVS operations. A pilot cannot use a synthetic vision image on a head-up or a head-down display in lieu of natural vision to descend below DA/DH or MDA. An EFVS can, however, be integrated with an SVS, also known as a Combined Vision System (CVS). A CVS can be used to conduct EFVS operations if all of the requirements for an EFVS are satisfied and the SVS image does not interfere with the pilot's ability to see the external scene, to identify the required visual references, or to see the sensor image.

**m. Additional Information.** Operational criteria for EFVS can be found in Advisory Circular (AC) 90-106, Enhanced Flight Vision Systems, and airworthiness criteria for EFVS can be found in AC 20-167, Airworthiness Approval of Enhanced Vision System, Synthetic Vision System, Combined Vision System, and Enhanced Flight Vision System Equipment.

### 5-4-23. Visual Approach

**a.** A visual approach is conducted on an IFR flight plan and authorizes a pilot to proceed visually and clear of clouds to the airport. The pilot must have either the airport or the preceding identified aircraft in sight. This approach must be authorized and controlled by the appropriate air traffic control

facility. Reported weather at the airport must have a ceiling at or above 1,000 feet and visibility 3 miles or greater. ATC may authorize this type approach when it will be operationally beneficial. Visual approaches are an IFR procedure conducted under IFR in visual meteorological conditions. Cloud clearance requirements of 14 CFR Section 91.155 are not applicable, unless required by operation specifications.

**b. Operating to an Airport Without Weather Reporting Service.** ATC will advise the pilot when weather is not available at the destination airport. ATC may initiate a visual approach provided there is a reasonable assurance that weather at the airport is a ceiling at or above 1,000 feet and visibility 3 miles or greater (e.g., area weather reports, PIREPs, etc.).

**c. Operating to an Airport With an Operating Control Tower.** Aircraft may be authorized to conduct a visual approach to one runway while other aircraft are conducting IFR or VFR approaches to another parallel, intersecting, or converging runway. When operating to airports with parallel runways separated by less than 2,500 feet, the succeeding aircraft must report sighting the preceding aircraft unless standard separation is being provided by ATC. When operating to parallel runways separated by at least 2,500 feet but less than 4,300 feet, controllers will clear/vector aircraft to the final at an angle not greater than 30 degrees unless radar, vertical, or visual separation is provided during the turn-on. The purpose of the 30 degree intercept angle is to reduce the potential for overshoots of the final and to preclude side-by-side operations with one or both aircraft in a belly-up configuration during the turn-on. Once the aircraft are established within 30 degrees of final, or on the final, these operations may be conducted simultaneously. When the parallel runways are separated by 4,300 feet or more, or intersecting/converging runways are in use, ATC may authorize a visual approach after advising all aircraft involved that other aircraft are conducting operations to the other runway. This may be accomplished through use of the ATIS.

**d. Separation Responsibilities.** If the pilot has the airport in sight but cannot see the aircraft to be followed, ATC may clear the aircraft for a visual approach; however, ATC retains both separation and wake vortex separation responsibility. When visually following a preceding aircraft, acceptance of the visual approach clearance constitutes acceptance of

pilot responsibility for maintaining a safe approach interval and adequate wake turbulence separation.

**e.** A visual approach is not an IAP and therefore has no missed approach segment. If a go around is necessary for any reason, aircraft operating at controlled airports will be issued an appropriate advisory/clearance/instruction by the tower. At uncontrolled airports, aircraft are expected to remain clear of clouds and complete a landing as soon as possible. If a landing cannot be accomplished, the aircraft is expected to remain clear of clouds and contact ATC as soon as possible for further clearance. Separation from other IFR aircraft will be maintained under these circumstances.

**f.** Visual approaches reduce pilot/controller workload and expedite traffic by shortening flight paths to the airport. It is the pilot's responsibility to advise ATC as soon as possible if a visual approach is not desired.

**g.** Authorization to conduct a visual approach is an IFR authorization and does not alter IFR flight plan cancellation responsibility.

**REFERENCE—**  
*AIM Paragraph 5-1-15, Canceling IFR Flight Plan*

**h.** Radar service is automatically terminated, without advising the pilot, when the aircraft is instructed to change to advisory frequency.

#### **5-4-24. Charted Visual Flight Procedure (CVFP)**

**a.** CVFPs are charted visual approaches established for environmental/noise considerations, and/or when necessary for the safety and efficiency of air traffic operations. The approach charts depict prominent landmarks, courses, and recommended altitudes to specific runways. CVFPs are designed to be used primarily for turbojet aircraft.

**b.** These procedures will be used only at airports with an operating control tower.

**c.** Most approach charts will depict some NAVAID information which is for supplemental navigational guidance only.

**d.** Unless indicating a Class B airspace floor, all depicted altitudes are for noise abatement purposes and are recommended only. Pilots are not prohibited

from flying other than recommended altitudes if operational requirements dictate.

**e.** When landmarks used for navigation are not visible at night, the approach will be annotated "*PROCEDURE NOT AUTHORIZED AT NIGHT.*"

**f.** CVFPs usually begin within 20 flying miles from the airport.

**g.** Published weather minimums for CVFPs are based on minimum vectoring altitudes rather than the recommended altitudes depicted on charts.

**h.** CVFPs are not instrument approaches and do not have missed approach segments.

**i.** ATC will not issue clearances for CVFPs when the weather is less than the published minimum.

**j.** ATC will clear aircraft for a CVFP after the pilot reports sighting a charted landmark or a preceding aircraft. If instructed to follow a preceding aircraft, pilots are responsible for maintaining a safe approach interval and wake turbulence separation.

**k.** Pilots should advise ATC if at any point they are unable to continue an approach or lose sight of a preceding aircraft. Missed approaches will be handled as a go-around.

#### **5-4-25. Contact Approach**

**a.** Pilots operating in accordance with an IFR flight plan, provided they are clear of clouds and have at least 1 mile flight visibility and can reasonably expect to continue to the destination airport in those conditions, may request ATC authorization for a contact approach.

**b.** Controllers may authorize a contact approach provided:

**1.** The contact approach is specifically requested by the pilot. ATC cannot initiate this approach.

**EXAMPLE—**  
*Request contact approach.*

**2.** The reported ground visibility at the destination airport is at least 1 statute mile.

**3.** The contact approach will be made to an airport having a standard or special instrument approach procedure.

**4.** Approved separation is applied between aircraft so cleared and between these aircraft and other IFR or special VFR aircraft.

**EXAMPLE—**

*Cleared contact approach (and, if required) at or below (altitude) (routing) if not possible (alternative procedures) and advise.*

c. A contact approach is an approach procedure that may be used by a pilot (with prior authorization from ATC) in lieu of conducting a standard or special IAP to an airport. It is not intended for use by a pilot on an IFR flight clearance to operate to an airport not having a published and functioning IAP. Nor is it intended for an aircraft to conduct an instrument approach to one airport and then, when “in the clear,” discontinue that approach and proceed to another airport. In the execution of a contact approach, the pilot assumes the responsibility for obstruction clearance. If radar service is being received, it will automatically terminate when the pilot is instructed to change to advisory frequency.

**5-4-26. Landing Priority**

A clearance for a specific type of approach (ILS, RNAV, GLS, ADF, VOR or Visual Approach) to an aircraft operating on an IFR flight plan does not mean that landing priority will be given over other traffic. ATCTs handle all aircraft, regardless of the type of flight plan, on a “first-come, first-served” basis. Therefore, because of local traffic or runway in use, it may be necessary for the controller in the interest of safety, to provide a different landing sequence. In any case, a landing sequence will be issued to each aircraft as soon as possible to enable the pilot to properly adjust the aircraft’s flight path.

**5-4-27. Overhead Approach Maneuver**

a. Pilots operating in accordance with an IFR flight plan in Visual Meteorological Condi-

tions (VMC) may request ATC authorization for an overhead maneuver. An overhead maneuver is not an instrument approach procedure. Overhead maneuver patterns are developed at airports where aircraft have an operational need to conduct the maneuver. An aircraft conducting an overhead maneuver is considered to be VFR and the IFR flight plan is cancelled when the aircraft reaches the initial point on the initial approach portion of the maneuver. (See FIG 5-4-36.) The existence of a standard overhead maneuver pattern does not eliminate the possible requirement for an aircraft to conform to conventional rectangular patterns if an overhead maneuver cannot be approved. Aircraft operating to an airport without a functioning control tower must initiate cancellation of an IFR flight plan prior to executing the overhead maneuver. Cancellation of the IFR flight plan must be accomplished after crossing the landing threshold on the initial portion of the maneuver or after landing. Controllers may authorize an overhead maneuver and issue the following to arriving aircraft:

1. Pattern altitude and direction of traffic. This information may be omitted if either is standard.

**PHRASEOLOGY—**

*PATTERN ALTITUDE (altitude). RIGHT TURNS.*

2. Request for a report on initial approach.

**PHRASEOLOGY—**

*REPORT INITIAL.*

3. “Break” information and a request for the pilot to report. The “Break Point” will be specified if nonstandard. Pilots may be requested to report “break” if required for traffic or other reasons.

**PHRASEOLOGY—**

*BREAK AT (specified point).*

*REPORT BREAK.*

**FIG 5-4-36**  
**Overhead Maneuver**

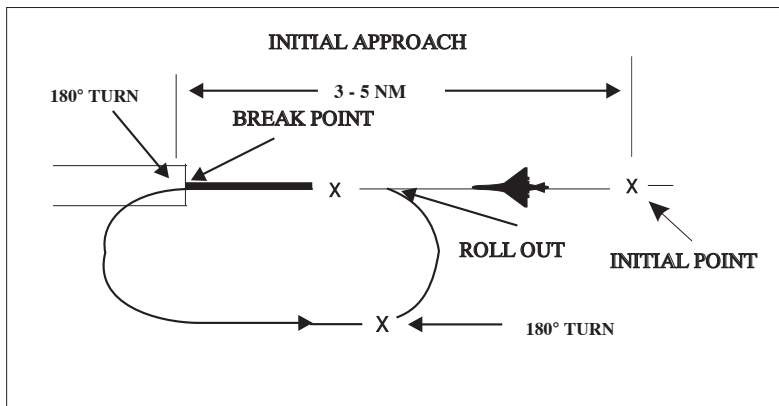
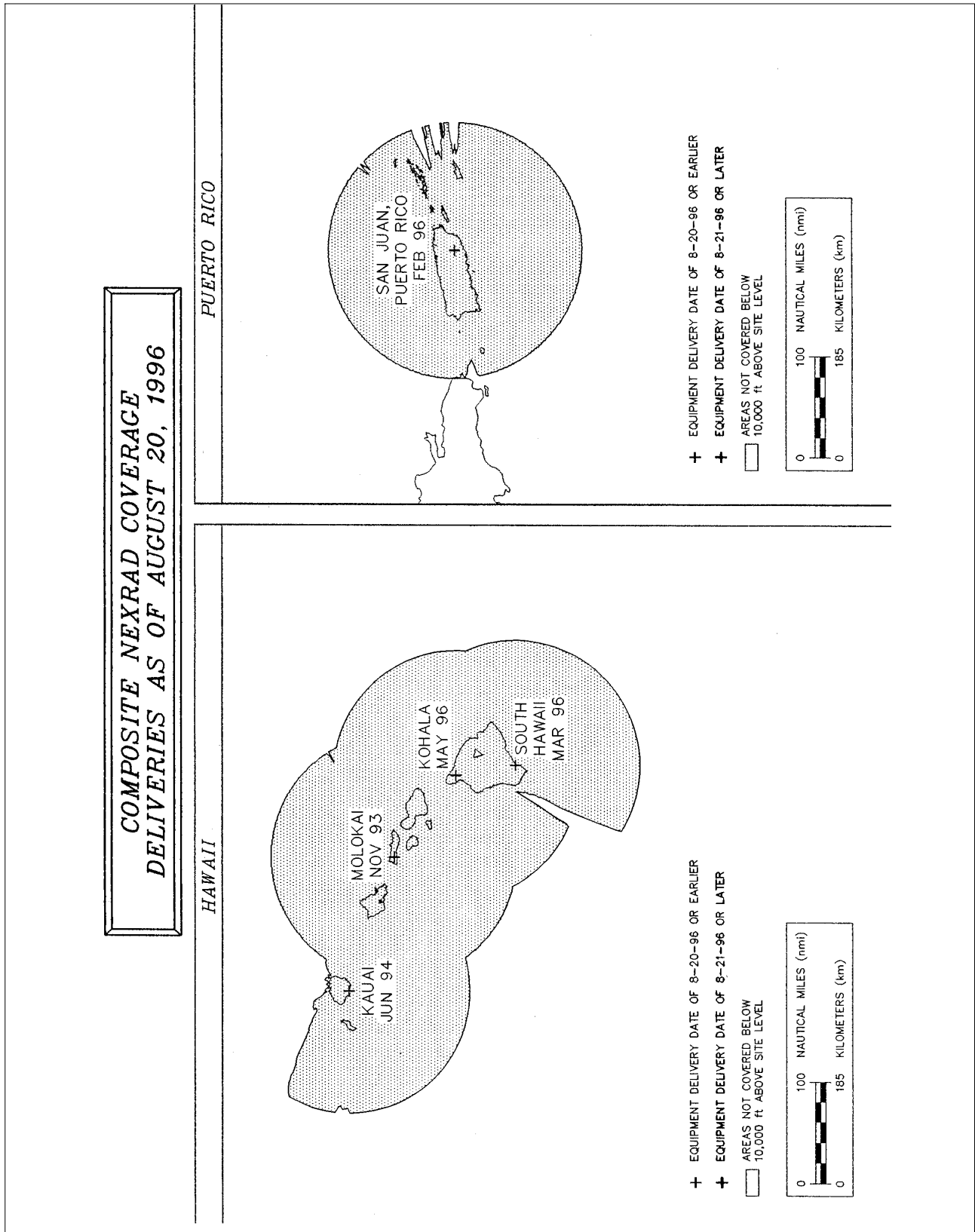


FIG 7-1-11  
NEXRAD Coverage



**d.** All En Route Flight Advisory Service facilities and FSSs have equipment to directly access the radar displays from the individual weather radar sites. Specialists at these locations are trained to interpret the display for pilot briefing and inflight advisory services. The Center Weather Service Units located in ARTCCs also have access to weather radar displays and provide support to all air traffic facilities within their center's area.

**e.** Additional information on weather radar products and services can be found in AC 00-45, Aviation Weather Services.

**REFERENCE-**

*Pilot/Controller Glossary Term- Precipitation Radar Weather Descriptions.*

*AIM, Paragraph 7-1-28, Thunderstorms*

*Chart Supplement U.S., Charts, NWS Upper Air Observing Stations and Weather Network for the location of specific radar sites.*

## **7-1-14. ATC Inflight Weather Avoidance Assistance**

### **a. ATC Radar Weather Display.**

**1.** ATC radars are able to display areas of precipitation by sending out a beam of radio energy that is reflected back to the radar antenna when it strikes an object or moisture which may be in the form of rain drops, hail, or snow. The larger the object is, or the more dense its reflective surface, the stronger the return will be presented. Radar weather processors indicate the intensity of reflective returns in terms of decibels (dBZ). ATC systems cannot detect the presence or absence of clouds. The ATC systems can often determine the intensity of a precipitation area, but the specific character of that area (snow, rain, hail, VIRGA, etc.) cannot be determined. For this reason, ATC refers to all weather areas displayed on ATC radar scopes as "precipitation."

**2.** All ATC facilities using radar weather processors with the ability to determine precipitation intensity, will describe the intensity to pilots as:

- (a)** "LIGHT" (< 26 dBZ)
- (b)** "MODERATE" (26 to 40 dBZ)
- (c)** "HEAVY" (> 40 to 50 dBZ)
- (d)** "EXTREME" (> 50 dBZ)

**NOTE-**

*En route ATC radar's Weather and Radar Processor (WARP) does not display light precipitation intensity.*

**3.** ATC facilities that, due to equipment limitations, cannot display the intensity levels of precipitation, will describe the location of the precipitation area by geographic position, or position relative to the aircraft. Since the intensity level is not available, the controller will state "INTENSITY UNKNOWN."

**4.** ARTCC facilities normally use a Weather and Radar Processor (WARP) to display a mosaic of data obtained from multiple NEXRAD sites. There is a time delay between actual conditions and those displayed to the controller. For example, the precipitation data on the ARTCC controller's display could be up to 6 minutes old. When the WARP is not available, a second system, the narrowband Air Route Surveillance Radar (ARSR) can display two distinct levels of precipitation intensity that will be described to pilots as "MODERATE" (30 to 40 dBZ) and "HEAVY TO EXTREME" (> 40 dBZ). The WARP processor is only used in ARTCC facilities.

**5.** *ATC radar is not able to detect turbulence.* Generally, turbulence can be expected to occur as the rate of rainfall or intensity of precipitation increases. Turbulence associated with greater rates of rainfall/precipitation will normally be more severe than any associated with lesser rates of rainfall/precipitation. Turbulence should be expected to occur near convective activity, even in clear air. Thunderstorms are a form of convective activity that imply severe or greater turbulence. Operation within 20 miles of thunderstorms should be approached with great caution, as the severity of turbulence can be markedly greater than the precipitation intensity might indicate.

### **b. Weather Avoidance Assistance.**

**1.** To the extent possible, controllers will issue pertinent information on weather or chaff areas and assist pilots in avoiding such areas when requested. Pilots should respond to a weather advisory by either acknowledging the advisory or by acknowledging the advisory and requesting an alternative course of action as follows:

**(a)** Request to deviate off course by stating a heading or degrees, direction of deviation, and approximate number of miles. In this case, when the requested deviation is approved, navigation is at the pilot's prerogative, but must maintain the altitude assigned, and remain within the lateral restrictions issued by ATC.

*TBL 7-5-1***Jurisdictions Controlling Navigable Bodies of Water**

<b>Authority to Consult For Use of a Body of Water</b>		
<b>Location</b>	<b>Authority</b>	<b>Contact</b>
Wilderness Area	U.S. Department of Agriculture, Forest Service	Local forest ranger
National Forest	USDA Forest Service	Local forest ranger
National Park	U.S. Department of the Interior, National Park Service	Local park ranger
Indian Reservation	USDI, Bureau of Indian Affairs	Local Bureau office
State Park	State government or state forestry or park service	Local state aviation office for further information
Canadian National and Provincial Parks	Supervised and restricted on an individual basis from province to province and by different departments of the Canadian government; consult Canadian Flight Information Manual and/or Water Aerodrome Supplement	Park Superintendent in an emergency

e. The FAA recommends that each seaplane owner or operator provide flotation gear for occupants any time a seaplane operates on or near water. 14 CFR Section 91.205(b)(12) requires approved flotation gear for aircraft operated for hire over water and beyond power-off gliding distance from shore. FAA-approved gear differs from that required for navigable waterways under USCG rules. FAA-approved life vests are inflatable designs as compared to the USCG's noninflatable PFD's that may consist of solid, bulky material. Such USCG PFDs are impractical for seaplanes and other aircraft because they may block passage through the relatively narrow exits available to pilots and passengers. Life vests approved under Technical Standard Order (TSO) TSO-C13E contain fully inflatable compartments. The wearer inflates the compartments (AFTER exiting the aircraft) primarily by independent CO2 cartridges, with an oral inflation tube as a backup. The flotation gear also contains a water-activated, self-illuminating signal light. The fact that pilots and

passengers can easily don and wear inflatable life vests (when not inflated) provides maximum effectiveness and allows for unrestricted movement. It is imperative that passengers are briefed on the location and proper use of available PFDs prior to leaving the dock.

f. The FAA recommends that seaplane owners and operators obtain Advisory Circular (AC) 91-69, Seaplane Safety for 14 CFR Part 91 Operations, free from the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75<sup>th</sup> Avenue, Landover, MD 20785; fax: (301) 386-5394. The USCG Navigation Rules International-Inland (COMDTINSTM 16672.2B) is available for a fee from the Government Publishing Office by facsimile request to (202) 512-2250, and can be ordered using Mastercard or Visa.

**7-5-9. Flight Operations in Volcanic Ash**

a. Severe volcanic eruptions which send ash and sulphur dioxide (SO<sub>2</sub>) gas into the upper atmosphere occur somewhere around the world several times each year. Flying into a volcanic ash cloud can be exceedingly dangerous. A B747-200 lost all four engines after such an encounter and a B747-400 had the same nearly catastrophic experience. Piston-powered aircraft are less likely to lose power but severe damage is almost certain to ensue after an encounter with a volcanic ash cloud which is only a few hours old.

b. Most important is to avoid any encounter with volcanic ash. The ash plume may not be visible, especially in instrument conditions or at night; and even if visible, it is difficult to distinguish visually between an ash cloud and an ordinary weather cloud. Volcanic ash clouds are not displayed on airborne or ATC radar. The pilot must rely on reports from air traffic controllers and other pilots to determine the location of the ash cloud and use that information to remain well clear of the area. Additionally, the presence of a sulphur-like odor throughout the cabin may indicate the presence of SO<sub>2</sub> emitted by volcanic activity, but may or may not indicate the presence of volcanic ash. Every attempt should be made to remain on the upwind side of the volcano.

c. It is recommended that pilots encountering an ash cloud should immediately reduce thrust to idle (altitude permitting), and reverse course in order to

escape from the cloud. Ash clouds may extend for hundreds of miles and pilots should not attempt to fly through or climb out of the cloud. In addition, the following procedures are recommended:

**1.** Disengage the autothrottle if engaged. This will prevent the autothrottle from increasing engine thrust;

**2.** Turn on continuous ignition;

**3.** Turn on all accessory airbleeds including all air conditioning packs, nacelles, and wing anti-ice. This will provide an additional engine stall margin by reducing engine pressure.

**d.** The following has been reported by flightcrews who have experienced encounters with volcanic dust clouds:

**1.** Smoke or dust appearing in the cockpit.

**2.** An acrid odor similar to electrical smoke.

**3.** Multiple engine malfunctions, such as compressor stalls, increasing EGT, torching from tailpipe, and flameouts.

**4.** At night, St. Elmo's fire or other static discharges accompanied by a bright orange glow in the engine inlets.

**5.** A fire warning in the forward cargo area.

**e.** It may become necessary to shut down and then restart engines to prevent exceeding EGT limits. Volcanic ash may block the pitot system and result in unreliable airspeed indications.

**f.** If you see a volcanic eruption and have not been previously notified of it, you may have been the first person to observe it. In this case, immediately contact ATC and alert them to the existence of the eruption. If possible, use the Volcanic Activity Reporting form (VAR) depicted in Appendix 2 of this manual. Items 1 through 8 of the VAR should be transmitted immediately. The information requested in items 9 through 16 should be passed after landing. If a VAR form is not immediately available, relay enough information to identify the position and nature of the volcanic activity. Do not become unnecessarily alarmed if there is merely steam or very low-level eruptions of ash.

**g.** When landing at airports where volcanic ash has been deposited on the runway, be aware that even a thin layer of dry ash can be detrimental to braking

action. Wet ash on the runway may also reduce effectiveness of braking. It is recommended that reverse thrust be limited to minimum practical to reduce the possibility of reduced visibility and engine ingestion of airborne ash.

**h.** When departing from airports where volcanic ash has been deposited, it is recommended that pilots avoid operating in visible airborne ash. Allow ash to settle before initiating takeoff roll. It is also recommended that flap extension be delayed until initiating the before takeoff checklist and that a rolling takeoff be executed to avoid blowing ash back into the air.

### **7-5-10. Emergency Airborne Inspection of Other Aircraft**

**a.** Providing airborne assistance to another aircraft may involve flying in very close proximity to that aircraft. Most pilots receive little, if any, formal training or instruction in this type of flying activity. Close proximity flying without sufficient time to plan (i.e., in an emergency situation), coupled with the stress involved in a perceived emergency can be hazardous.

**b.** The pilot in the best position to assess the situation should take the responsibility of coordinating the airborne intercept and inspection, and take into account the unique flight characteristics and differences of the category(s) of aircraft involved.

**c.** Some of the safety considerations are:

**1.** Area, direction and speed of the intercept;

**2.** Aerodynamic effects (i.e., rotorcraft downwash);

**3.** Minimum safe separation distances;

**4.** Communications requirements, lost communications procedures, coordination with ATC;

**5.** Suitability of diverting the distressed aircraft to the nearest safe airport; and

**6.** Emergency actions to terminate the intercept.

**d.** Close proximity, inflight inspection of another aircraft is uniquely hazardous. The pilot-in-command of the aircraft experiencing the problem/emergency must not relinquish control of the situation and/or jeopardize the safety of their aircraft. The maneuver must be accomplished with minimum risk to both aircraft.



### 7-5-13. Flying in Flat Light, Brown Out Conditions, and White Out Conditions

**a. Flat Light.** Flat light is an optical illusion, also known as “sector or partial white out.” It is not as severe as “white out” but the condition causes pilots to lose their depth-of-field and contrast in vision. Flat light conditions are usually accompanied by overcast skies inhibiting any visual clues. Such conditions can occur anywhere in the world, primarily in snow covered areas but can occur in dust, sand, mud flats, or on glassy water. Flat light can completely obscure features of the terrain, creating an inability to distinguish distances and closure rates. As a result of this reflected light, it can give pilots the illusion that they are ascending or descending when they may actually be flying level. However, with good judgment and proper training and planning, it is possible to safely operate an aircraft in flat light conditions.

**b. Brown Out.** A brownout (or *brown-out*) is an in-flight visibility restriction due to dust or sand in the air. In a brownout, the pilot cannot see nearby objects which provide the outside visual references necessary to control the aircraft near the ground. This can cause spatial disorientation and loss of situational awareness leading to an accident.

1. The following factors will affect the probability and severity of brownout: rotor disk loading, rotor configuration, soil composition, wind, approach speed, and approach angle.

2. The brownout phenomenon causes accidents during helicopter landing and take-off operations in dust, fine dirt, sand, or arid desert terrain. Intense, blinding dust clouds stirred up by the helicopter rotor downwash during near-ground flight causes significant flight safety risks from aircraft and ground obstacle collisions, and dynamic rollover due to sloped and uneven terrain.

3. This is a dangerous phenomenon experienced by many helicopters when making landing approaches in dusty environments, whereby sand or dust particles become swept up in the rotor outwash and obscure the pilot’s vision of the terrain. This is particularly dangerous because the pilot needs those visual cues from their surroundings in order to make a safe landing.

4. Blowing sand and dust can cause an illusion of a tilted horizon. A pilot not using the flight

instruments for reference may instinctively try to level the aircraft with respect to the false horizon, resulting in an accident. Helicopter rotor wash also causes sand to blow around outside the cockpit windows, possibly leading the pilot to experience an illusion where the helicopter appears to be turning when it is actually in a level hover. This can also cause the pilot to make incorrect control inputs which can quickly lead to disaster when hovering near the ground. In night landings, aircraft lighting can enhance the visual illusions by illuminating the brownout cloud.

**c. White Out.** As defined in meteorological terms, white out occurs when a person becomes engulfed in a uniformly white glow. The glow is a result of being surrounded by blowing snow, dust, sand, mud or water. There are no shadows, no horizon or clouds and all depth-of-field and orientation are lost. A white out situation is severe in that there are no visual references. Flying is not recommended in any white out situation. Flat light conditions can lead to a white out environment quite rapidly, and both atmospheric conditions are insidious; they sneak up on you as your visual references slowly begin to disappear. White out has been the cause of several aviation accidents.

**d. Self Induced White Out.** This effect typically occurs when a helicopter takes off or lands on a snow-covered area. The rotor down wash picks up particles and re-circulates them through the rotor down wash. The effect can vary in intensity depending upon the amount of light on the surface. This can happen on the sunniest, brightest day with good contrast everywhere. However, when it happens, there can be a complete loss of visual clues. If the pilot has not prepared for this immediate loss of visibility, the results can be disastrous. Good planning does not prevent one from encountering flat light or white out conditions.

**e. Never take off in a white out situation.**

1. Realize that in flat light conditions it may be possible to depart but not to return to that site. During takeoff, make sure you have a reference point. Do not lose sight of it until you have a departure reference point in view. Be prepared to return to the takeoff reference if the departure reference does not come into view.

2. Flat light is common to snow skiers. One way to compensate for the lack of visual contrast and

depth-of-field loss is by wearing amber tinted lenses (also known as blue blockers). Special note of caution: Eyewear is not ideal for every pilot. Take into consideration personal factors – age, light sensitivity, and ambient lighting conditions.

3. So what should a pilot do when all visual references are lost?

- (a) Trust the cockpit instruments.
- (b) Execute a 180 degree turnaround and start looking for outside references.
- (c) Above all – fly the aircraft.

**f. Landing in Low Light Conditions.** When landing in a low light condition – use extreme caution. Look for intermediate reference points, in addition to checkpoints along each leg of the route for course confirmation and timing. The lower the ambient light becomes, the more reference points a pilot should use.

**g. Airport Landings.**

1. Look for features around the airport or approach path that can be used in determining depth perception. Buildings, towers, vehicles or other aircraft serve well for this measurement. Use something that will provide you with a sense of height above the ground, in addition to orienting you to the runway.

2. Be cautious of snowdrifts and snow banks – anything that can distinguish the edge of the runway. Look for subtle changes in snow texture or shading to identify ridges or changes in snow depth.

**h. Off-Airport Landings.**

1. In the event of an off-airport landing, pilots have used a number of different visual cues to gain reference. Use whatever you must to create the contrast you need. Natural references seem to work best (trees, rocks, snow ribs, etc.)

- (a) Over flight.
- (b) Use of markers.
- (c) Weighted flags.
- (d) Smoke bombs.
- (e) Any colored rags.

(f) Dye markers.

(g) Kool-aid.

(h) Trees or tree branches.

2. It is difficult to determine the depth of snow in areas that are level. Dropping items from the aircraft to use as reference points should be used as a visual aid only and not as a primary landing reference. Unless your marker is biodegradable, be sure to retrieve it after landing. Never put yourself in a position where no visual references exist.

3. Abort landing if blowing snow obscures your reference. Make your decisions early. Don't assume you can pick up a lost reference point when you get closer.

4. Exercise extreme caution when flying from sunlight into shade. Physical awareness may tell you that you are flying straight but you may actually be in a spiral dive with centrifugal force pressing against you. Having no visual references enhances this illusion. Just because you have a good visual reference does not mean that it's safe to continue. There may be snow-covered terrain not visible in the direction that you are traveling. Getting caught in a no visual reference situation can be fatal.

**i. Flying Around a Lake.**

1. When flying along lakeshores, use them as a reference point. Even if you can see the other side, realize that your depth perception may be poor. It is easy to fly into the surface. If you must cross the lake, check the altimeter frequently and maintain a safe altitude while you still have a good reference. Don't descend below that altitude.

2. The same rules apply to seemingly flat areas of snow. If you don't have good references, avoid going there.

**j. Other Traffic.** Be on the look out for other traffic in the area. Other aircraft may be using your same reference point. Chances are greater of colliding with someone traveling in the same direction as you, than someone flying in the opposite direction.

**k. Ceilings.** Low ceilings have caught many pilots off guard. Clouds do not always form parallel to the surface, or at the same altitude. Pilots may try to compensate for this by flying with a slight bank and thus creating a descending turn.

**1. Glaciers.** Be conscious of your altitude when flying over glaciers. The glaciers may be rising faster than you are climbing.

### 7–5–14. Operations in Ground Icing Conditions

**a.** The presence of aircraft airframe icing during takeoff, typically caused by improper or no deicing of the aircraft being accomplished prior to flight has contributed to many recent accidents in turbine aircraft. The General Aviation Joint Steering Committee (GAJSC) is the primary vehicle for government–industry cooperation, communication, and coordination on GA accident mitigation. The Turbine Aircraft Operations Subgroup (TAOS) works to mitigate accidents in turbine accident aviation. While there is sufficient information and guidance currently available regarding the effects of icing on aircraft and methods for deicing, the TAOS has developed a list of recommended actions to further assist pilots and operators in this area.

While the efforts of the TAOS specifically focus on turbine aircraft, it is recognized that their recommendations are applicable to and can be adapted for the pilot of a small, piston powered aircraft too.

**b.** The following recommendations are offered:

**1.** Ensure that your aircraft’s lift–generating surfaces are COMPLETELY free of contamination before flight through a tactile (hands on) check of the critical surfaces when feasible. Even when otherwise permitted, operators should avoid smooth or polished frost on lift–generating surfaces as an acceptable preflight condition.

**2.** Review and refresh your cold weather standard operating procedures.

**3.** Review and be familiar with the Airplane Flight Manual (AFM) limitations and procedures necessary to deal with icing conditions prior to flight, as well as in flight.

**4.** Protect your aircraft while on the ground, if possible, from sleet and freezing rain by taking advantage of aircraft hangars.

**5.** Take full advantage of the opportunities available at airports for deicing. Do not refuse deicing services simply because of cost.

**6.** Always consider canceling or delaying a flight if weather conditions do not support a safe operation.

**c.** If you haven’t already developed a set of Standard Operating Procedures for cold weather operations, they should include:

**1.** Procedures based on information that is applicable to the aircraft operated, such as AFM limitations and procedures;

**2.** Concise and easy to understand guidance that outlines best operational practices;

**3.** A systematic procedure for recognizing, evaluating and addressing the associated icing risk, and offer clear guidance to mitigate this risk;

**4.** An aid (such as a checklist or reference cards) that is readily available during normal day–to–day aircraft operations.

**d.** There are several sources for guidance relating to airframe icing, including:

**1.** <http://aircrafticing.grc.nasa.gov/index.html>

**2.** <http://www.ibac.org/is-bao/isbao.htm>

**3.** [http://www.natasafety1st.org/bus\\_deice.htm](http://www.natasafety1st.org/bus_deice.htm)

**4.** Advisory Circular (AC) 91–74, Pilot Guide, Flight in Icing Conditions.

**5.** AC 135–17, Pilot Guide Small Aircraft Ground Deicing.

**6.** AC 135–9, FAR Part 135 Icing Limitations.

**7.** AC 120–60, Ground Deicing and Anti–icing Program.

**8.** AC 135–16, Ground Deicing and Anti–icing Training and Checking.

The FAA Approved Deicing Program Updates is published annually as a Flight Standards Information Bulletin for Air Transportation and contains detailed information on deicing and anti–icing procedures and holdover times. It may be accessed at the following website by selecting the current year’s information bulletins:

[http://www.faa.gov/library/manuals/examiners\\_inspectors/8400/fsat](http://www.faa.gov/library/manuals/examiners_inspectors/8400/fsat)

**7-5-15. Avoid Flight in the Vicinity of Exhaust Plumes (Smoke Stacks and Cooling Towers)**

**a. Flight Hazards Exist Around Exhaust Plumes.** Exhaust plumes are defined as visible or invisible emissions from power plants, industrial production facilities, or other industrial systems that release large amounts of vertically directed unstable gases (effluent). High temperature exhaust plumes can cause significant air disturbances such as turbulence and vertical shear. Other identified potential hazards include, but are not necessarily limited to: reduced visibility, oxygen depletion, engine particulate contamination, exposure to gaseous oxides, and/or icing. Results of encountering a plume may include airframe damage, aircraft upset, and/or engine damage/failure. These hazards are most critical during low altitude flight in calm and cold air, especially in and around approach and departure corridors or airport traffic areas.

Whether plumes are visible or invisible, the total extent of their turbulent affect is difficult to predict. Some studies do predict that the significant turbulent effects of an exhaust plume can extend to heights of over 1,000 feet above the height of the top of the stack or cooling tower. Any effects will be more pronounced in calm stable air where the plume is very hot and the surrounding area is still and cold. Fortunately, studies also predict that any amount of crosswind will help to dissipate the effects. However, the size of the tower or stack is not a good indicator of the predicted effect the plume may produce. The major effects are related to the heat or size of the

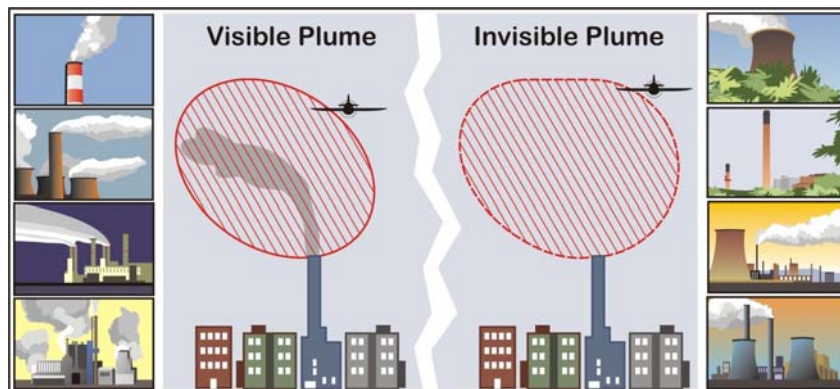
plume effluent, the ambient air temperature, and the wind speed affecting the plume. Smaller aircraft can expect to feel an effect at a higher altitude than heavier aircraft.

**b. When able, a pilot should steer clear of exhaust plumes by flying on the upwind side of smokestacks or cooling towers.** When a plume is visible via smoke or a condensation cloud, remain clear and realize a plume may have both visible and invisible characteristics. Exhaust stacks without visible plumes may still be in full operation, and airspace in the vicinity should be treated with caution. As with mountain wave turbulence or clear air turbulence, an invisible plume may be encountered unexpectedly. Cooling towers, power plant stacks, exhaust fans, and other similar structures are depicted in FIG 7-5-2.

Pilots are encouraged to exercise caution when flying in the vicinity of exhaust plumes. Pilots are also encouraged to reference the Chart Supplement U.S. where amplifying notes may caution pilots and identify the location of structure(s) emitting exhaust plumes.

The best available information on this phenomenon must come from pilots via the PIREP reporting procedures. All pilots encountering hazardous plume conditions are urgently requested to report time, location, and intensity (light, moderate, severe, or extreme) of the element to the FAA facility with which they are maintaining radio contact. If time and conditions permit, elements should be reported according to the standards for other PIREPs and position reports (AIM Paragraph 7-1-23, PIREPS Relating to Turbulence).

**FIG 7-5-2  
Plumes**



# PILOT/CONTROLLER GLOSSARY

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## PURPOSE

a. This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in *bold italics*. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

b. Because of the international nature of flying, terms used in the Lexicon, published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are followed by "[ICAO]." For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Code of Federal Regulations (CFR) and the Aeronautical Information Manual (AIM).

c. This Glossary will be revised, as necessary, to maintain a common understanding of the system.

## EXPLANATION OF CHANGES

d. Terms Added:

CHOP  
FALLEN HERO  
LAND-BASED AIR DEFENSE IDENTIFICATION ZONE (ADIZ)  
MOUNTAIN WAVE  
TURBULENCE

e. Terms Modified:

AERONAUTICAL CHART  
AIR DEFENSE IDENTIFICATION ZONE (ADIZ)  
AIRMEN'S METEOROLOGICAL INFORMATION (AIRMET)  
APPROACH HOLD AREA  
PRECIPITATION RADAR WETHER DESCRIPTIONS  
SPECIAL USE AIRSPACE  
WEATHER ADVISORY

f. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes.



# A

**AAI-**

(See ARRIVAL AIRCRAFT INTERVAL.)

**AAR-**

(See AIRPORT ARRIVAL RATE.)

**ABBREVIATED IFR FLIGHT PLANS-** An authorization by ATC requiring pilots to submit only that information needed for the purpose of ATC. It includes only a small portion of the usual IFR flight plan information. In certain instances, this may be only aircraft identification, location, and pilot request. Other information may be requested if needed by ATC for separation/control purposes. It is frequently used by aircraft which are airborne and desire an instrument approach or by aircraft which are on the ground and desire a climb to VFR-on-top.

(See VFR-ON-TOP.)

(Refer to AIM.)

**ABEAM-** An aircraft is “abeam” a fix, point, or object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.

**ABORT-** To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

**ACC [ICAO]-**

(See ICAO term AREA CONTROL CENTER.)

**ACCELERATE-STOP DISTANCE AVAILABLE-**

The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.

**ACCELERATE-STOP DISTANCE AVAILABLE**

[ICAO]- The length of the take-off run available plus the length of the stopway if provided.

**ACDO-**

(See AIR CARRIER DISTRICT OFFICE.)

**ACKNOWLEDGE-** Let me know that you have received and understood this message.

**ACL-**

(See AIRCRAFT LIST.)

**ACLS-**

(See AUTOMATIC CARRIER LANDING SYSTEM.)

**ACLT-**

(See ACTUAL CALCULATED LANDING TIME.)

**ACROBATIC FLIGHT-** An intentional maneuver involving an abrupt change in an aircraft’s attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight.

(See ICAO term ACROBATIC FLIGHT.)

(Refer to 14 CFR Part 91.)

**ACROBATIC FLIGHT [ICAO]-** Maneuvers intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

**ACTIVE RUNWAY-**

(See RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY.)

**ACTUAL CALCULATED LANDING TIME-**

ACL<sub>T</sub> is a flight’s frozen calculated landing time. An actual time determined at freeze calculated landing time (FCLT) or meter list display interval (MLDI) for the adapted vertex for each arrival aircraft based upon runway configuration, airport acceptance rate, airport arrival delay period, and other metered arrival aircraft. This time is either the vertex time of arrival (VTA) of the aircraft or the tentative calculated landing time (TCLT)/ACL<sub>T</sub> of the previous aircraft plus the arrival aircraft interval (AAI), whichever is later. This time will not be updated in response to the aircraft’s progress.

**ACTUAL NAVIGATION PERFORMANCE (ANP)-**

(See REQUIRED NAVIGATION PERFORMANCE.)

**ADDITIONAL SERVICES-** Advisory information provided by ATC which includes but is not limited to the following:

a. Traffic advisories.

b. Vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic.

c. Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C).

d. Advisories that traffic is no longer a factor.

- e. Weather and chaff information.
- f. Weather assistance.
- g. Bird activity information.
- h. Holding pattern surveillance. Additional services are provided to the extent possible contingent only upon the controller's capability to fit them into the performance of higher priority duties and on the basis of limitations of the radar, volume of traffic, frequency congestion, and controller workload. The controller has complete discretion for determining if he/she is able to provide or continue to provide a service in a particular case. The controller's reason not to provide or continue to provide a service in a particular case is not subject to question by the pilot and need not be made known to him/her.

(See TRAFFIC ADVISORIES.)

(Refer to AIM.)

ADF-

(See AUTOMATIC DIRECTION FINDER.)

ADIZ-

(See AIR DEFENSE IDENTIFICATION ZONE.)

ADLY-

(See ARRIVAL DELAY.)

**ADMINISTRATOR**- The Federal Aviation Administrator or any person to whom he/she has delegated his/her authority in the matter concerned.

ADR-

(See AIRPORT DEPARTURE RATE.)

ADS [ICAO]-

(See ICAO term AUTOMATIC DEPENDENT SURVEILLANCE.)

ADS-B-

(See AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST.)

ADS-C-

(See AUTOMATIC DEPENDENT SURVEILLANCE-CONTRACT.)

**ADVISE INTENTIONS**- Tell me what you plan to do.

**ADVISORY**- Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.

(See ADVISORY SERVICE.)

**ADVISORY FREQUENCY**- The appropriate frequency to be used for Airport Advisory Service.

(See LOCAL AIRPORT ADVISORY.)

(See UNICOM.)

(Refer to ADVISORY CIRCULAR NO. 90-42.)

(Refer to AIM.)

**ADVISORY SERVICE**- Advice and information provided by a facility to assist pilots in the safe conduct of flight and aircraft movement.

(See ADDITIONAL SERVICES.)

(See LOCAL AIRPORT ADVISORY.)

(See RADAR ADVISORY.)

(See SAFETY ALERT.)

(See TRAFFIC ADVISORIES.)

(Refer to AIM.)

**AERIAL REFUELING**- A procedure used by the military to transfer fuel from one aircraft to another during flight.

(Refer to VFR/IFR Wall Planning Charts.)

**AERODROME**- A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.

**AERODROME BEACON [ICAO]**- Aeronautical beacon used to indicate the location of an aerodrome from the air.

**AERODROME CONTROL SERVICE [ICAO]**- Air traffic control service for aerodrome traffic.

**AERODROME CONTROL TOWER [ICAO]**- A unit established to provide air traffic control service to aerodrome traffic.

**AERODROME ELEVATION [ICAO]**- The elevation of the highest point of the landing area.

**AERODROME TRAFFIC CIRCUIT [ICAO]**- The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

**AERONAUTICAL BEACON**- A visual NAVAID displaying flashes of white and/or colored light to indicate the location of an airport, a heliport, a landmark, a certain point of a Federal airway in mountainous terrain, or an obstruction.

(See AIRPORT ROTATING BEACON.)

(Refer to AIM.)

**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. Commonly used aeronautical charts are:

**a. 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, permanent special use airspace (SUA), obstructions, and related data.

**b. VFR Terminal Area Charts (1:250,000)**– Depict Class B airspace which provides for the control or segregation of all the aircraft within Class B airspace. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, permanent SUA, obstructions, and related data.

**c. En Route Low Altitude Charts**– Provide aeronautical information for en route instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum en route and minimum obstruction clearance altitudes, airway distances, reporting points, permanent SUA, and related data. Area charts, which are a part of this series, furnish terminal data at a larger scale in congested areas.

**d. En Route High Altitude Charts**– Provide aeronautical information for en route instrument navigation (IFR) in the high altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace, and related information.

**e. Instrument Approach Procedure (IAP) Charts**– Portray the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, TACAN, VOR, ILS RNAV and GLS. These charts are identified by the type of navigational aid(s)/equipment required to provide final approach guidance.

**f. Instrument Departure Procedure (DP) Charts**– Designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations. Each DP is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

**g. Standard Terminal Arrival (STAR) Charts**– Designed to expedite air traffic control arrival procedures and to facilitate transition between en route and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

**h. Airport Taxi Charts**– Designed to expedite the efficient and safe flow of ground traffic at an airport. These charts are identified by the official airport name; e.g., Ronald Reagan Washington National Airport.

(See ICAO term AERONAUTICAL CHART.)

**AERONAUTICAL CHART [ICAO]**– A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation.

**AERONAUTICAL INFORMATION MANUAL (AIM)**– A primary FAA publication whose purpose is to instruct airmen about operating in the National Airspace System of the U.S. It provides basic flight information, ATC Procedures and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

**AERONAUTICAL INFORMATION PUBLICATION (AIP) [ICAO]**– A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

(See CHART SUPPLEMENT U.S.)

**AFFIRMATIVE**– Yes.

**AFIS**–

(See AUTOMATIC FLIGHT INFORMATION SERVICE – ALASKA FSSs ONLY.)

**AFP**–

(See AIRSPACE FLOW PROGRAM.)

**AIM**–

(See AERONAUTICAL INFORMATION MANUAL.)

**AIP [ICAO]–**

(See ICAO term AERONAUTICAL INFORMATION PUBLICATION.)

**AIR CARRIER DISTRICT OFFICE–** An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel serving the aviation industry and the general public on matters related to the certification and operation of scheduled air carriers and other large aircraft operations.

**AIR DEFENSE EMERGENCY–** A military emergency condition declared by a designated authority. This condition exists when an attack upon the continental U.S., Alaska, Canada, or U.S. installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place.

(Refer to AIM.)

**AIR DEFENSE IDENTIFICATION ZONE (ADIZ)–** An area of airspace over land or water in which the ready identification, location, and control of all aircraft (except for Department of Defense and law enforcement aircraft) is required in the interest of national security.

Note: ADIZ locations and operating and flight plan requirements for civil aircraft operations are specified in 14 CFR Part 99.

(Refer to AIM.)

**AIR NAVIGATION FACILITY–** Any facility used in, available for use in, or designed for use in, aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio-directional finding, or for radio or other electrical communication, and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or the landing and takeoff of aircraft.

(See NAVIGATIONAL AID.)

**AIR ROUTE SURVEILLANCE RADAR–** Air route traffic control center (ARTCC) radar used primarily to detect and display an aircraft's position while en route between terminal areas. The ARSR enables controllers to provide radar air traffic control service when aircraft are within the ARSR coverage. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to but usually more limited than those provided by a radar approach control.

**AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)–** A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See EN ROUTE AIR TRAFFIC CONTROL SERVICES.)

(Refer to AIM.)

**AIR TAXI–** Used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet AGL. The aircraft may proceed either via hover taxi or flight at speeds more than 20 knots. The pilot is solely responsible for selecting a safe airspeed/altitude for the operation being conducted.

(See HOVER TAXI.)

(Refer to AIM.)

**AIR TRAFFIC–** Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

(See ICAO term AIR TRAFFIC.)

**AIR TRAFFIC [ICAO]–** All aircraft in flight or operating on the maneuvering area of an aerodrome.

**AIR TRAFFIC CLEARANCE–** An authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace. The pilot-in-command of an aircraft may not deviate from the provisions of a visual flight rules (VFR) or instrument flight rules (IFR) air traffic clearance except in an emergency or unless an amended clearance has been obtained. Additionally, the pilot may request a different clearance from that which has been issued by air traffic control (ATC) if information available to the pilot makes another course of action more practicable or if aircraft equipment limitations or company procedures forbid compliance with the clearance issued. Pilots may also request clarification or amendment, as appropriate, any time a clearance is not fully understood, or considered unacceptable because of safety of flight. Controllers should, in such instances and to the extent of operational practicality and safety, honor the pilot's request. 14 CFR Part 91.3(a) states: "The pilot in command of an aircraft is directly responsible for, and is the

final authority as to, the operation of that aircraft.”  
**THE PILOT IS RESPONSIBLE TO REQUEST AN AMENDED CLEARANCE** if ATC issues a clearance that would cause a pilot to deviate from a rule or regulation, or in the pilot’s opinion, would place the aircraft in jeopardy.

(See ATC INSTRUCTIONS.)

(See ICAO term AIR TRAFFIC CONTROL CLEARANCE.)

**AIR TRAFFIC CONTROL**– A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

(See ICAO term AIR TRAFFIC CONTROL SERVICE.)

**AIR TRAFFIC CONTROL CLEARANCE [ICAO]**– Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

Note 1: For convenience, the term air traffic control clearance is frequently abbreviated to clearance when used in appropriate contexts.

Note 2: The abbreviated term clearance may be prefixed by the words taxi, takeoff, departure, en route, approach or landing to indicate the particular portion of flight to which the air traffic control clearance relates.

**AIR TRAFFIC CONTROL SERVICE**–

(See AIR TRAFFIC CONTROL.)

**AIR TRAFFIC CONTROL SERVICE [ICAO]**– A service provided for the purpose of:

**a.** Preventing collisions:

**1.** Between aircraft; and

**2.** On the maneuvering area between aircraft and obstructions.

**b.** Expediting and maintaining an orderly flow of air traffic.

**AIR TRAFFIC CONTROL SPECIALIST**– A person authorized to provide air traffic control service.

(See AIR TRAFFIC CONTROL.)

(See FLIGHT SERVICE STATION.)

(See ICAO term CONTROLLER.)

**AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER (ATCSCC)**– An Air Traffic Tactical Operations facility responsible for monitoring and managing the flow of air traffic throughout the NAS, producing a safe, orderly, and expeditious flow of traffic while minimizing delays. The following functions are located at the ATCSCC:

**a.** Central Altitude Reservation Function (CARF). Responsible for coordinating, planning, and approving special user requirements under the Altitude Reservation (ALTRV) concept.

(See ALTITUDE RESERVATION.)

**b.** Airport Reservation Office (ARO). Monitors the operation and allocation of reservations for unscheduled operations at airports designated by the Administrator as High Density Airports. These airports are generally known as slot controlled airports. The ARO allocates reservations on a first come, first served basis determined by the time the request is received at the ARO.

(Refer to 14 CFR Part 93.)

(See CHART SUPPLEMENT U.S.)

**c.** U.S. Notice to Airmen (NOTAM) Office. Responsible for collecting, maintaining, and distributing NOTAMs for the U.S. civilian and military, as well as international aviation communities.

(See NOTICE TO AIRMEN.)

**d.** Weather Unit. Monitor all aspects of weather for the U.S. that might affect aviation including cloud cover, visibility, winds, precipitation, thunderstorms, icing, turbulence, and more. Provide forecasts based on observations and on discussions with meteorologists from various National Weather Service offices, FAA facilities, airlines, and private weather services.

**AIR TRAFFIC SERVICE**– A generic term meaning:

**a.** Flight Information Service.

**b.** Alerting Service.

**c.** Air Traffic Advisory Service.

**d.** Air Traffic Control Service:

**1.** Area Control Service,

**2.** Approach Control Service, or

**3.** Airport Control Service.

**AIR TRAFFIC SERVICE (ATS) ROUTES** – The term “ATS Route” is a generic term that includes “VOR Federal airways,” “colored Federal airways,” “jet routes,” and “RNAV routes.” The term “ATS route” does not replace these more familiar route names, but serves only as an overall title when listing the types of routes that comprise the United States route structure.

**AIRBORNE**– An aircraft is considered airborne when all parts of the aircraft are off the ground.

**AIRBORNE DELAY**– Amount of delay to be encountered in airborne holding.

**AIRCRAFT**– Device(s) that are used or intended to be used for flight in the air, and when used in air traffic control terminology, may include the flight crew.

(See ICAO term AIRCRAFT.)

**AIRCRAFT [ICAO]**– Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

**AIRCRAFT APPROACH CATEGORY**– A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. An aircraft must fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the category for that speed must be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, must use the approach Category B minimums when circling to land. The categories are as follows:

- a. Category A– Speed less than 91 knots.
  - b. Category B– Speed 91 knots or more but less than 121 knots.
  - c. Category C– Speed 121 knots or more but less than 141 knots.
  - d. Category D– Speed 141 knots or more but less than 166 knots.
  - e. Category E– Speed 166 knots or more.
- (Refer to 14 CFR Part 97.)

**AIRCRAFT CLASSES**– For the purposes of Wake Turbulence Separation Minima, ATC classifies aircraft as Super, Heavy, Large, and Small as follows:

- a. Super. The Airbus A-380-800 (A388) and the Antonov An-225 (A225) are classified as super.
  - b. Heavy– Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.
  - c. Large– Aircraft of more than 41,000 pounds, maximum certificated takeoff weight, up to but not including 300,000 pounds.
  - d. Small– Aircraft of 41,000 pounds or less maximum certificated takeoff weight.
- (Refer to AIM.)

**AIRCRAFT CONFLICT**– Predicted conflict, within EDST of two aircraft, or between aircraft and airspace. A Red alert is used for conflicts when the predicted minimum separation is 5 nautical miles or less. A Yellow alert is used when the predicted minimum separation is between 5 and approximately 12 nautical miles. A Blue alert is used for conflicts between an aircraft and predefined airspace.

(See EN ROUTE DECISION SUPPORT TOOL.)

**AIRCRAFT LIST (ACL)**– A view available with EDST that lists aircraft currently in or predicted to be in a particular sector's airspace. The view contains textual flight data information in line format and may be sorted into various orders based on the specific needs of the sector team.

(See EN ROUTE DECISION SUPPORT TOOL.)

**AIRCRAFT SURGE LAUNCH AND RECOVERY**– Procedures used at USAF bases to provide increased launch and recovery rates in instrument flight rules conditions. ASLAR is based on:

- a. Reduced separation between aircraft which is based on time or distance. Standard arrival separation applies between participants including multiple flights until the DRAG point. The DRAG point is a published location on an ASLAR approach where aircraft landing second in a formation slows to a predetermined airspeed. The DRAG point is the reference point at which MARSAs applies as expanding elements effect separation within a flight or between subsequent participating flights.

- b. ASLAR procedures shall be covered in a Letter of Agreement between the responsible USAF military ATC facility and the concerned Federal Aviation Administration facility. Initial Approach Fix spacing requirements are normally addressed as a minimum.

**AIRMEN'S METEOROLOGICAL INFORMATION (AIRMET)**– In-flight weather advisories issued only to amend the Aviation Surface Forecast, Aviation Cloud Forecast, or area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMETs concern weather of less severity than that covered by SIGMETs or Convective SIGMETs.

**AIRMETS** cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement.

(See AWW.)

(See CONVECTIVE SIGMET.)

(See CWA.)

(See SIGMET.)

(Refer to AIM.)

**AIRPORT**— An area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

**AIRPORT ADVISORY AREA**— The area within ten miles of an airport without a control tower or where the tower is not in operation, and on which a Flight Service Station is located.

(See LOCAL AIRPORT ADVISORY.)

(Refer to AIM.)

**AIRPORT ARRIVAL RATE (AAR)**— A dynamic input parameter specifying the number of arriving aircraft which an airport or airspace can accept from the ARTCC per hour. The AAR is used to calculate the desired interval between successive arrival aircraft.

**AIRPORT DEPARTURE RATE (ADR)**— A dynamic parameter specifying the number of aircraft which can depart an airport and the airspace can accept per hour.

**AIRPORT ELEVATION**— The highest point of an airport's usable runways measured in feet from mean sea level.

(See TOUCHDOWN ZONE ELEVATION.)

(See ICAO term AERODROME ELEVATION.)

**AIRPORT LIGHTING**— Various lighting aids that may be installed on an airport. Types of airport lighting include:

**a. Approach Light System (ALS)**— An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his/her final approach for landing. Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with

the ALS at some airports. Types of Approach Light Systems are:

**1. ALSF-1**— Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.

**2. ALSF-2**— Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration. The ALSF-2 may operate as an SSALR when weather conditions permit.

**3. SSALF**— Simplified Short Approach Light System with Sequenced Flashing Lights.

**4. SSALR**— Simplified Short Approach Light System with Runway Alignment Indicator Lights.

**5. MALSF**— Medium Intensity Approach Light System with Sequenced Flashing Lights.

**6. MALSR**— Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

**7. RLLS**— Runway Lead-in Light System Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

**8. RAIL**— Runway Alignment Indicator Lights— Sequenced Flashing Lights which are installed only in combination with other light systems.

**9. ODALS**— Omnidirectional Approach Lighting System consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge, or 75 feet from the runway edge when installed on a runway equipped with a VASI.

(Refer to FAA Order JO 6850.2, VISUAL GUIDANCE LIGHTING SYSTEMS.)

**b. Runway Lights/Runway Edge Lights**— Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.

**c. Touchdown Zone Lighting**— Two rows of transverse light bars located symmetrically about the

runway centerline normally at 100 foot intervals. The basic system extends 3,000 feet along the runway.

**d. Runway Centerline Lighting**– Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

**e. Threshold Lights**– Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold.

**f. Runway End Identifier Lights (REIL)**– Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

**g. Visual Approach Slope Indicator (VASI)**– An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he/she is “on path” if he/she sees red/white, “above path” if white/white, and “below path” if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

**h. Precision Approach Path Indicator (PAPI)**– An airport lighting facility, similar to VASI, providing vertical approach slope guidance to aircraft during approach to landing. PAPIs consist of a single row of either two or four lights, normally installed on the left side of the runway, and have an effective visual range of about 5 miles during the day and up to 20 miles at night. PAPIs radiate a directional pattern of high intensity red and white focused light beams which indicate that the pilot is “on path” if the pilot sees an equal number of white lights and red lights, with white to the left of the red; “above path” if the pilot sees more white than red lights; and “below path” if the pilot sees more red than white lights.

**i. Boundary Lights**– Lights defining the perimeter of an airport or landing area.

(Refer to AIM.)

**AIRPORT MARKING AIDS**– Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as:

- a. Visual.**

- b. Nonprecision instrument.**

- c. Precision instrument.**

(Refer to AIM.)

**AIRPORT REFERENCE POINT (ARP)**– The approximate geometric center of all usable runway surfaces.

**AIRPORT RESERVATION OFFICE**– Office responsible for monitoring the operation of slot controlled airports. It receives and processes requests for unscheduled operations at slot controlled airports.

**AIRPORT ROTATING BEACON**– A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dualpeaked (two quick) white flashes between the green flashes.

(See INSTRUMENT FLIGHT RULES.)

(See SPECIAL VFR OPERATIONS.)

(See ICAO term AERODROME BEACON.)

(Refer to AIM.)

**AIRPORT STREAM FILTER (ASF)**– An on/off filter that allows the conflict notification function to be inhibited for arrival streams into single or multiple airports to prevent nuisance alerts.

**AIRPORT SURFACE DETECTION EQUIPMENT (ASDE)**– Surveillance equipment specifically designed to detect aircraft, vehicular traffic, and other objects, on the surface of an airport, and to present the image on a tower display. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways. There are three ASDE systems deployed in the NAS:

- a. ASDE-3**– a Surface Movement Radar.

**b. ASDE-X**– a system that uses an X-band Surface Movement Radar, multilateration, and ADS-B.

**c. Airport Surface Surveillance Capability (ASSC)**– A system that uses Surface Movement Radar, multilateration, and ADS-B.

**AIRPORT SURVEILLANCE RADAR**– Approach control radar used to detect and display an aircraft’s position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 miles.

**AIRPORT TAXI CHARTS**–

(See AERONAUTICAL CHART.)

**AIRPORT TRAFFIC CONTROL SERVICE**– A service provided by a control tower for aircraft operating on the movement area and in the vicinity of an airport.

(See MOVEMENT AREA.)

(See TOWER.)

(See ICAO term AERODROME CONTROL SERVICE.)

**AIRPORT TRAFFIC CONTROL TOWER**–

(See TOWER.)

**AIRSPACE CONFLICT**– Predicted conflict of an aircraft and active Special Activity Airspace (SAA).

**AIRSPACE FLOW PROGRAM (AFP)**– AFP is a Traffic Management (TM) process administered by the Air Traffic Control System Command Center (ATCSCC) where aircraft are assigned an Expect Departure Clearance Time (EDCT) in order to manage capacity and demand for a specific area of the National Airspace System (NAS). The purpose of the program is to mitigate the effects of en route constraints. It is a flexible program and may be implemented in various forms depending upon the needs of the air traffic system.

**AIRSPACE HIERARCHY**– Within the airspace classes, there is a hierarchy and, in the event of an overlap of airspace: Class A preempts Class B, Class B preempts Class C, Class C preempts Class D, Class D preempts Class E, and Class E preempts Class G.

**AIRSPEED**– The speed of an aircraft relative to its surrounding air mass. The unqualified term “airspeed” means one of the following:

**a. Indicated Airspeed**– The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term “airspeed.”

(Refer to 14 CFR Part 1.)

**b. True Airspeed**– The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as “true airspeed” and not shortened to “airspeed.”

**AIRSTART**– The starting of an aircraft engine while the aircraft is airborne, preceded by engine shutdown during training flights or by actual engine failure.

**AIRWAY**– A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids.

(See FEDERAL AIRWAYS.)

(See ICAO term AIRWAY.)

(Refer to 14 CFR Part 71.)

(Refer to AIM.)

**AIRWAY [ICAO]**– A control area or portion thereof established in the form of corridor equipped with radio navigational aids.

**AIRWAY BEACON**– Used to mark airway segments in remote mountain areas. The light flashes Morse Code to identify the beacon site.

(Refer to AIM.)

**AIT**–

(See AUTOMATED INFORMATION TRANSFER.)

**ALERFA (Alert Phase) [ICAO]**– A situation wherein apprehension exists as to the safety of an aircraft and its occupants.

**ALERT**– A notification to a position that there is an aircraft-to-aircraft or aircraft-to-airspace conflict, as detected by Automated Problem Detection (APD).

**ALERT AREA**–

(See SPECIAL USE AIRSPACE.)

**ALERT NOTICE (ALNOT)**– A request originated by a flight service station (FSS) or an air route traffic control center (ARTCC) for an extensive communication search for overdue, unreported, or missing aircraft.

**ALERTING SERVICE**– A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

**ALNOT**–

(See ALERT NOTICE.)

**ALONG-TRACK DISTANCE (ATD)**– The horizontal distance between the aircraft’s current position and a fix measured by an area navigation system that is not subject to slant range errors.

**ALPHANUMERIC DISPLAY**– Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display.

(See AUTOMATED RADAR TERMINAL SYSTEMS.)

**ALTERNATE AERODROME [ICAO]**– An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing.

Note: The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for the flight.

**ALTERNATE AIRPORT**– An airport at which an aircraft may land if a landing at the intended airport becomes inadvisable.

(See ICAO term ALTERNATE AERODROME.)

**ALTIMETER SETTING**– The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92).

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

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

(See FLIGHT LEVEL.)

**a. MSL Altitude**– Altitude expressed in feet measured from mean sea level.

**b. AGL Altitude**– Altitude expressed in feet measured above ground level.

**c. 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.

(See ICAO term ALTITUDE.)

**ALTITUDE [ICAO]**– The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

**ALTITUDE READOUT**– An aircraft's altitude, transmitted via the Mode C transponder feature, that is visually displayed in 100-foot increments on a radar scope having readout capability.

(See ALPHANUMERIC DISPLAY.)

(See AUTOMATED RADAR TERMINAL SYSTEMS.)

(Refer to AIM.)

**ALTITUDE RESERVATION (ALTRV)**– Airspace utilization under prescribed conditions normally employed for the mass movement of aircraft or other special user requirements which cannot otherwise be

accomplished. ALTRVs are approved by the appropriate FAA facility.

(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER.)

**ALTITUDE RESTRICTION**– An altitude or altitudes, stated in the order flown, which are to be maintained until reaching a specific point or time. Altitude restrictions may be issued by ATC due to traffic, terrain, or other airspace considerations.

**ALTITUDE RESTRICTIONS ARE CANCELED**– Adherence to previously imposed altitude restrictions is no longer required during a climb or descent.

**ALTRV**–

(See ALTITUDE RESERVATION.)

**AMVER**–

(See AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM.)

**APB**–

(See AUTOMATED PROBLEM DETECTION BOUNDARY.)

**APD**–

(See AUTOMATED PROBLEM DETECTION.)

**APDIA**–

(See AUTOMATED PROBLEM DETECTION INHIBITED AREA.)

**APPROACH CLEARANCE**– Authorization by ATC for a pilot to conduct an instrument approach. The type of instrument approach for which a clearance and other pertinent information is provided in the approach clearance when required.

(See CLEARED APPROACH.)

(See INSTRUMENT APPROACH PROCEDURE.)

(Refer to AIM.)

(Refer to 14 CFR Part 91.)

**APPROACH CONTROL FACILITY**– A terminal ATC facility that provides approach control service in a terminal area.

(See APPROACH CONTROL SERVICE.)

(See RADAR APPROACH CONTROL FACILITY.)

**APPROACH CONTROL SERVICE**– Air traffic control service provided by an approach control facility for arriving and departing VFR/IFR aircraft and, on occasion, en route aircraft. At some airports



not served by an approach control facility, the ARTCC provides limited approach control service.

(See ICAO term **APPROACH CONTROL SERVICE**.)

(Refer to AIM.)

**APPROACH CONTROL SERVICE [ICAO]**– Air traffic control service for arriving or departing controlled flights.

**APPROACH GATE**– An imaginary point used within ATC as a basis for vectoring aircraft to the final approach course. The gate will be established along the final approach course 1 mile from the final approach fix on the side away from the airport and will be no closer than 5 miles from the landing threshold.

**APPROACH/DEPARTURE HOLD AREA**– The locations on taxiways in the approach or departure areas of a runway designated to protect landing or departing aircraft. These locations are identified by signs and markings.

**APPROACH LIGHT SYSTEM**–

(See **AIRPORT LIGHTING**.)

**APPROACH SEQUENCE**– The order in which aircraft are positioned while on approach or awaiting approach clearance.

(See **LANDING SEQUENCE**.)

(See ICAO term **APPROACH SEQUENCE**.)

**APPROACH SEQUENCE [ICAO]**– The order in which two or more aircraft are cleared to approach to land at the aerodrome.

**APPROACH SPEED**– The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration.

**APPROACH WITH VERTICAL GUIDANCE (APV)**– A term used to describe RNAV approach procedures that provide lateral and vertical guidance but do not meet the requirements to be considered a precision approach.

**APPROPRIATE ATS AUTHORITY [ICAO]**– The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned. In the United States, the “appropriate ATS authority” is the Program Director for Air Traffic Planning and Procedures, ATP-1.

**APPROPRIATE AUTHORITY**–

a. Regarding flight over the high seas: the relevant authority is the State of Registry.

b. Regarding flight over other than the high seas: the relevant authority is the State having sovereignty over the territory being overflown.

**APPROPRIATE OBSTACLE CLEARANCE**

**MINIMUM ALTITUDE**– Any of the following:

(See **MINIMUM EN ROUTE IFR ALTITUDE**.)

(See **MINIMUM IFR ALTITUDE**.)

(See **MINIMUM OBSTRUCTION CLEARANCE ALTITUDE**.)

(See **MINIMUM VECTORING ALTITUDE**.)

**APPROPRIATE TERRAIN CLEARANCE**

**MINIMUM ALTITUDE**– Any of the following:

(See **MINIMUM EN ROUTE IFR ALTITUDE**.)

(See **MINIMUM IFR ALTITUDE**.)

(See **MINIMUM OBSTRUCTION CLEARANCE ALTITUDE**.)

(See **MINIMUM VECTORING ALTITUDE**.)

**APRON**– A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

(See ICAO term **APRON**.)

**APRON [ICAO]**– A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refueling, parking or maintenance.

**ARC**– The track over the ground of an aircraft flying at a constant distance from a navigational aid by reference to distance measuring equipment (DME).

**AREA CONTROL CENTER [ICAO]**– An air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight. The U.S. equivalent facility is an air route traffic control center (ARTCC).

**AREA NAVIGATION (RNAV)**– A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note: Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

## AREA NAVIGATION (RNAV) APPROACH CONFIGURATION:

**a. STANDARD T**– An RNAV approach whose design allows direct flight to any one of three initial approach fixes (IAF) and eliminates the need for procedure turns. The standard design is to align the procedure on the extended centerline with the missed approach point (MAP) at the runway threshold, the final approach fix (FAF), and the initial approach/intermediate fix (IAF/IF). The other two IAFs will be established perpendicular to the IF.

**b. MODIFIED T**– An RNAV approach design for single or multiple runways where terrain or operational constraints do not allow for the standard T. The “T” may be modified by increasing or decreasing the angle from the corner IAF(s) to the IF or by eliminating one or both corner IAFs.

**c. STANDARD I**– An RNAV approach design for a single runway with both corner IAFs eliminated. Course reversal or radar vectoring may be required at busy terminals with multiple runways.

**d. TERMINAL ARRIVAL AREA (TAA)**– The TAA is controlled airspace established in conjunction with the Standard or Modified T and I RNAV approach configurations. In the standard TAA, there are three areas: straight-in, left base, and right base. The arc boundaries of the three areas of the TAA are published portions of the approach and allow aircraft to transition from the en route structure direct to the nearest IAF. TAAs will also eliminate or reduce feeder routes, departure extensions, and procedure turns or course reversal.

**1. STRAIGHT-IN AREA**– A 30NM arc centered on the IF bounded by a straight line extending through the IF perpendicular to the intermediate course.

**2. LEFT BASE AREA**– A 30NM arc centered on the right corner IAF. The area shares a boundary with the straight-in area except that it extends out for 30NM from the IAF and is bounded on the other side by a line extending from the IF through the FAF to the arc.

**3. RIGHT BASE AREA**– A 30NM arc centered on the left corner IAF. The area shares a boundary with the straight-in area except that it extends out for 30NM from the IAF and is bounded on the other side by a line extending from the IF through the FAF to the arc.

## AREA NAVIGATION (RNAV) GLOBAL POSITIONING SYSTEM (GPS) PRECISION RUNWAY MONITORING (PRM) APPROACH

A GPS approach, which requires vertical guidance, used in lieu of an ILS PRM approach to conduct approaches to parallel runways whose extended centerlines are separated by less than 4,300 feet and at least 3,000 feet, where simultaneous close parallel approaches are permitted. Also used in lieu of an ILS PRM and/or LDA PRM approach to conduct Simultaneous Offset Instrument Approach (SOIA) operations.

**ARINC**– An acronym for Aeronautical Radio, Inc., a corporation largely owned by a group of airlines. ARINC is licensed by the FCC as an aeronautical station and contracted by the FAA to provide communications support for air traffic control and meteorological services in portions of international airspace.

**ARMY AVIATION FLIGHT INFORMATION BULLETIN**– A bulletin that provides air operation data covering Army, National Guard, and Army Reserve aviation activities.

**ARO**–

(See AIRPORT RESERVATION OFFICE.)

**ARRESTING SYSTEM**– A safety device consisting of two major components, namely, engaging or catching devices and energy absorption devices for the purpose of arresting both tailhook and/or nontailhook-equipped aircraft. It is used to prevent aircraft from overrunning runways when the aircraft cannot be stopped after landing or during aborted takeoff. Arresting systems have various names; e.g., arresting gear, hook device, wire barrier cable.

(See ABORT.)

(Refer to AIM.)

**ARRIVAL AIRCRAFT INTERVAL**– An internally generated program in hundredths of minutes based upon the AAR. AAI is the desired optimum interval between successive arrival aircraft over the vertex.

**ARRIVAL CENTER**– The ARTCC having jurisdiction for the impacted airport.

**ARRIVAL DELAY**– A parameter which specifies a period of time in which no aircraft will be metered for arrival at the specified airport.

**ARRIVAL SECTOR**– An operational control sector containing one or more meter fixes.

**ARRIVAL SECTOR ADVISORY LIST**– An ordered list of data on arrivals displayed at the

PVD/MDM of the sector which controls the meter fix.

**ARRIVAL SEQUENCING PROGRAM**– The automated program designed to assist in sequencing aircraft destined for the same airport.

**ARRIVAL TIME**– The time an aircraft touches down on arrival.

**ARSR**–  
(See AIR ROUTE SURVEILLANCE RADAR.)

**ARTCC**–  
(See AIR ROUTE TRAFFIC CONTROL CENTER.)

**ARTS**–  
(See AUTOMATED RADAR TERMINAL SYSTEMS.)

**ASDA**–  
(See ACCELERATE-STOP DISTANCE AVAILABLE.)

**ASDA [ICAO]**–  
(See ICAO Term ACCELERATE-STOP DISTANCE AVAILABLE.)

**ASDE**–  
(See AIRPORT SURFACE DETECTION EQUIPMENT.)

**ASF**–  
(See AIRPORT STREAM FILTER.)

**ASLAR**–  
(See AIRCRAFT SURGE LAUNCH AND RECOVERY.)

**ASP**–  
(See ARRIVAL SEQUENCING PROGRAM.)

**ASR**–  
(See AIRPORT SURVEILLANCE RADAR.)

**ASR APPROACH**–  
(See SURVEILLANCE APPROACH.)

**ASSOCIATED**– A radar target displaying a data block with flight identification and altitude information.

(See UNASSOCIATED.)

**ATC**–  
(See AIR TRAFFIC CONTROL.)

**ATC ADVISES**– Used to prefix a message of noncontrol information when it is relayed to an aircraft by other than an air traffic controller.

(See ADVISORY.)

**ATC ASSIGNED AIRSPACE**– Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic.

(See SPECIAL USE AIRSPACE.)

**ATC CLEARANCE**–  
(See AIR TRAFFIC CLEARANCE.)

**ATC CLEARS**– Used to prefix an ATC clearance when it is relayed to an aircraft by other than an air traffic controller.

**ATC INSTRUCTIONS**– Directives issued by air traffic control for the purpose of requiring a pilot to take specific actions; e.g., “Turn left heading two five zero,” “Go around,” “Clear the runway.”

(Refer to 14 CFR Part 91.)

**ATC PREFERRED ROUTE NOTIFICATION**– EDST notification to the appropriate controller of the need to determine if an ATC preferred route needs to be applied, based on destination airport.

(See ROUTE ACTION NOTIFICATION.)

(See EN ROUTE DECISION SUPPORT TOOL.)

**ATC PREFERRED ROUTES**– Preferred routes that are not automatically applied by Host.

**ATC REQUESTS**– Used to prefix an ATC request when it is relayed to an aircraft by other than an air traffic controller.

**ATC SECURITY SERVICES**– Communications and security tracking provided by an ATC facility in support of the DHS, the DOD, or other Federal security elements in the interest of national security. Such security services are only applicable within designated areas. ATC security services do not include ATC basic radar services or flight following.

**ATC SECURITY SERVICES POSITION**– The position responsible for providing ATC security services as defined. This position does not provide ATC, IFR separation, or VFR flight following services, but is responsible for providing security services in an area comprising airspace assigned to one or more ATC operating sectors. This position may be combined with control positions.

**ATC SECURITY TRACKING**– The continuous tracking of aircraft movement by an ATC facility in

support of the DHS, the DOD, or other security elements for national security using radar (i.e., radar tracking) or other means (e.g., manual tracking) without providing basic radar services (including traffic advisories) or other ATC services not defined in this section.

**ATS SURVEILLANCE SERVICE [ICAO]**– A term used to indicate a service provided directly by means of an ATS surveillance system.

**ATC SURVEILLANCE SOURCE**– Used by ATC for establishing identification, control and separation using a target depicted on an air traffic control facility’s video display that has met the relevant safety standards for operational use and received from one, or a combination, of the following surveillance sources:

- a. Radar (See RADAR.)
- b. ADS-B (See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST.)
- c. WAM (See WIDE AREA MULTILATERATION.)  
(See INTERROGATOR.)  
(See TRANSPONDER.)  
(See ICAO term RADAR.)  
(Refer to AIM.)

**ATS SURVEILLANCE SYSTEM [ICAO]**– A generic term meaning variously, ADS–B, PSR, SSR or any comparable ground–based system that enables the identification of aircraft.

Note: A comparable ground–based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

**ATCAA**–  
(See ATC ASSIGNED AIRSPACE.)

**ATCRBS**–  
(See RADAR.)

**ATCSCC**–  
(See AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER.)

**ATCT**–  
(See TOWER.)

**ATD**–  
(See ALONG–TRACK DISTANCE.)

**ATIS**–  
(See AUTOMATIC TERMINAL INFORMATION SERVICE.)

**ATIS [ICAO]**–  
(See ICAO Term AUTOMATIC TERMINAL INFORMATION SERVICE.)

**ATS ROUTE [ICAO]**– A specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services.

Note: The term “ATS Route” is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure, etc.

**ATTENTION ALL USERS PAGE (AAUP)**– The AAUP provides the pilot with additional information relative to conducting a specific operation, for example, PRM approaches and RNAV departures.

**AUTOLAND APPROACH**–An autoland system aids by providing control of aircraft systems during a precision instrument approach to at least decision altitude and possibly all the way to touchdown, as well as in some cases, through the landing rollout. The autoland system is a sub-system of the autopilot system from which control surface management occurs. The aircraft autopilot sends instructions to the autoland system and monitors the autoland system performance and integrity during its execution.

**AUTOMATED INFORMATION TRANSFER (AIT)**– A precoordinated process, specifically defined in facility directives, during which a transfer of altitude control and/or radar identification is accomplished without verbal coordination between controllers using information communicated in a full data block.

**AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM**– A facility which can deliver, in a matter of minutes, a surface picture (SURPIC) of vessels in the area of a potential or actual search and rescue incident, including their predicted positions and their characteristics.

(See FAA Order JO 7110.65, Para 10–6–4, INFLIGHT CONTINGENCIES.)

**AUTOMATED PROBLEM DETECTION (APD)**– An Automation Processing capability that compares trajectories in order to predict conflicts.

**AUTOMATED PROBLEM DETECTION BOUNDARY (APB)**– The adapted distance beyond a facilities boundary defining the airspace within which EDST performs conflict detection.

(See EN ROUTE DECISION SUPPORT TOOL.)

**AUTOMATED PROBLEM DETECTION INHIBITED AREA (APDIA)**– Airspace surrounding a

terminal area within which APD is inhibited for all flights within that airspace.

**AUTOMATED RADAR TERMINAL SYSTEMS (ARTS)**– A generic term for several tracking systems included in the Terminal Automation Systems (TAS). ARTS plus a suffix roman numeral denotes a major modification to that system.

**a. ARTS IIIA.** The Radar Tracking and Beacon Tracking Level (RT&BTL) of the modular, programmable automated radar terminal system. ARTS IIIA detects, tracks, and predicts primary as well as secondary radar-derived aircraft targets. This more sophisticated computer-driven system upgrades the existing ARTS III system by providing improved tracking, continuous data recording, and fail-soft capabilities.

**b. Common ARTS.** Includes ARTS IIE, ARTS IIIIE; and ARTS IIIIE with ACD (see DTAS) which combines functionalities of the previous ARTS systems.

**AUTOMATED WEATHER SYSTEM**– Any of the automated weather sensor platforms that collect weather data at airports and disseminate the weather information via radio and/or landline. The systems currently consist of the Automated Surface Observing System (ASOS), Automated Weather Sensor System (AWSS) and Automated Weather Observation System (AWOS).

**AUTOMATED UNICOM**– Provides completely automated weather, radio check capability and airport advisory information on an Automated UNICOM system. These systems offer a variety of features, typically selectable by microphone clicks, on the UNICOM frequency. Availability will be published in the Chart Supplement U.S. and approach charts.

**AUTOMATIC ALTITUDE REPORT**–  
(See ALTITUDE READOUT.)

**AUTOMATIC ALTITUDE REPORTING**– That function of a transponder which responds to Mode C interrogations by transmitting the aircraft's altitude in 100-foot increments.

**AUTOMATIC CARRIER LANDING SYSTEM**– U.S. Navy final approach equipment consisting of precision tracking radar coupled to a computer data link to provide continuous information to the aircraft,

monitoring capability to the pilot, and a backup approach system.

**AUTOMATIC DEPENDENT SURVEILLANCE (ADS) [ICAO]**– A surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position fixing systems, including aircraft identification, four dimensional position and additional data as appropriate.

**AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST (ADS-B)**– A surveillance system in which an aircraft or vehicle to be detected is fitted with cooperative equipment in the form of a data link transmitter. The aircraft or vehicle periodically broadcasts its GPS-derived position and other information such as velocity over the data link, which is received by a ground-based transmitter/receiver (transceiver) for processing and display at an air traffic control facility.

(See GLOBAL POSITIONING SYSTEM.)

(See GROUND-BASED TRANSCEIVER.)

**AUTOMATIC DEPENDENT SURVEILLANCE–CONTRACT (ADS-C)**– A data link position reporting system, controlled by a ground station, that establishes contracts with an aircraft's avionics that occur automatically whenever specific events occur, or specific time intervals are reached.

**AUTOMATIC DEPENDENT SURVEILLANCE–REBROADCAST (ADS-R)**– A datalink translation function of the ADS-B ground system required to accommodate the two separate operating frequencies (978 MHz and 1090 MHz). The ADS-B system receives the ADS-B messages transmitted on one frequency and ADS-R translates and reformats the information for rebroadcast and use on the other frequency. This allows ADS-B In equipped aircraft to see nearby ADS-B Out traffic regardless of the operating link of the other aircraft. Aircraft operating on the same ADS-B frequency exchange information directly and do not require the ADS-R translation function.

**AUTOMATIC DIRECTION FINDER**– An aircraft radio navigation system which senses and indicates the direction to a 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.

(See BEARING.)

(See NONDIRECTIONAL BEACON.)

**AUTOMATIC FLIGHT INFORMATION SERVICE (AFIS) – ALASKA FSSs ONLY**– The continuous broadcast of recorded non-control information at airports in Alaska where a FSS provides local airport advisory service. The AFIS broadcast automates the repetitive transmission of essential but routine information such as weather, wind, altimeter, favored runway, braking action, airport NOTAMs, and other applicable information. The information is continuously broadcast over a discrete VHF radio frequency (usually the ASOS/AWSS/AWOS frequency).

**AUTOMATIC TERMINAL INFORMATION SERVICE**– 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; e.g., “Los Angeles information Alfa. One three zero zero Coordinated Universal Time. Weather, measured ceiling two thousand overcast, visibility three, haze, smoke, temperature seven one, dew point five seven, wind two five zero at five, altimeter two niner niner six. I-L-S Runway Two Five Left approach in use, Runway Two Five Right closed, advise you have Alfa.”

(See ICAO term AUTOMATIC TERMINAL INFORMATION SERVICE.)

(Refer to AIM.)

**AUTOMATIC TERMINAL INFORMATION SERVICE [ICAO]**– The provision of current, routine

information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

**AUTOROTATION**– A rotorcraft flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft is in motion.

**a. Autorotative Landing/Touchdown Autorotation.** Used by a pilot to indicate that the landing will be made without applying power to the rotor.

**b. Low Level Autorotation.** Commences at an altitude well below the traffic pattern, usually below 100 feet AGL and is used primarily for tactical military training.

**c. 180 degrees Autorotation.** Initiated from a downwind heading and is commenced well inside the normal traffic pattern. “Go around” may not be possible during the latter part of this maneuver.

**AVAILABLE LANDING DISTANCE (ALD)**– The portion of a runway available for landing and roll-out for aircraft cleared for LAHSO. This distance is measured from the landing threshold to the hold-short point.

**AVIATION WEATHER SERVICE**– A service provided by the National Weather Service (NWS) and FAA which collects and disseminates pertinent weather information for pilots, aircraft operators, and ATC. Available aviation weather reports and forecasts are displayed at each NWS office and FAA FSS.

(See TRANSCRIBED WEATHER BROADCAST.)

(See WEATHER ADVISORY.)

(Refer to AIM.)

**AWW**–

(See SEVERE WEATHER FORECAST ALERTS.)

# B

**BACK-TAXI**– A term used by air traffic controllers to taxi an aircraft on the runway opposite to the traffic flow. The aircraft may be instructed to back-taxi to the beginning of the runway or at some point before reaching the runway end for the purpose of departure or to exit the runway.

**BASE LEG**–

(See TRAFFIC PATTERN.)

**BEACON**–

(See AERONAUTICAL BEACON.)

(See AIRPORT ROTATING BEACON.)

(See AIRWAY BEACON.)

(See MARKER BEACON.)

(See NONDIRECTIONAL BEACON.)

(See RADAR.)

**BEARING**– The horizontal direction to or from any point, usually measured clockwise from true north, magnetic north, or some other reference point through 360 degrees.

(See NONDIRECTIONAL BEACON.)

**BELOW MINIMUMS**– Weather conditions below the minimums prescribed by regulation for the particular action involved; e.g., landing minimums, takeoff minimums.

**BLAST FENCE**– A barrier that is used to divert or dissipate jet or propeller blast.

**BLAST PAD**– A surface adjacent to the ends of a runway provided to reduce the erosive effect of jet blast and propeller wash.

**BLIND SPEED**– The rate of departure or closing of a target relative to the radar antenna at which cancellation of the primary radar target by moving target indicator (MTI) circuits in the radar equipment causes a reduction or complete loss of signal.

(See ICAO term BLIND VELOCITY.)

**BLIND SPOT**– An area from which radio transmissions and/or radar echoes cannot be received. The term is also used to describe portions of the airport not visible from the control tower.

**BLIND TRANSMISSION**–

(See TRANSMITTING IN THE BLIND.)

**BLIND VELOCITY [ICAO]**– The radial velocity of a moving target such that the target is not seen on primary radars fitted with certain forms of fixed echo suppression.

**BLIND ZONE**–

(See BLIND SPOT.)

**BLOCKED**– Phraseology used to indicate that a radio transmission has been distorted or interrupted due to multiple simultaneous radio transmissions.

**BOTTOM ALTITUDE**– In reference to published altitude restrictions on a STAR or STAR runway transition, the lowest altitude authorized.

**BOUNDARY LIGHTS**–

(See AIRPORT LIGHTING.)

**BRAKING ACTION (GOOD, GOOD TO MEDIUM, MEDIUM, MEDIUM TO POOR, POOR, OR NIL)**– A report of conditions on the airport movement area providing a pilot with a degree/quality of braking to expect. Braking action is reported in terms of good, good to medium, medium, medium to poor, poor, or nil.

(See RUNWAY CONDITION READING.)

(See RUNWAY CONDITION REPORT.)

(See RUNWAY CONDITION CODES.)

**BRAKING ACTION ADVISORIES**– When tower controllers receive runway braking action reports which include the terms “medium,” “poor,” or “nil,” or whenever weather conditions are conducive to deteriorating or rapidly changing runway braking conditions, the tower will include on the ATIS broadcast the statement, “Braking Action Advisories are in Effect.” During the time braking action advisories are in effect, ATC will issue the most current braking action report for the runway in use to each arriving and departing aircraft. Pilots should be prepared for deteriorating braking conditions and should request current runway condition information if not issued by controllers. Pilots should also be prepared to provide a descriptive runway condition report to controllers after landing.

**BREAKOUT**– A technique to direct aircraft out of the approach stream. In the context of simultaneous (independent) parallel operations, a breakout is used to direct threatened aircraft away from a deviating aircraft.

**BROADCAST**– Transmission of information for which an acknowledgement is not expected.

(See ICAO term BROADCAST.)

**BROADCAST [ICAO]**– A transmission of information relating to air navigation that is not addressed to a specific station or stations.

**BUFFER AREA**– As applied to an MVA or MIA chart, a depicted three (3) or five (5) NM radius MVA/MIA sector isolating a displayed obstacle for which the sector is established. A portion of a buffer area can also be inclusive of a MVA/MIA sector polygon boundary.



# C

**CALCULATED LANDING TIME**– A term that may be used in place of tentative or actual calculated landing time, whichever applies.

**CALL FOR RELEASE**– Wherein the overlying ARTCC requires a terminal facility to initiate verbal coordination to secure ARTCC approval for release of a departure into the en route environment.

**CALL UP**– Initial voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call.

(Refer to AIM.)

**CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE**– That portion of Canadian domestic airspace within which MNPS separation may be applied.

**CARDINAL ALTITUDES**– “Odd” or “Even” thousand-foot altitudes or flight levels; e.g., 5,000, 6,000, 7,000, FL 250, FL 260, FL 270.

(See ALTITUDE.)

(See FLIGHT LEVEL.)

**CARDINAL FLIGHT LEVELS**–

(See CARDINAL ALTITUDES.)

**CAT**–

(See CLEAR-AIR TURBULENCE.)

**CATCH POINT**– A fix/waypoint that serves as a transition point from the high altitude waypoint navigation structure to an arrival procedure (STAR) or the low altitude ground-based navigation structure.

**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.”

(See ICAO term CEILING.)

**CEILING [ICAO]**– The height above the ground or water of the base of the lowest layer of cloud below 6,000 meters (20,000 feet) covering more than half the sky.

**CENRAP**–

(See CENTER RADAR ARTS PRESENTATION/PROCESSING.)

**CENRAP-PLUS**–

(See CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS.)

**CENTER**–

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

**CENTER’S AREA**– The specified airspace within which an air route traffic control center (ARTCC) provides air traffic control and advisory service.

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

(Refer to AIM.)

**CENTER RADAR ARTS PRESENTATION/PROCESSING**– A computer program developed to provide a back-up system for airport surveillance radar in the event of a failure or malfunction. The program uses air route traffic control center radar for the processing and presentation of data on the ARTS IIA or IIIA displays.

**CENTER RADAR ARTS PRESENTATION/PROCESSING-PLUS**– A computer program developed to provide a back-up system for airport surveillance radar in the event of a terminal secondary radar system failure. The program uses a combination of Air Route Traffic Control Center Radar and terminal airport surveillance radar primary targets displayed simultaneously for the processing and presentation of data on the ARTS IIA or IIIA displays.

**CENTER TRACON AUTOMATION SYSTEM (CTAS)**– A computerized set of programs designed to aid Air Route Traffic Control Centers and TRACONS in the management and control of air traffic.

**CENTER WEATHER ADVISORY**– An unscheduled weather advisory issued by Center Weather Service Unit meteorologists for ATC use to alert pilots of existing or anticipated adverse weather conditions within the next 2 hours. A CWA may modify or redefine a SIGMET.

(See AWW.)

(See AIRMET.)

(See CONVECTIVE SIGMET.)

(See SIGMET.)

(Refer to AIM.)

**CENTRAL EAST PACIFIC**– An organized route system between the U.S. West Coast and Hawaii.

**CEP**–

(See **CENTRAL EAST PACIFIC**.)

**CERAP**–

(See **COMBINED CENTER-RAPCON**.)

**CERTIFIED TOWER RADAR DISPLAY (CTRD)**– An FAA radar display certified for use in the NAS.

**CFR**–

(See **CALL FOR RELEASE**.)

**CHAFF**– Thin, narrow metallic reflectors of various lengths and frequency responses, used to reflect radar energy. These reflectors, when dropped from aircraft and allowed to drift downward, result in large targets on the radar display.

**CHART SUPPLEMENT U.S.**– 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.

**CHARTED VFR FLYWAYS**– Charted VFR Flyways are flight paths recommended for use to bypass areas heavily traversed by large turbine-powered aircraft. Pilot compliance with recommended flyways and associated altitudes is strictly voluntary. VFR Flyway Planning charts are published on the back of existing VFR Terminal Area charts.

**CHARTED VISUAL FLIGHT PROCEDURE APPROACH**– An approach conducted while operating on an instrument flight rules (IFR) flight plan which authorizes the pilot of an aircraft to proceed visually and clear of clouds to the airport via visual landmarks and other information depicted on a charted visual flight procedure. This approach must be authorized and under the control of the appropriate air traffic control facility. Weather minimums required are depicted on the chart.

**CHASE**– An aircraft flown in proximity to another aircraft normally to observe its performance during training or testing.

**CHASE AIRCRAFT**–

(See **CHASE**.)

**CHOP**– A form of turbulence.

**a. Light Chop**– Turbulence that causes slight, rapid and somewhat rhythmic bumpiness without appreciable changes in altitude or attitude.

**b. Moderate Chop**– Turbulence similar to Light Chop but of greater intensity. It causes rapid bumps or jolts without appreciable changes in aircraft altitude or attitude.

(See **TURBULENCE**.)

**CIRCLE-TO-LAND MANEUVER**– A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. At tower controlled airports, this maneuver is made only after ATC authorization has been obtained and the pilot has established required visual reference to the airport.

(See **CIRCLE TO RUNWAY**.)

(See **LANDING MINIMUMS**.)

(Refer to **AIM**.)

**CIRCLE TO RUNWAY (RUNWAY NUMBER)**– Used by ATC to inform the pilot that he/she must circle to land because the runway in use is other than the runway aligned with the instrument approach procedure. When the direction of the circling maneuver in relation to the airport/runway is required, the controller will state the direction (eight cardinal compass points) and specify a left or right downwind or base leg as appropriate; e.g., “Cleared VOR Runway Three Six Approach circle to Runway Two Two,” or “Circle northwest of the airport for a right downwind to Runway Two Two.”

(See **CIRCLE-TO-LAND MANEUVER**.)

(See **LANDING MINIMUMS**.)

(Refer to **AIM**.)

**CIRCLING APPROACH**–

(See **CIRCLE-TO-LAND MANEUVER**.)

**CIRCLING MANEUVER**–

(See **CIRCLE-TO-LAND MANEUVER**.)

**CIRCLING MINIMA**–

(See **LANDING MINIMUMS**.)

**CLASS A AIRSPACE**–

(See **CONTROLLED AIRSPACE**.)

**CLASS B AIRSPACE**–

(See **CONTROLLED AIRSPACE**.)

**CLASS C AIRSPACE**–

(See **CONTROLLED AIRSPACE**.)

**CLASS D AIRSPACE–**

(See CONTROLLED AIRSPACE.)

**CLASS E AIRSPACE–**

(See CONTROLLED AIRSPACE.)

**CLASS G AIRSPACE–** That airspace not designated as Class A, B, C, D or E.

**CLEAR AIR TURBULENCE (CAT)–** Turbulence encountered in air where no clouds are present. This term is commonly applied to high-level turbulence associated with wind shear. CAT is often encountered in the vicinity of the jet stream.

(See WIND SHEAR.)

(See JET STREAM.)

**CLEAR OF THE RUNWAY–**

**a.** Taxiing aircraft, which is approaching a runway, is clear of the runway when all parts of the aircraft are held short of the applicable runway holding position marking.

**b.** A pilot or controller may consider an aircraft, which is exiting or crossing a runway, to be clear of the runway when all parts of the aircraft are beyond the runway edge and there are no restrictions to its continued movement beyond the applicable runway holding position marking.

**c.** Pilots and controllers shall exercise good judgement to ensure that adequate separation exists between all aircraft on runways and taxiways at airports with inadequate runway edge lines or holding position markings.

**CLEARANCE–**

(See AIR TRAFFIC CLEARANCE.)

**CLEARANCE LIMIT–** The fix, point, or location to which an aircraft is cleared when issued an air traffic clearance.

(See ICAO term CLEARANCE LIMIT.)

**CLEARANCE LIMIT [ICAO]–** The point to which an aircraft is granted an air traffic control clearance.

**CLEARANCE VOID IF NOT OFF BY (TIME)–**

Used by ATC to advise an aircraft that the departure clearance is automatically canceled if takeoff is not made prior to a specified time. The pilot must obtain a new clearance or cancel his/her IFR flight plan if not off by the specified time.

(See ICAO term CLEARANCE VOID TIME.)

**CLEARANCE VOID TIME [ICAO]–** A time specified by an air traffic control unit at which a

clearance ceases to be valid unless the aircraft concerned has already taken action to comply therewith.

**CLEARED APPROACH–** ATC authorization for an aircraft to execute any standard or special instrument approach procedure for that airport. Normally, an aircraft will be cleared for a specific instrument approach procedure.

(See CLEARED (Type of) APPROACH.)

(See INSTRUMENT APPROACH PROCEDURE.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**CLEARED (Type of) APPROACH–** ATC authorization for an aircraft to execute a specific instrument approach procedure to an airport; e.g., “Cleared ILS Runway Three Six Approach.”

(See APPROACH CLEARANCE.)

(See INSTRUMENT APPROACH PROCEDURE.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**CLEARED AS FILED–** Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, DP, or DP Transition.

(See REQUEST FULL ROUTE CLEARANCE.)

(Refer to AIM.)

**CLEARED FOR TAKEOFF–** ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.

**CLEARED FOR THE OPTION–** ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It is normally used in training so that an instructor can evaluate a student’s performance under changing situations. Pilots should advise ATC if they decide to remain on the runway, of any delay in their stop and go, delay clearing the runway, or are unable to comply with the instruction(s).

(See OPTION APPROACH.)

(Refer to AIM.)

**CLEARED THROUGH–** ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

**CLEARED TO LAND**– ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

**CLEARWAY**– An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

(Refer to 14 CFR Part 1.)

**CLIMB TO VFR**– ATC authorization for an aircraft to climb to VFR conditions within Class B, C, D, and E surface areas when the only weather limitation is restricted visibility. The aircraft must remain clear of clouds while climbing to VFR.

(See SPECIAL VFR CONDITIONS.)

(Refer to AIM.)

**CLIMBOUT**– That portion of flight operation between takeoff and the initial cruising altitude.

**CLIMB VIA**– An abbreviated ATC clearance that requires compliance with the procedure lateral path, associated speed restrictions, and altitude restrictions along the cleared route or procedure.

**CLOSE PARALLEL RUNWAYS**– Two parallel runways whose extended centerlines are separated by less than 4,300 feet and at least 3000 feet (750 feet for SOIA operations) for which ATC is authorized to conduct simultaneous independent approach operations. PRM and simultaneous close parallel appear in approach title. Dual communications, special pilot training, an Attention All Users Page (AAUP), NTZ monitoring by displays that have aural and visual alerting algorithms are required. A high update rate surveillance sensor is required for certain runway or approach course spacing.

**CLOSED RUNWAY**– A runway that is unusable for aircraft operations. Only the airport management/military operations office can close a runway.

**CLOSED TRAFFIC**– Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

**CLOUD**– A cloud is a visible accumulation of minute water droplets and/or ice particles in the atmosphere above the Earth's surface. Cloud differs

from ground fog, fog, or ice fog only in that the latter are, by definition, in contact with the Earth's surface.

**CLT**–

(See CALCULATED LANDING TIME.)

**CLUTTER**– In radar operations, clutter refers to the reception and visual display of radar returns caused by precipitation, chaff, terrain, numerous aircraft targets, or other phenomena. Such returns may limit or preclude ATC from providing services based on radar.

(See CHAFF.)

(See GROUND CLUTTER.)

(See PRECIPITATION.)

(See TARGET.)

(See ICAO term RADAR CLUTTER.)

**CMNPS**–

(See CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE.)

**COASTAL FIX**– A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

**CODES**– The number assigned to a particular multiple pulse reply signal transmitted by a transponder.

(See DISCRETE CODE.)

**COLD TEMPERATURE COMPENSATION**– An action on the part of the pilot to adjust an aircraft's indicated altitude due to the effect of cold temperatures on true altitude above terrain versus aircraft indicated altitude. The amount of compensation required increases at a greater rate with a decrease in temperature and increase in height above the reporting station.

**COLLABORATIVE TRAJECTORY OPTIONS PROGRAM (CTOP)**– CTOP is a traffic management program administered by the Air Traffic Control System Command Center (ATCSCC) that manages demand through constrained airspace, while considering operator preference with regard to both route and delay as defined in a Trajectory Options Set (TOS).

**COMBINED CENTER-RAPCON**– An air traffic facility which combines the functions of an ARTCC and a radar approach control facility.

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

(See RADAR APPROACH CONTROL FACILITY.)

**COMMON POINT**– A significant point over which two or more aircraft will report passing or have reported passing before proceeding on the same or diverging tracks. To establish/maintain longitudinal separation, a controller may determine a common point not originally in the aircraft's flight plan and then clear the aircraft to fly over the point.

(See **SIGNIFICANT POINT**.)

**COMMON PORTION**–

(See **COMMON ROUTE**.)

**COMMON ROUTE**– That segment of a North American Route between the inland navigation facility and the coastal fix.

## OR

**COMMON ROUTE**– Typically the portion of a RNAV STAR between the en route transition end point and the runway transition start point; however, the common route may only consist of a single point that joins the en route and runway transitions.

**COMMON TRAFFIC ADVISORY FREQUENCY (CTAF)**– A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, Multicom, FSS, or tower frequency and is identified in appropriate aeronautical publications.

(See **DESIGNATED COMMON TRAFFIC ADVISORY FREQUENCY (CTAF) AREA**.)

(Refer to AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers.)

**COMPASS LOCATOR**– A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

**a. Outer Compass Locator (LOM)**– A compass locator installed at the site of the outer marker of an instrument landing system.

(See **OUTER MARKER**.)

**b. Middle Compass Locator (LMM)**– A compass locator installed at the site of the middle marker of an instrument landing system.

(See **MIDDLE MARKER**.)

(See ICAO term **LOCATOR**.)

**COMPASS ROSE**– A circle, graduated in degrees, printed on some charts or marked on the ground at an

airport. It is used as a reference to either true or magnetic direction.

**COMPLY WITH RESTRICTIONS**– An ATC instruction that requires an aircraft being vectored back onto an arrival or departure procedure to comply with all altitude and/or speed restrictions depicted on the procedure. This term may be used in lieu of repeating each remaining restriction that appears on the procedure.

**COMPOSITE FLIGHT PLAN**– A flight plan which specifies VFR operation for one portion of flight and IFR for another portion. It is used primarily in military operations.

(Refer to **AIM**.)

**COMPOSITE ROUTE SYSTEM**– An organized oceanic route structure, incorporating reduced lateral spacing between routes, in which composite separation is authorized.

**COMPOSITE SEPARATION**– A method of separating aircraft in a composite route system where, by management of route and altitude assignments, a combination of half the lateral minimum specified for the area concerned and half the vertical minimum is applied.

**COMPULSORY REPORTING POINTS**– Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in "radar contact."

**CONDITIONS NOT MONITORED**– When an airport operator cannot monitor the condition of the movement area or airfield surface area, this information is issued as a NOTAM. Usually necessitated due to staffing, operating hours or other mitigating factors associated with airport operations.

**CONFIDENCE MANEUVER**– A confidence maneuver consists of one or more turns, a climb or descent, or other maneuver to determine if the pilot in command (PIC) is able to receive and comply with ATC instructions.

**CONFLICT ALERT**– A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between

tracked targets (known IFR or VFR aircraft) that require his/her immediate attention/action.

(See MODE C INTRUDER ALERT.)

**CONFLICT RESOLUTION**– The resolution of potential conflicts between aircraft that are radar identified and in communication with ATC by ensuring that radar targets do not touch. Pertinent traffic advisories shall be issued when this procedure is applied.

Note: This procedure shall not be provided utilizing mosaic radar systems.

**CONFORMANCE**– The condition established when an aircraft’s actual position is within the conformance region constructed around that aircraft at its position, according to the trajectory associated with the aircraft’s Current Plan.

**CONFORMANCE REGION**– A volume, bounded laterally, vertically, and longitudinally, within which an aircraft must be at a given time in order to be in conformance with the Current Plan Trajectory for that aircraft. At a given time, the conformance region is determined by the simultaneous application of the lateral, vertical, and longitudinal conformance bounds for the aircraft at the position defined by time and aircraft’s trajectory.

**CONSOLAN**– A low frequency, long-distance NAVAIID used principally for transoceanic navigations.

**CONTACT**–

a. Establish communication with (followed by the name of the facility and, if appropriate, the frequency to be used).

b. A flight condition wherein the pilot ascertains the attitude of his/her aircraft and navigates by visual reference to the surface.

(See CONTACT APPROACH.)

(See RADAR CONTACT.)

**CONTACT APPROACH**– An approach wherein an aircraft on an IFR flight plan, having an air traffic control authorization, operating clear of clouds with at least 1 mile flight visibility and a reasonable expectation of continuing to the destination airport in those conditions, may deviate from the instrument approach procedure and proceed to the destination airport by visual reference to the surface. This approach will only be authorized when requested by

the pilot and the reported ground visibility at the destination airport is at least 1 statute mile.

(Refer to AIM.)

**CONTAMINATED RUNWAY**– A runway is considered contaminated whenever standing water, ice, snow, slush, frost in any form, heavy rubber, or other substances are present. A runway is contaminated with respect to rubber deposits or other friction-degrading substances when the average friction value for any 500-foot segment of the runway within the ALD fails below the recommended minimum friction level and the average friction value in the adjacent 500-foot segments falls below the maintenance planning friction level.

**CONTERMINOUS U.S.**– The 48 adjoining States and the District of Columbia.

**CONTINENTAL UNITED STATES**– The 49 States located on the continent of North America and the District of Columbia.

**CONTINUE**– When used as a control instruction should be followed by another word or words clarifying what is expected of the pilot. Example: “continue taxi,” “continue descent,” “continue inbound,” etc.

**CONTROL AREA [ICAO]**– A controlled airspace extending upwards from a specified limit above the earth.

**CONTROL SECTOR**– An airspace area of defined horizontal and vertical dimensions for which a controller or group of controllers has air traffic control responsibility, normally within an air route traffic control center or an approach control facility. Sectors are established based on predominant traffic flows, altitude strata, and controller workload. Pilot communications during operations within a sector are normally maintained on discrete frequencies assigned to the sector.

(See DISCRETE FREQUENCY.)

**CONTROL SLASH**– A radar beacon slash representing the actual position of the associated aircraft. Normally, the control slash is the one closest to the interrogating radar beacon site. When ARTCC radar is operating in narrowband (digitized) mode, the control slash is converted to a target symbol.

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

**a.** Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

**b.** Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in 14 CFR Part 91 (for specific operating requirements, please refer to 14 CFR Part 91). For IFR operations in any class of controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance. Each Class B, Class C, and Class D airspace area designated for an airport contains at least one primary airport around which the airspace is designated (for specific designations and descriptions of the airspace classes, please refer to 14 CFR Part 71).

**c.** Controlled airspace in the United States is designated as follows:

**1. CLASS A–** Generally, that airspace from 18,000 feet MSL up to and including FL 600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.

**2. CLASS B–** Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation’s busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is “clear of clouds.”

**3. CLASS C–** Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area with a 5 nautical mile (NM) radius, a circle with a 10NM radius that extends no lower than 1,200 feet up to 4,000 feet above the

airport elevation, and an outer area that is not charted. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.

(See OUTER AREA.)

**4. CLASS D–** Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.

**5. CLASS E–** Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska, up to, but not including 18,000 feet MSL, and the airspace above FL 600.

**CONTROLLED AIRSPACE [ICAO]–** An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

**Note:** Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D, and E.

**CONTROLLED TIME OF ARRIVAL–** Arrival time assigned during a Traffic Management Program. This

time may be modified due to adjustments or user options.

**CONTROLLER-**

(See AIR TRAFFIC CONTROL SPECIALIST.)

**CONTROLLER [ICAO]-** A person authorized to provide air traffic control services.

**CONTROLLER PILOT DATA LINK COMMUNICATIONS (CPDLC)-** A two-way digital communications system that conveys textual air traffic control messages between controllers and pilots using ground or satellite-based radio relay stations.

**CONVECTIVE SIGMET-** A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMETs are issued for tornadoes, lines of thunderstorms, embedded thunderstorms of any intensity level, areas of thunderstorms greater than or equal to VIP level 4 with an area coverage of  $\frac{4}{10}$  (40%) or more, and hail  $\frac{3}{4}$  inch or greater.

(See AIRMET.)

(See AWW.)

(See CWA.)

(See SIGMET.)

(Refer to AIM.)

**CONVECTIVE SIGNIFICANT METEOROLOGICAL INFORMATION-**

(See CONVECTIVE SIGMET.)

**COORDINATES-** The intersection of lines of reference, usually expressed in degrees/minutes/seconds of latitude and longitude, used to determine position or location.

**COORDINATION FIX-** The fix in relation to which facilities will handoff, transfer control of an aircraft, or coordinate flight progress data. For terminal facilities, it may also serve as a clearance for arriving aircraft.

**COPTER-**

(See HELICOPTER.)

**CORRECTION-** An error has been made in the transmission and the correct version follows.

**COUPLED APPROACH-** An instrument approach performed by the aircraft autopilot, and/or visually depicted on the flight director, which is receiving position information and/or steering commands from onboard navigational equipment. In general, coupled

non-precision approaches must be flown manually (autopilot disengaged) at altitudes lower than 50 feet AGL below the minimum descent altitude, and coupled precision approaches must be flown manually (autopilot disengaged) below 50 feet AGL unless authorized to conduct autoland operations. Coupled instrument approaches are commonly flown to the allowable IFR weather minima established by the operator or PIC, or flown VFR for training and safety.

**COURSE-**

**a.** The intended direction of flight in the horizontal plane measured in degrees from north.

**b.** The ILS localizer signal pattern usually specified as the front course or the back course.

(See BEARING.)

(See INSTRUMENT LANDING SYSTEM.)

(See RADIAL.)

**CPDLC-**

(See CONTROLLER PILOT DATA LINK COMMUNICATIONS.)

**CPL [ICAO]-**

(See ICAO term CURRENT FLIGHT PLAN.)

**CRITICAL ENGINE-** The engine which, upon failure, would most adversely affect the performance or handling qualities of an aircraft.

**CROSS (FIX) AT (ALTITUDE)-** Used by ATC when a specific altitude restriction at a specified fix is required.

**CROSS (FIX) AT OR ABOVE (ALTITUDE)-** Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.

(See ALTITUDE RESTRICTION.)

(Refer to AIM.)

**CROSS (FIX) AT OR BELOW (ALTITUDE)-** Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude.

(See ALTITUDE RESTRICTION.)

(See MINIMUM IFR ALTITUDES.)

(Refer to 14 CFR Part 91.)

**CROSSWIND-**



**a.** When used concerning the traffic pattern, the word means “crosswind leg.”

(See TRAFFIC PATTERN.)

**b.** When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft.

(See CROSSWIND COMPONENT.)

**CROSSWIND COMPONENT**– The wind component measured in knots at 90 degrees to the longitudinal axis of the runway.

**CRUISE**– Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediate altitude within this block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and verbally reports leaving an altitude in the block, he/she may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:

**a.** An airport clearance limit at locations with a standard/special instrument approach procedure. The CFRs require that if an instrument letdown to an airport is necessary, the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or

**b.** An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in Class G airspace; however, it provides a means for the aircraft to proceed to destination airport, descend, and land in accordance with applicable CFRs governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed.

(See INSTRUMENT APPROACH PROCEDURE.)

**CRUISE CLIMB**– A climb technique employed by aircraft, usually at a constant power setting, resulting in an increase of altitude as the aircraft weight decreases.

**CRUISING ALTITUDE**– An altitude or flight level maintained during en route level flight. This is a constant altitude and should not be confused with a cruise clearance.

(See ALTITUDE.)

(See ICAO term CRUISING LEVEL.)

**CRUISING LEVEL**–

(See CRUISING ALTITUDE.)

**CRUISING LEVEL [ICAO]**– A level maintained during a significant portion of a flight.

**CT MESSAGE**– An EDCT time generated by the ATCSCC to regulate traffic at arrival airports. Normally, a CT message is automatically transferred from the traffic management system computer to the NAS en route computer and appears as an EDCT. In the event of a communication failure between the traffic management system computer and the NAS, the CT message can be manually entered by the TMC at the en route facility.

**CTA**–

(See CONTROLLED TIME OF ARRIVAL.)

(See ICAO term CONTROL AREA.)

**CTAF**–

(See COMMON TRAFFIC ADVISORY FREQUENCY.)

**CTAS**–

(See CENTER TRACON AUTOMATION SYSTEM.)

**CTOP**–

(See COLLABORATIVE TRAJECTORY OPTIONS PROGRAM)

**CTRD**–

(See CERTIFIED TOWER RADAR DISPLAY.)

**CURRENT FLIGHT PLAN [ICAO]**– The flight plan, including changes, if any, brought about by subsequent clearances.

**CURRENT PLAN**– The ATC clearance the aircraft has received and is expected to fly.

**CVFP APPROACH**–

(See CHARTED VISUAL FLIGHT PROCEDURE APPROACH.)

**CWA**–

(See CENTER WEATHER ADVISORY and WEATHER ADVISORY.)



# D

## D-ATIS-

(See DIGITAL-AUTOMATIC TERMINAL INFORMATION SERVICE.)

## D-ATIS [ICAO]-

(See ICAO Term DATA LINK AUTOMATIC TERMINAL INFORMATION SERVICE.)

## DA [ICAO]-

(See ICAO Term DECISION ALTITUDE/DECISION HEIGHT.)

## DAIR-

(See DIRECT ALTITUDE AND IDENTITY READOUT.)

**DANGER AREA [ICAO]-** An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Note: The term "Danger Area" is not used in reference to areas within the United States or any of its possessions or territories.

## DAS-

(See DELAY ASSIGNMENT.)

## DATA BLOCK-

(See ALPHANUMERIC DISPLAY.)

**DATA LINK AUTOMATIC TERMINAL INFORMATION SERVICE (D-ATIS) [ICAO]-** The provision of ATIS via data link.

**DEAD RECKONING-** Dead reckoning, as applied to flying, is the navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, and speed, groundspeed, and elapsed time.

**DECISION ALTITUDE/DECISION HEIGHT [ICAO Annex 6]-** 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.

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

2. Category II and III minima are expressed as a DH and not a DA. Minima is assessed by reference to a radio altimeter and not a barometric altimeter, which makes the minima a DH.

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

**DECISION ALTITUDE (DA)-** A specified altitude (mean sea level (MSL)) on an instrument approach procedure (ILS, GLS, vertically guided RNAV) at which the pilot must decide whether to continue the approach or initiate an immediate missed approach if the pilot does not see the required visual references.

**DECISION HEIGHT (DH)-** 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.

(See ICAO term DECISION ALTITUDE/DECISION HEIGHT.)

**DECODER-** The device used to decipher signals received from ATCRBS transponders to effect their display as select codes.

(See CODES.)

(See RADAR.)

**DEFENSE AREA-** Any airspace of the contiguous United States that is not an ADIZ in which the control of aircraft is required for reasons of national security.

**DEFENSE VISUAL FLIGHT RULES-** Rules applicable to flights within an ADIZ conducted under the visual flight rules in 14 CFR Part 91.

(See AIR DEFENSE IDENTIFICATION ZONE.)

(Refer to 14 CFR Part 91.)

(Refer to 14 CFR Part 99.)

**DELAY ASSIGNMENT (DAS)-** Delays are distributed to aircraft based on the traffic management program parameters. The delay assignment is calculated in 15-minute increments and appears as a table in Traffic Flow Management System (TFMS).

***DELAY INDEFINITE (REASON IF KNOWN) EXPECT FURTHER CLEARANCE (TIME)-***

Used by ATC to inform a pilot when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; e.g., a disabled

aircraft on the runway, terminal or center area saturation, weather below landing minimums, etc.

(See EXPECT FURTHER CLEARANCE (TIME).)

**DELAY TIME**– The amount of time that the arrival must lose to cross the meter fix at the assigned meter fix time. This is the difference between ACLT and VTA.

**DEPARTURE CENTER**– The ARTCC having jurisdiction for the airspace that generates a flight to the impacted airport.

**DEPARTURE CONTROL**– A function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft.

(See APPROACH CONTROL FACILITY.)

(Refer to AIM.)

**DEPARTURE SEQUENCING PROGRAM**– A program designed to assist in achieving a specified interval over a common point for departures.

**DEPARTURE TIME**– The time an aircraft becomes airborne.

**DESCEND VIA**– An abbreviated ATC clearance that requires compliance with a published procedure lateral path and associated speed restrictions and provides a pilot-discretion descent to comply with published altitude restrictions.

**DESCENT SPEED ADJUSTMENTS**– Speed deceleration calculations made to determine an accurate VTA. These calculations start at the transition point and use arrival speed segments to the vertex.

**DESIGNATED COMMON TRAFFIC ADVISORY FREQUENCY (CTAF) AREA**– In Alaska, in addition to being designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating airport traffic control tower, a CTAF may also be designated for the purpose of carrying out advisory practices for operations in and through areas with a high volume of VFR traffic.

**DESIRED COURSE**–

**a. True**– A predetermined desired course direction to be followed (measured in degrees from true north).

**b. Magnetic**– A predetermined desired course direction to be followed (measured in degrees from local magnetic north).

**DESIRED TRACK**– The planned or intended track between two waypoints. It is measured in degrees from either magnetic or true north. The instantaneous angle may change from point to point along the great circle track between waypoints.

**DETRESFA (DISTRESS PHASE) [ICAO]**– The code word used to designate an emergency phase wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

**DEVIATIONS**–

**a.** A departure from a current clearance, such as an off course maneuver to avoid weather or turbulence.

**b.** Where specifically authorized in the CFRs and requested by the pilot, ATC may permit pilots to deviate from certain regulations.

**DH**–

(See DECISION HEIGHT.)

**DH [ICAO]**–

(See ICAO Term DECISION ALTITUDE/  
DECISION HEIGHT.)

**DIGITAL-AUTOMATIC TERMINAL INFORMATION SERVICE (D-ATIS)**– The service provides text messages to aircraft, airlines, and other users outside the standard reception range of conventional ATIS via landline and data link communications to the cockpit. Also, the service provides a computer-synthesized voice message that can be transmitted to all aircraft within range of existing transmitters. The Terminal Data Link System (TDLS) D-ATIS application uses weather inputs from local automated weather sources or manually entered meteorological data together with preprogrammed menus to provide standard information to users. Airports with D-ATIS capability are listed in the Chart Supplement U.S.

**DIGITAL TARGET**– A computer-generated symbol representing an aircraft's position, based on a primary return or radar beacon reply, shown on a digital display.

**DIGITAL TERMINAL AUTOMATION SYSTEM (DTAS)**– A system where digital radar and beacon data is presented on digital displays and the operational program monitors the system performance on a real-time basis.

**DIGITIZED TARGET**– A computer-generated indication shown on an analog radar display resulting from a primary radar return or a radar beacon reply.

**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 aircraft is under radar contact.

**DIRECTLY BEHIND**– An aircraft is considered to be operating directly behind when it is following the actual flight path of the lead aircraft over the surface of the earth except when applying wake turbulence separation criteria.

**DISCRETE BEACON CODE**–

(See DISCRETE CODE.)

**DISCRETE CODE**– As used in the Air Traffic Control Radar Beacon System (ATCRBS), any one of the 4096 selectable Mode 3/A aircraft transponder codes except those ending in zero zero; e.g., discrete codes: 0010, 1201, 2317, 7777; nondiscrete codes: 0100, 1200, 7700. Nondiscrete codes are normally reserved for radar facilities that are not equipped with discrete decoding capability and for other purposes such as emergencies (7700), VFR aircraft (1200), etc.

(See RADAR.)

(Refer to AIM.)

**DISCRETE FREQUENCY**– A separate radio frequency for use in direct pilot-controller communications in air traffic control which reduces frequency congestion by controlling the number of aircraft operating on a particular frequency at one time. Discrete frequencies are normally designated for each control sector in en route/terminal ATC facilities. Discrete frequencies are listed in the Chart Supplement U.S. and the DOD FLIP IFR En Route Supplement.

(See CONTROL SECTOR.)

**DISPLACED THRESHOLD**– A threshold that is located at a point on the runway other than the designated beginning of the runway.

(See THRESHOLD.)

(Refer to AIM.)

**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.

(See TACAN.)

(See VORTAC.)

**DISTRESS**– A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

**DIVE BRAKES**–

(See SPEED BRAKES.)

**DIVERSE VECTOR AREA**– In a radar environment, that area in which a prescribed departure route is not required as the only suitable route to avoid obstacles. The area in which random radar vectors below the MVA/MIA, established in accordance with the TERPS criteria for diverse departures, obstacles and terrain avoidance, may be issued to departing aircraft.

**DIVERSION (DVRSN)**– Flights that are required to land at other than their original destination for reasons beyond the control of the pilot/company, e.g. periods of significant weather.

**DME**–

(See DISTANCE MEASURING EQUIPMENT.)

**DME FIX**– A geographical position determined by reference to a navigational aid which provides distance and azimuth information. It is defined by a specific distance in nautical miles and a radial, azimuth, or course (i.e., localizer) in degrees magnetic from that aid.

(See DISTANCE MEASURING EQUIPMENT.)

(See FIX.)

**DME SEPARATION**– Spacing of aircraft in terms of distances (nautical miles) determined by reference to distance measuring equipment (DME).

(See DISTANCE MEASURING EQUIPMENT.)

**DOD FLIP**– Department of Defense Flight Information Publications used for flight planning, en route, and terminal operations. FLIP is produced by the National Geospatial-Intelligence Agency (NGA) for world-wide use. United States Government Flight Information Publications (en route charts and instrument approach procedure charts) are incorporated in DOD FLIP for use in the National Airspace System (NAS).

**DOMESTIC AIRSPACE**– Airspace which overlies the continental land mass of the United States plus Hawaii and U.S. possessions. Domestic airspace extends to 12 miles offshore.

**DOWNBURST**– A strong downdraft which induces an outburst of damaging winds on or near the ground. Damaging winds, either straight or curved, are highly

divergent. The sizes of downbursts vary from 1/2 mile or less to more than 10 miles. An intense downburst often causes widespread damage. Damaging winds, lasting 5 to 30 minutes, could reach speeds as high as 120 knots.

**DOWNWIND LEG-**

(See **TRAFFIC PATTERN.**)

**DP-**

(See **INSTRUMENT DEPARTURE PROCEDURE.**)

**DRAG CHUTE-** A parachute device installed on certain aircraft which is deployed on landing roll to assist in deceleration of the aircraft.

**DROP ZONE-** Any pre-determined area upon which parachutists or objects land after making an intentional parachute jump or drop.

(Refer to 14 CFR §105.3, Definitions)

**DSP-**

(See **DEPARTURE SEQUENCING PROGRAM.**)

**DT-**

(See **DELAY TIME.**)

**DTAS-**

(See **DIGITAL TERMINAL AUTOMATION SYSTEM.**)

**DUE REGARD-** A phase of flight wherein an aircraft commander of a State-operated aircraft

assumes responsibility to separate his/her aircraft from all other aircraft.

(See also FAA Order JO 7110.65, Para 1-2-1, **WORD MEANINGS.**)

**DUTY RUNWAY-**

(See **RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY.**)

**DVA-**

(See **DIVERSE VECTOR AREA.**)

**DVFR-**

(See **DEFENSE VISUAL FLIGHT RULES.**)

**DVFR FLIGHT PLAN-** A flight plan filed for a VFR aircraft which intends to operate in airspace within which the ready identification, location, and control of aircraft are required in the interest of national security.

**DVRSN-**

(See **DIVERSION.**)

**DYNAMIC-** Continuous review, evaluation, and change to meet demands.

**DYNAMIC RESTRICTIONS-** Those restrictions imposed by the local facility on an "as needed" basis to manage unpredictable fluctuations in traffic demands.

# E

## EAS–

(See EN ROUTE AUTOMATION SYSTEM.)

## EDCT–

(See EXPECT DEPARTURE CLEARANCE TIME.)

## EDST–

(See EN ROUTE DECISION SUPPORT TOOL)

## EFC–

(See EXPECT FURTHER CLEARANCE (TIME).)

## ELT–

(See EMERGENCY LOCATOR TRANSMITTER.)

**EMERGENCY**– A distress or an urgency condition.

**EMERGENCY LOCATOR TRANSMITTER (ELT)**– A radio transmitter attached to the aircraft structure which operates from its own power source on 121.5 MHz and 243.0 MHz. It aids in locating downed aircraft by radiating a downward sweeping audio tone, 2-4 times per second. It is designed to function without human action after an accident.

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

## E-MSAW–

(See EN ROUTE MINIMUM SAFE ALTITUDE WARNING.)

## ENHANCED FLIGHT VISION SYSTEM (EFVS)–

An EFVS is an installed aircraft system which uses an electronic means to provide a display of the forward external scene topography (the natural or man-made features of a place or region especially in a way to show their relative positions and elevation) through the use of imaging sensors, including but not limited to forward-looking infrared, millimeter wave radiometry, millimeter wave radar, or low-light level image intensification. An EFVS includes the display element, sensors, computers and power supplies, indications, and controls. An operator's authorization to conduct an EFVS operation may have provisions which allow pilots to conduct IAPs when the reported weather is below minimums prescribed on the IAP to be flown.

**EN ROUTE AIR TRAFFIC CONTROL SERVICES**– Air traffic control service provided aircraft on IFR flight plans, generally by centers, when these

aircraft are operating between departure and destination terminal areas. When equipment, capabilities, and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

(See AIR ROUTE TRAFFIC CONTROL CENTER.)

(Refer to AIM.)

**EN ROUTE AUTOMATION SYSTEM (EAS)**– The complex integrated environment consisting of situation display systems, surveillance systems and flight data processing, remote devices, decision support tools, and the related communications equipment that form the heart of the automated IFR air traffic control system. It interfaces with automated terminal systems and is used in the control of en route IFR aircraft.

(Refer to AIM.)

## EN ROUTE CHARTS–

(See AERONAUTICAL CHART.)

## EN ROUTE DECISION SUPPORT TOOL (EDST)–

An automated tool provided at each Radar Associate position in selected En Route facilities. This tool utilizes flight and radar data to determine present and future trajectories for all active and proposal aircraft and provides enhanced automated flight data management.

**EN ROUTE DESCENT**– Descent from the en route cruising altitude which takes place along the route of flight.

## EN ROUTE HIGH ALTITUDE CHARTS–

(See AERONAUTICAL CHART.)

## EN ROUTE LOW ALTITUDE CHARTS–

(See AERONAUTICAL CHART.)

## EN ROUTE MINIMUM SAFE ALTITUDE WARN-

**ING (E-MSAW)**– A function of the EAS that aids the controller by providing an alert when a tracked aircraft is below or predicted by the computer to go below a predetermined minimum IFR altitude (MIA).

**EN ROUTE SPACING PROGRAM (ESP)**– A program designed to assist the exit sector in achieving the required in-trail spacing.

**EN ROUTE TRANSITION–**

**a.** Conventional STARs/SIDs. The portion of a SID/STAR that connects to one or more en route airway/jet route.

**b.** RNAV STARs/SIDs. The portion of a STAR preceding the common route or point, or for a SID the portion following, that is coded for a specific en route fix, airway or jet route.

**ESP–**

(See EN ROUTE SPACING PROGRAM.)

**EST–**

(See ESTIMATED.)

**ESTABLISHED–** To be stable or fixed at an altitude or on a course, route, route segment, heading, instrument approach or departure procedure, etc.

**ESTIMATED (EST)–**When used in NOTAMs “EST” is a contraction that is used by the issuing authority only when the condition is expected to return to service prior to the expiration time. Using “EST” lets the user know that this NOTAM has the possibility of returning to service earlier than the expiration time. Any NOTAM which includes an “EST” will be auto-expired at the designated expiration time.

**ESTIMATED ELAPSED TIME [ICAO]–** The estimated time required to proceed from one significant point to another.

(See ICAO Term TOTAL ESTIMATED ELAPSED TIME.)

**ESTIMATED OFF-BLOCK TIME [ICAO]–** The estimated time at which the aircraft will commence movement associated with departure.

**ESTIMATED POSITION ERROR (EPE)–**

(See Required Navigation Performance)

**ESTIMATED TIME OF ARRIVAL–** The time the flight is estimated to arrive at the gate (scheduled operators) or the actual runway on times for nonscheduled operators.

**ESTIMATED TIME EN ROUTE–** The estimated flying time from departure point to destination (lift-off to touchdown).

**ETA–**

(See ESTIMATED TIME OF ARRIVAL.)

**ETE–**

(See ESTIMATED TIME EN ROUTE.)

**EXECUTE MISSED APPROACH–** Instructions issued to a pilot making an instrument approach which means continue inbound to the missed approach point and execute the missed approach procedure as described on the Instrument Approach Procedure Chart or as previously assigned by ATC. The pilot may climb immediately to the altitude specified in the missed approach procedure upon making a missed approach. No turns should be initiated prior to reaching the missed approach point. When conducting an ASR or PAR approach, execute the assigned missed approach procedure immediately upon receiving instructions to “execute missed approach.”

(Refer to AIM.)

**EXPECT (ALTITUDE) AT (TIME) or (FIX)–** Used under certain conditions to provide a pilot with an altitude to be used in the event of two-way communications failure. It also provides altitude information to assist the pilot in planning.

(Refer to AIM.)

**EXPECT DEPARTURE CLEARANCE TIME (EDCT)–** The runway release time assigned to an aircraft in a traffic management program and shown on the flight progress strip as an EDCT.

(See GROUND DELAY PROGRAM.)

**EXPECT FURTHER CLEARANCE (TIME)–** The time a pilot can expect to receive clearance beyond a clearance limit.

**EXPECT FURTHER CLEARANCE VIA (AIRWAYS, ROUTES OR FIXES)–** Used to inform a pilot of the routing he/she can expect if any part of the route beyond a short range clearance limit differs from that filed.

**EXPEDITE–** Used by ATC when prompt compliance is required to avoid the development of an imminent situation. Expedite climb/descent normally indicates to a pilot that the approximate best rate of climb/descent should be used without requiring an exceptional change in aircraft handling characteristics.



# F

## FAF–

(See FINAL APPROACH FIX.)

**FALLEN HERO**– Remains of fallen members of the United States military are often returned home by aircraft. These flights may be identified with the phrase “FALLEN HERO” added to the remarks section of the flight plan, or they may be transmitted via air/ground communications. If able, these flights will receive priority handling.

**FAST FILE**– An FSS system whereby a pilot files a flight plan via telephone that is recorded and later transcribed for transmission to the appropriate air traffic facility. (Alaska only.)

**FAWP**– Final Approach Waypoint

## FCLT–

(See FREEZE CALCULATED LANDING TIME.)

**FEATHERED PROPELLER**– A propeller whose blades have been rotated so that the leading and trailing edges are nearly parallel with the aircraft flight path to stop or minimize drag and engine rotation. Normally used to indicate shutdown of a reciprocating or turboprop engine due to malfunction.

## FEDERAL AIRWAYS–

(See LOW ALTITUDE AIRWAY STRUCTURE.)

**FEEDER FIX**– The fix depicted on Instrument Approach Procedure Charts which establishes the starting point of the feeder route.

**FEEDER ROUTE**– A route depicted on instrument approach procedure charts to designate routes for aircraft to proceed from the en route structure to the initial approach fix (IAF).

(See INSTRUMENT APPROACH PROCEDURE.)

**FERRY FLIGHT**– A flight for the purpose of:

- a. Returning an aircraft to base.
- b. Delivering an aircraft from one location to another.
- c. Moving an aircraft to and from a maintenance base. Ferry flights, under certain conditions, may be conducted under terms of a special flight permit.

## FIELD ELEVATION–

(See AIRPORT ELEVATION.)

**FILED**– Normally used in conjunction with flight plans, meaning a flight plan has been submitted to ATC.

**FILED EN ROUTE DELAY**– Any of the following preplanned delays at points/areas along the route of flight which require special flight plan filing and handling techniques.

a. Terminal Area Delay. A delay within a terminal area for touch-and-go, low approach, or other terminal area activity.

b. Special Use Airspace Delay. A delay within a Military Operations Area, Restricted Area, Warning Area, or ATC Assigned Airspace.

c. Aerial Refueling Delay. A delay within an Aerial Refueling Track or Anchor.

**FILED FLIGHT PLAN**– The flight plan as filed with an ATS unit by the pilot or his/her designated representative without any subsequent changes or clearances.

**FINAL**– Commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area.

(See FINAL APPROACH COURSE.)

(See FINAL APPROACH-IFR.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**FINAL APPROACH [ICAO]**– That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified.

a. At the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

b. At the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:

1. A landing can be made; or
2. A missed approach procedure is initiated.

**FINAL APPROACH COURSE**– A bearing/radial/track of an instrument approach leading to a runway or an extended runway centerline all without regard to distance.

**FINAL APPROACH FIX**– The fix from which the final approach (IFR) to an airport is executed and which identifies the beginning of the final approach segment. It is designated on Government charts by the Maltese Cross symbol for nonprecision approaches and the lightning bolt symbol, designating the PFAF, for precision approaches; or when ATC directs a lower-than-published glideslope/path or vertical path intercept altitude, it is the resultant actual point of the glideslope/path or vertical path intercept.

(See FINAL APPROACH POINT.)

(See GLIDESLOPE INTERCEPT ALTITUDE.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**FINAL APPROACH-IFR**– The flight path of an aircraft which is inbound to an airport on a final instrument approach course, beginning at the final approach fix or point and extending to the airport or the point where a circle-to-land maneuver or a missed approach is executed.

(See FINAL APPROACH COURSE.)

(See FINAL APPROACH FIX.)

(See FINAL APPROACH POINT.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

(See ICAO term FINAL APPROACH.)

**FINAL APPROACH POINT**– The point, applicable only to a nonprecision approach with no depicted FAF (such as an on airport VOR), where the aircraft is established inbound on the final approach course from the procedure turn and where the final approach descent may be commenced. The FAP serves as the FAF and identifies the beginning of the final approach segment.

(See FINAL APPROACH FIX.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**FINAL APPROACH SEGMENT**–

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**FINAL APPROACH SEGMENT [ICAO]**– That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

**FINAL CONTROLLER**– The controller providing information and final approach guidance during PAR and ASR approaches utilizing radar equipment.

(See RADAR APPROACH.)

**FINAL GUARD SERVICE**– A value added service provided in conjunction with LAA/RAA only during periods of significant and fast changing weather conditions that may affect landing and takeoff operations.

**FINAL MONITOR AID**– A high resolution color display that is equipped with the controller alert system hardware/software used to monitor the no transgression zone (NTZ) during simultaneous parallel approach operations. The display includes alert algorithms providing the target predictors, a color change alert when a target penetrates or is predicted to penetrate the no transgression zone (NTZ), synthesized voice alerts, and digital mapping.

(See RADAR APPROACH.)

**FINAL MONITOR CONTROLLER**– Air Traffic Control Specialist assigned to radar monitor the flight path of aircraft during simultaneous parallel (approach courses spaced less than 9000 feet/9200 feet above 5000 feet) and simultaneous close parallel approach operations. Each runway is assigned a final monitor controller during simultaneous parallel and simultaneous close parallel ILS approaches.

**FIR**–

(See FLIGHT INFORMATION REGION.)

**FIRST TIER CENTER**– An ARTCC immediately adjacent to the impacted center.

**FIS-B**–

(See FLIGHT INFORMATION SERVICE-BROADCAST.)

**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.

**FIX BALANCING**– A process whereby aircraft are evenly distributed over several available arrival fixes reducing delays and controller workload.

**FLAG**– A warning device incorporated in certain airborne navigation and flight instruments indicating that:

a. Instruments are inoperative or otherwise not operating satisfactorily, or

**b.** Signal strength or quality of the received signal falls below acceptable values.

**FLAG ALARM–**

(See FLAG.)

**FLAMEOUT–** An emergency condition caused by a loss of engine power.

**FLAMEOUT PATTERN–** An approach normally conducted by a single-engine military aircraft experiencing loss or anticipating loss of engine power or control. The standard overhead approach starts at a relatively high altitude over a runway (“high key”) followed by a continuous 180 degree turn to a high, wide position (“low key”) followed by a continuous 180 degree turn final. The standard straight-in pattern starts at a point that results in a straight-in approach with a high rate of descent to the runway. Flameout approaches terminate in the type approach requested by the pilot (normally fullstop).

**FLIGHT CHECK–** A call sign prefix used by FAA aircraft engaged in flight inspection/certification of navigational aids and flight procedures. The word “recorded” may be added as a suffix; e.g., “Flight Check 320 recorded” to indicate that an automated flight inspection is in progress in terminal areas.

(See FLIGHT INSPECTION.)

(Refer to AIM.)

**FLIGHT FOLLOWING–**

(See TRAFFIC ADVISORIES.)

**FLIGHT INFORMATION REGION–** An airspace of defined dimensions within which Flight Information Service and Alerting Service are provided.

**a.** Flight Information Service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

**b.** Alerting Service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

**FLIGHT INFORMATION SERVICE–** A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

**FLIGHT INFORMATION SERVICE– BROADCAST (FIS–B)–** A ground broadcast service provided through the ADS–B Broadcast Services

network over the UAT data link that operates on 978 MHz. The FIS–B system provides pilots and flight crews of properly equipped aircraft with a cockpit display of certain aviation weather and aeronautical information.

**FLIGHT INSPECTION–** Inflight investigation and evaluation of a navigational aid to determine whether it meets established tolerances.

(See FLIGHT CHECK.)

(See NAVIGATIONAL AID.)

**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 (FL) 250 represents a barometric altimeter indication of 25,000 feet; FL 255, an indication of 25,500 feet.

(See ICAO term FLIGHT LEVEL.)

**FLIGHT LEVEL [ICAO]–** A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals.

Note 1: A pressure type altimeter calibrated in accordance with the standard atmosphere:

- a.** When set to a QNH altimeter setting, will indicate altitude;
- b.** When set to a QFE altimeter setting, will indicate height above the QFE reference datum; and
- c.** When set to a pressure of 1013.2 hPa (1013.2 mb), may be used to indicate flight levels.

Note 2: The terms ‘height’ and ‘altitude,’ used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

**FLIGHT LINE–** A term used to describe the precise movement of a civil photogrammetric aircraft along a predetermined course(s) at a predetermined altitude during the actual photographic run.

**FLIGHT MANAGEMENT SYSTEMS–** A computer system that uses a large data base 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 PATH**– A line, course, or track along which an aircraft is flying or intended to be flown.

(See **COURSE**.)

(See **TRACK**.)

**FLIGHT PLAN**– Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.

(See **FAST FILE**.)

(See **FILED**.)

(Refer to **AIM**.)

**FLIGHT PLAN AREA (FPA)**– The geographical area assigned to a flight service station (FSS) for the purpose of establishing primary responsibility for services that may include search and rescue for VFR aircraft, issuance of NOTAMS, pilot briefings, inflight services, broadcast services, emergency services, flight data processing, international operations, and aviation weather services. Large consolidated FSS facilities may combine FPAs into larger areas of responsibility (AOR).

(See **FLIGHT SERVICE STATION**.)

(See **TIE-IN FACILITY**.)

**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. Flight recorders may make records of airspeed, outside air temperature, vertical acceleration, engine RPM, manifold pressure, and other pertinent variables for a given flight.

(See ICAO term **FLIGHT RECORDER**.)

**FLIGHT RECORDER [ICAO]**– Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

Note: See Annex 6 Part I, for specifications relating to flight recorders.

**FLIGHT SERVICE STATION (FSS)**– An air traffic facility which provides pilot briefings, flight plan processing, en route flight advisories, search and rescue services, and assistance to lost aircraft and aircraft in emergency situations. FSS also relay ATC clearances, process Notices to Airmen, broadcast aviation weather and aeronautical information, and advise Customs and Immigration of transborder flights. In Alaska, FSS provide Airport Advisory Services.

(See **FLIGHT PLAN AREA**.)

(See **TIE-IN FACILITY**.)

**FLIGHT STANDARDS DISTRICT OFFICE**– An FAA field office serving an assigned geographical area and staffed with Flight Standards personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operational safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

**FLIGHT TERMINATION**– The intentional and deliberate process of terminating the flight of a UA in the event of an unrecoverable lost link, loss of control, or other failure that compromises the safety of flight.

**FLIGHT TEST**– A flight for the purpose of:

a. Investigating the operation/flight characteristics of an aircraft or aircraft component.

b. Evaluating an applicant for a pilot certificate or rating.

**FLIGHT VISIBILITY**–

(See **VISIBILITY**.)

**FLIP**–

(See **DOD FLIP**.)

**FLY HEADING (DEGREES)**– Informs the pilot of the heading he/she should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

**FLY-BY WAYPOINT**– A fly-by waypoint requires the use of turn anticipation to avoid overshoot of the next flight segment.

**FLY-OVER WAYPOINT**– A fly-over waypoint precludes any turn until the waypoint is overflown and is followed by an intercept maneuver of the next flight segment.

**FLY VISUAL TO AIRPORT**–

(See **PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT**.)

**FMA**–

(See **FINAL MONITOR AID**.)

**FMS**–

(See **FLIGHT MANAGEMENT SYSTEM**.)

**FORMATION FLIGHT**– More than one aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation

and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during join-up and breakaway.

**a.** A standard formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman.

**b.** Nonstandard formations are those operating under any of the following conditions:

**1.** When the flight leader has requested and ATC has approved other than standard formation dimensions.

**2.** When operating within an authorized altitude reservation (ALTRV) or under the provisions of a letter of agreement.

**3.** When the operations are conducted in airspace specifically designed for a special activity.  
(See ALTITUDE RESERVATION.)  
(Refer to 14 CFR Part 91.)

***FRC***–

(See REQUEST FULL ROUTE CLEARANCE.)

**FREEZE/FROZEN**– Terms used in referring to arrivals which have been assigned ACLTs and to the lists in which they are displayed.

**FREEZE CALCULATED LANDING TIME**– A dynamic parameter number of minutes prior to the meter fix calculated time of arrival for each aircraft when the TCLT is frozen and becomes an ACLT (i.e., the VTA is updated and consequently the TCLT is modified as appropriate until FCLT minutes prior to meter fix calculated time of arrival, at which time updating is suspended and an ACLT and a frozen meter fix crossing time (MFT) is assigned).

**FREEZE HORIZON**– The time or point at which an aircraft's STA becomes fixed and no longer fluctuates with each radar update. This setting ensures a constant time for each aircraft, necessary for the metering controller to plan his/her delay technique. This setting can be either in distance from the meter fix or a prescribed flying time to the meter fix.

**FREEZE SPEED PARAMETER**– A speed adapted for each aircraft to determine fast and slow aircraft.

Fast aircraft freeze on parameter FCLT and slow aircraft freeze on parameter MLDI.

**FRICITION MEASUREMENT**– A measurement of the friction characteristics of the runway pavement surface using continuous self-watering friction measurement equipment in accordance with the specifications, procedures and schedules contained in AC 150/5320–12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces.

**FSDO**–

(See FLIGHT STANDARDS DISTRICT OFFICE.)

**FSPD**–

(See FREEZE SPEED PARAMETER.)

**FSS**–

(See FLIGHT SERVICE STATION.)

**FUEL DUMPING**– Airborne release of usable fuel. This does not include the dropping of fuel tanks.

(See JETTISONING OF EXTERNAL STORES.)

**FUEL REMAINING**– A phrase used by either pilots or controllers when relating to the fuel remaining on board until actual fuel exhaustion. When transmitting such information in response to either a controller question or pilot initiated cautionary advisory to air traffic control, pilots will state the APPROXIMATE NUMBER OF MINUTES the flight can continue with the fuel remaining. All reserve fuel SHOULD BE INCLUDED in the time stated, as should an allowance for established fuel gauge system error.

**FUEL SIPHONING**– Unintentional release of fuel caused by overflow, puncture, loose cap, etc.

**FUEL VENTING**–

(See FUEL SIPHONING.)

**FUSED TARGET**–

(See DIGITAL TARGET)

**FUSION [STARS/CARTS]**– the combination of all available surveillance sources (airport surveillance radar [ASR], air route surveillance radar [ARSR], ADS-B, etc.) into the display of a single tracked target for air traffic control separation services. FUSION is the equivalent of the current single-sensor radar display. FUSION performance is characteristic of a single-sensor radar display system. Terminal areas use mono-pulse secondary surveillance radar (ASR 9, Mode S or ASR 11, MSSR).



# G

**GATE HOLD PROCEDURES**– Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine start/taxi advisories or new proposed start/taxi time if the delay changes.

**GBT**–

(See **GROUND-BASED TRANSCEIVER**.)

**GCA**–

(See **GROUND CONTROLLED APPROACH**.)

**GDP**–

(See **GROUND DELAY PROGRAM**.)

**GENERAL AVIATION**– That portion of civil aviation that does not include scheduled or unscheduled air carriers or commercial space operations.

(See ICAO term **GENERAL AVIATION**.)

**GENERAL AVIATION [ICAO]**– All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

**GEO MAP**– The digitized map markings associated with the ASR-9 Radar System.

**GLIDEPATH**–

(See **GLIDESLOPE**.)

**GLIDEPATH [ICAO]**– A descent profile determined for vertical guidance during a final approach.

**GLIDEPATH INTERCEPT ALTITUDE**–

(See **GLIDESLOPE INTERCEPT ALTITUDE**.)

**GLIDESLOPE**– Provides vertical guidance for aircraft during approach and landing. The glideslope/glidepath is based on the following:

**a.** Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or,

**b.** Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.

**c.** **PAR**. Used by ATC to inform an aircraft making a PAR approach of its vertical position (elevation) relative to the descent profile.

(See ICAO term **GLIDEPATH**.)

**GLIDESLOPE INTERCEPT ALTITUDE**– The published minimum altitude to intercept the glideslope in the intermediate segment of an instrument approach. Government charts use the lightning bolt symbol to identify this intercept point. This intersection is called the Precise Final Approach fix (PFAF). ATC directs a higher altitude, the resultant intercept becomes the PFAF.

(See **FINAL APPROACH FIX**.)

(See **SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE**.)

**GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) [ICAO]**– GNSS refers collectively to the worldwide positioning, navigation, and timing determination capability available from one or more satellite constellation in conjunction with a network of ground stations.

**GLOBAL NAVIGATION SATELLITE SYSTEM MINIMUM EN ROUTE IFR ALTITUDE (GNSS MEA)**– The minimum en route IFR altitude on a published ATS route or route segment which assures acceptable Global Navigation Satellite System reception and meets obstacle clearance requirements. (Refer to 14 CFR Part 91.) (Refer to 14 CFR Part 95.)

**GLOBAL POSITIONING SYSTEM (GPS)**– GPS refers to the worldwide positioning, navigation and timing determination capability available from the U.S. satellite constellation. The service provided by GPS for civil use is defined in the GPS Standard Positioning System Performance Standard. GPS is composed of space, control, and user elements.

**GNSS [ICAO]**–

(See **GLOBAL NAVIGATION SATELLITE SYSTEM**.)

**GNSS MEA–**

(See GLOBAL NAVIGATION SATELLITE SYSTEM MINIMUM EN ROUTE IFR ALTITUDE.)

**GO AHEAD–** Proceed with your message. Not to be used for any other purpose.

**GO AROUND–** Instructions for a pilot to abandon his/her approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g., “Go around” (additional instructions if required).

(See LOW APPROACH.)

(See MISSED APPROACH.)

**GPD–**

(See GRAPHIC PLAN DISPLAY.)

**GPS–**

(See GLOBAL POSITIONING SYSTEM.)

**GRAPHIC PLAN DISPLAY (GPD)–** A view available with EDST that provides a graphic display of aircraft, traffic, and notification of predicted conflicts. Graphic routes for Current Plans and Trial Plans are displayed upon controller request.

(See EN ROUTE DECISION SUPPORT TOOL.)

**GROSS NAVIGATION ERROR (GNE) –** A lateral deviation from a cleared track, normally in excess of 25 Nautical Miles (NM). More stringent standards (for example, 10NM in some parts of the North Atlantic region) may be used in certain regions to support reductions in lateral separation.

**GROUND BASED AUGMENTATION SYSTEM (GBAS)–** A ground based GNSS station which provides local differential corrections, integrity parameters and approach data via VHF data broadcast to GNSS users to meet real-time performance requirements for CAT I precision approaches. The aircraft applies the broadcast data to improve the accuracy and integrity of its GNSS signals and computes the deviations to the selected approach. A single ground station can serve multiple runway ends up to an approximate radius of 23 NM.

**GROUND BASED AUGMENTATION SYSTEM (GBAS) LANDING SYSTEM (GLS)–** A type of precision IAP based on local augmentation of GNSS data using a single GBAS station to transmit locally corrected GNSS data, integrity parameters and approach information. This improves the accuracy of aircraft GNSS receivers’ signal in space, enabling the pilot to fly a precision approach with much greater flexibility, reliability and complexity. The GLS procedure is published on standard IAP charts, features the title GLS with the designated runway and minima as low as 200 feet DA. Future plans are expected to support Cat II and CAT III operations.

**GROUND-BASED TRANSCEIVER (GBT)–** The ground-based transmitter/receiver (transceiver) receives automatic dependent surveillance-broadcast messages, which are forwarded to an air traffic control facility for processing and display with other radar targets on the plan position indicator (radar display).

(See AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST.)

**GROUND CLUTTER–** A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion.

(See CLUTTER.)

**GROUND COMMUNICATION OUTLET (GCO)–** An unstaffed, remotely controlled, ground/ground communications facility. Pilots at uncontrolled airports may contact ATC and FSS via VHF to a telephone connection to obtain an instrument clearance or close a VFR or IFR flight plan. They may also get an updated weather briefing prior to takeoff. Pilots will use four “key clicks” on the VHF radio to contact the appropriate ATC facility or six “key clicks” to contact the FSS. The GCO system is intended to be used only on the ground.

**GROUND CONTROLLED APPROACH–** A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term “GCA” by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a “PAR” approach when a



precision radar approach is desired or request an “ASR” or “surveillance” approach when a nonprecision radar approach is desired.

(See RADAR APPROACH.)

**GROUND DELAY PROGRAM (GDP)**– A traffic management process administered by the ATCSCC, when aircraft are held on the ground. The purpose of the program is to support the TM mission and limit airborne holding. It is a flexible program and may be implemented in various forms depending upon the needs of the AT system. Ground delay programs provide for equitable assignment of delays to all system users.

**GROUND SPEED**– The speed of an aircraft relative

to the surface of the earth.

**GROUND STOP (GS)**– The GS is a process that requires aircraft that meet a specific criteria to remain on the ground. The criteria may be airport specific, airspace specific, or equipment specific; for example, all departures to San Francisco, or all departures entering Yorktown sector, or all Category I and II aircraft going to Charlotte. GSs normally occur with little or no warning.

**GROUND VISIBILITY**–

(See VISIBILITY.)

**GS**–

(See GROUND STOP.)



# H

## HAA–

(See HEIGHT ABOVE AIRPORT.)

## HAL–

(See HEIGHT ABOVE LANDING.)

**HANDOFF**– An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller’s airspace and radio communications with the aircraft will be transferred.

## HAR–

(See HIGH ALTITUDE REDESIGN.)

## HAT–

(See HEIGHT ABOVE TOUCHDOWN.)

**HAVE NUMBERS**– Used by pilots to inform ATC that they have received runway, wind, and altimeter information only.

**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.

**HAZARDOUS WEATHER INFORMATION**– Summary of significant meteorological information (SIGMET/WS), convective significant meteorological information (convective SIGMET/WST), urgent pilot weather reports (urgent PIREP/UUA), center weather advisories (CWA), airmen’s meteorological information (AIRMET/WA) and any other weather such as isolated thunderstorms that are rapidly developing and increasing in intensity, or low ceilings and visibilities that are becoming widespread which is considered significant and are not included in a current hazardous weather advisory.

## **HEAVY (AIRCRAFT)–**

(See AIRCRAFT CLASSES.)

**HEIGHT ABOVE AIRPORT (HAA)**– The height of the Minimum Descent Altitude above the published airport elevation. This is published in conjunction with circling minimums.

(See MINIMUM DESCENT ALTITUDE.)

**HEIGHT ABOVE LANDING (HAL)**– The height above a designated helicopter landing area used for helicopter instrument approach procedures.

(Refer to 14 CFR Part 97.)

**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 feet of the runway). HAT is published on instrument approach charts in conjunction with all straight-in minimums.

(See DECISION HEIGHT.)

(See MINIMUM DESCENT ALTITUDE.)

**HELICOPTER**– A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

**HELIPAD**– A small, designated area, usually with a prepared surface, on a heliport, airport, landing/take-off area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters.

**HELIPORT**– An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters and includes its buildings and facilities if any.

**HELIPORT REFERENCE POINT (HRP)**– The geographic center of a heliport.

**HERTZ**– The standard radio equivalent of frequency in cycles per second of an electromagnetic wave. Kilohertz (kHz) is a frequency of one thousand cycles per second. Megahertz (MHz) is a frequency of one million cycles per second.

## HF–

(See HIGH FREQUENCY.)

## HF COMMUNICATIONS–

(See HIGH FREQUENCY COMMUNICATIONS.)

**HIGH ALTITUDE REDESIGN (HAR)**– A level of non-restrictive routing (NRR) service for aircraft that have all waypoints associated with the HAR program in their flight management systems or RNAV equipage.

**HIGH FREQUENCY**– The frequency band between 3 and 30 MHz.

(See HIGH FREQUENCY COMMUNICATIONS.)

**HIGH FREQUENCY COMMUNICATIONS**– High radio frequencies (HF) between 3 and 30 MHz used for air-to-ground voice communication in overseas operations.

**HIGH SPEED EXIT**–

(See HIGH SPEED TAXIWAY.)

**HIGH SPEED TAXIWAY**– A long radius taxiway designed and provided with lighting or marking to define the path of aircraft, traveling at high speed (up to 60 knots), from the runway center to a point on the center of a taxiway. Also referred to as long radius exit or turn-off taxiway. The high speed taxiway is designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy time.

**HIGH SPEED TURNOFF**–

(See HIGH SPEED TAXIWAY.)

**HIWAS**–

(See HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE.)

**HIWAS AREA**–

(See HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE.)

**HIWAS BROADCAST AREA**– A geographical area of responsibility including one or more HIWAS outlet areas assigned to a FSS for hazardous weather advisory broadcasting.

**HIWAS OUTLET AREA**– An area defined as a 150 NM radius of a HIWAS outlet, expanded as necessary to provide coverage.

**HOLD FOR RELEASE**– Used by ATC to delay an aircraft for traffic management reasons; i.e., weather, traffic volume, etc. Hold for release instructions (including departure delay information) are used to inform a pilot or a controller (either directly or through an authorized relay) that an IFR departure clearance is not valid until a release time or additional instructions have been received.

(See ICAO term HOLDING POINT.)

**HOLD-IN-LIEU OF PROCEDURE TURN**– A hold-in-lieu of procedure turn shall be established over a final or intermediate fix when an approach can be made from a properly aligned holding pattern. The hold-in-lieu of procedure turn permits the pilot to align with the final or intermediate segment of the approach and/or descend in the holding pattern to an

altitude that will permit a normal descent to the final approach fix altitude. The hold-in-lieu of procedure turn is a required maneuver (the same as a procedure turn) unless the aircraft is being radar vectored to the final approach course, when “NoPT” is shown on the approach chart, or when the pilot requests or the controller advises the pilot to make a “straight-in” approach.

**HOLD PROCEDURE**– A predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control.

(See HOLDING FIX.)

(Refer to AIM.)

**HOLDING FIX**– A specified fix identifiable to a pilot by NAVAIDs or visual reference to the ground used as a reference point in establishing and maintaining the position of an aircraft while holding.

(See FIX.)

(See VISUAL HOLDING.)

(Refer to AIM.)

**HOLDING POINT [ICAO]**– A specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control clearances.

**HOLDING PROCEDURE**–

(See HOLD PROCEDURE.)

**HOLD-SHORT POINT**– A point on the runway beyond which a landing aircraft with a LAHSO clearance is not authorized to proceed. This point may be located prior to an intersecting runway, taxiway, predetermined point, or approach/departure flight path.

**HOLD-SHORT POSITION LIGHTS**– Flashing in-pavement white lights located at specified hold-short points.

**HOLD-SHORT POSITION MARKING**– The painted runway marking located at the hold-short point on all LAHSO runways.

**HOLD-SHORT POSITION SIGNS**– Red and white holding position signs located alongside the hold-short point.

**HOMING**– Flight toward a NAVAID, without correcting for wind, by adjusting the aircraft heading to maintain a relative bearing of zero degrees.

(See BEARING.)

(See ICAO term HOMING.)

**HOMING [ICAO]**– The procedure of using the direction-finding equipment of one radio station with the emission of another radio station, where at least one of the stations is mobile, and whereby the mobile station proceeds continuously towards the other station.

**HOVER CHECK**– Used to describe when a helicopter/VTOL aircraft requires a stabilized hover to conduct a performance/power check prior to hover taxi, air taxi, or takeoff. Altitude of the hover will vary based on the purpose of the check.

**HOVER TAXI**– Used to describe a helicopter/VTOL aircraft movement conducted above the surface and in ground effect at airspeeds less than approximately 20 knots. The actual height may vary, and some helicopters may require hover taxi above 25 feet AGL to reduce ground effect turbulence or provide clearance for cargo slingloads.

(See AIR TAXI.)

(See HOVER CHECK.)

(Refer to AIM.)

**HOW DO YOU HEAR ME?**– A question relating to the quality of the transmission or to determine how well the transmission is being received.

**HZ**–

(See HERTZ.)



# I

**I SAY AGAIN**– The message will be repeated.

IAF–

(See INITIAL APPROACH FIX.)

IAP–

(See INSTRUMENT APPROACH PROCEDURE.)

IAWP– Initial Approach Waypoint

ICAO–

(See ICAO Term INTERNATIONAL CIVIL AVIATION ORGANIZATION.)

ICING– The accumulation of airframe ice.

Types of icing are:

**a. Rime Ice**– Rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets.

**b. Clear Ice**– A glossy, clear, or translucent ice formed by the relatively slow freezing or large supercooled water droplets.

**c. Mixed**– A mixture of clear ice and rime ice.

Intensity of icing:

**a. Trace**– Ice becomes perceptible. Rate of accumulation is slightly greater than the rate of sublimation. Deicing/anti-icing equipment is not utilized unless encountered for an extended period of time (over 1 hour).

**b. Light**– The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.

**c. Moderate**– The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or flight diversion is necessary.

**d. Severe**– The rate of ice accumulation is such that ice protection systems fail to remove the accumulation of ice, or ice accumulates in locations not normally prone to icing, such as areas aft of protected surfaces and any other areas identified by

the manufacturer. Immediate exit from the condition is necessary.

Note:

Severe icing is aircraft dependent, as are the other categories of icing intensity. Severe icing may occur at any ice accumulation rate.

**IDENT**– A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft.

(Refer to AIM.)

**IDENT FEATURE**– The special feature in the Air Traffic Control Radar Beacon System (ATCRBS) equipment. It is used to immediately distinguish one displayed beacon target from other beacon targets.

(See IDENT.)

**IDENTIFICATION [ICAO]**– The situation which exists when the position indication of a particular aircraft is seen on a situation display and positively identified.

IF–

(See INTERMEDIATE FIX.)

IFIM–

(See INTERNATIONAL FLIGHT INFORMATION MANUAL.)

**IF NO TRANSMISSION RECEIVED FOR (TIME)**– Used by ATC in radar approaches to prefix procedures which should be followed by the pilot in event of lost communications.

(See LOST COMMUNICATIONS.)

IFR–

(See INSTRUMENT FLIGHT RULES.)

**IFR AIRCRAFT**– An aircraft conducting flight in accordance with instrument flight rules.

**IFR CONDITIONS**– Weather conditions below the minimum for flight under visual flight rules.

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

**IFR DEPARTURE PROCEDURE**–

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(Refer to AIM.)

**IFR FLIGHT**–

(See IFR AIRCRAFT.)

**IFR LANDING MINIMUMS–**

(See LANDING MINIMUMS.)

**IFR MILITARY TRAINING ROUTES (IR)–** Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

**IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES–** Title 14 Code of Federal Regulations Part 91, prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both to assist pilots in avoiding obstacles during climb to the minimum en route altitude. Those airports are listed in FAA/DOD Instrument Approach Procedures (IAPs) Charts under a section entitled “IFR Takeoff Minimums and Departure Procedures.” The FAA/DOD IAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports or from any airports where there are no departure procedures, DPs, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

**IF/IAWP–** Intermediate Fix/Initial Approach Waypoint. The waypoint where the final approach course of a T approach meets the crossbar of the T. When designated (in conjunction with a TAA) this waypoint will be used as an IAWP when approaching the airport from certain directions, and as an IFWP when beginning the approach from another IAWP.

**IFWP–** Intermediate Fix Waypoint

**ILS–**

(See INSTRUMENT LANDING SYSTEM.)

**ILS CATEGORIES–** 1. Category I. An ILS approach procedure which provides for approach to a height above touchdown of not less than 200 feet and with runway visual range of not less than 1,800 feet.– 2. Special Authorization Category I. An ILS approach procedure which provides for approach to

a height above touchdown of not less than 150 feet and with runway visual range of not less than 1,400 feet, HUD to DH. 3. Category II. An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1,200 feet (with autoland or HUD to touchdown and noted on authorization, RVR 1,000 feet).– 4. Special Authorization Category II with Reduced Lighting. An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1,200 feet with autoland or HUD to touchdown and noted on authorization (no touchdown zone and centerline lighting are required).– 5. Category III:

**a. IIIA.–**An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 700 feet.

**b. IIIB.–**An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 150 feet.

**c. IIIC.–**An ILS approach procedure which provides for approach without a decision height minimum and without runway visual range minimum.

**ILS PRM APPROACH–** An instrument landing system (ILS) approach conducted to parallel runways whose extended centerlines are separated by less than 4,300 feet and at least 3,000 feet where independent closely spaced approaches are permitted. Also used in conjunction with an LDA PRM, RNAV PRM or GLS PRM approach to conduct Simultaneous Offset Instrument Approach (SOIA) operations. No Transgression Zone (NTZ) monitoring is required to conduct these approaches. ATC utilizes an enhanced display with alerting and, with certain runway spacing, a high update rate PRM surveillance sensor. Use of a secondary monitor frequency, pilot PRM training, and publication of an Attention All Users Page are also required for all PRM approaches.

(Refer to AIM)

**IM–**

(See INNER MARKER.)

**IMC–**

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)



**IMMEDIATELY**– Used by ATC or pilots when such action compliance is required to avoid an imminent situation.

**INCERFA (Uncertainty Phase) [ICAO]**– A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

**INCREASED SEPARATION REQUIRED (ISR)**– Indicates the confidence level of the track requires 5NM separation. 3NM separation, 1 1/2NM separation, and target resolution cannot be used.

**INCREASE SPEED TO (SPEED)**–

(See SPEED ADJUSTMENT.)

**INERTIAL NAVIGATION SYSTEM (INS)**– An RNAV system which is a form of self-contained navigation.

(See Area Navigation/RNAV.)

**INFLIGHT REFUELING**–

(See AERIAL REFUELING.)

**INFLIGHT WEATHER ADVISORY**–

(See WEATHER ADVISORY.)

**INFORMATION REQUEST (INREQ)**– A request originated by an FSS for information concerning an overdue VFR aircraft.

**INITIAL APPROACH FIX (IAF)**– The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s).

(See FIX.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**INITIAL APPROACH SEGMENT**–

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**INITIAL APPROACH SEGMENT [ICAO]**– That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

**INLAND NAVIGATION FACILITY**– A navigation aid on a North American Route at which the common route and/or the noncommon route begins or ends.

**INNER MARKER**– A marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per

second and indicating to the pilot, both aurally and visually, that he/she is at the designated decision height (DH), normally 100 feet above the touchdown zone elevation, on the ILS CAT II approach. It also marks progress during a CAT III approach.

(See INSTRUMENT LANDING SYSTEM.)

(Refer to AIM.)

**INNER MARKER BEACON**–

(See INNER MARKER.)

**INREQ**–

(See INFORMATION REQUEST.)

**INS**–

(See INERTIAL NAVIGATION SYSTEM.)

**INSTRUMENT APPROACH**–

(See INSTRUMENT APPROACH PROCEDURE.)

**INSTRUMENT APPROACH OPERATIONS**

[ICAO]– An approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:

**a.** A two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and

**b.** A three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

Note: Lateral and vertical navigation guidance refers to the guidance provided either by:

a) a ground-based radio navigation aid; or

b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

(See ICAO term INSTRUMENT APPROACH PROCEDURE.)

**INSTRUMENT APPROACH PROCEDURE**– A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority.

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**a.** U.S. civil standard instrument approach procedures are approved by the FAA as prescribed

under 14 CFR Part 97 and are available for public use.

**b.** U.S. military standard instrument approach procedures are approved and published by the Department of Defense.

**c.** Special instrument approach procedures are approved by the FAA for individual operators but are not published in 14 CFR Part 97 for public use.

(See ICAO term INSTRUMENT APPROACH PROCEDURE.)

**INSTRUMENT APPROACH PROCEDURE [ICAO]**– A series of predetermined maneuvers by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.

(See ICAO term INSTRUMENT APPROACH OPERATIONS)

**INSTRUMENT APPROACH PROCEDURE CHARTS**–

(See AERONAUTICAL CHART.)

**INSTRUMENT DEPARTURE PROCEDURE (DP)**– A preplanned instrument flight rule (IFR) departure procedure published for pilot use, in graphic or textual format, that provides obstruction clearance from the terminal area to the appropriate en route structure. There are two types of DP, Obstacle Departure Procedure (ODP), printed either textually or graphically, and, Standard Instrument Departure (SID), which is always printed graphically.

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(See OBSTACLE DEPARTURE PROCEDURES.)

(See STANDARD INSTRUMENT DEPARTURES.)

(Refer to AIM.)

**INSTRUMENT DEPARTURE PROCEDURE (DP) CHARTS**–

(See AERONAUTICAL CHART.)

**INSTRUMENT FLIGHT RULES (IFR)**– Rules governing the procedures for conducting instrument

flight. Also a term used by pilots and controllers to indicate type of flight plan.

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

(See VISUAL FLIGHT RULES.)

(See VISUAL METEOROLOGICAL CONDITIONS.)

(See ICAO term INSTRUMENT FLIGHT RULES.)

(Refer to AIM.)

**INSTRUMENT FLIGHT RULES [ICAO]**– A set of rules governing the conduct of flight under instrument meteorological conditions.

**INSTRUMENT LANDING SYSTEM (ILS)**– A precision instrument approach system which normally consists of the following electronic components and visual aids:

**a.** Localizer.

(See LOCALIZER.)

**b.** Glideslope.

(See GLIDESLOPE.)

**c.** Outer Marker.

(See OUTER MARKER.)

**d.** Middle Marker.

(See MIDDLE MARKER.)

**e.** Approach Lights.

(See AIRPORT LIGHTING.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**INSTRUMENT METEOROLOGICAL CONDITIONS (IMC)**– Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

(See INSTRUMENT FLIGHT RULES.)

(See VISUAL FLIGHT RULES.)

(See VISUAL METEOROLOGICAL CONDITIONS.)

**INSTRUMENT RUNWAY**– A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.

(See ICAO term INSTRUMENT RUNWAY.)

**INSTRUMENT RUNWAY [ICAO]**– One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

**a. Nonprecision Approach Runway**– An instrument runway served by visual aids and a nonvisual aid providing at least directional guidance adequate for a straight-in approach.

**b. Precision Approach Runway, Category I**– An instrument runway served by ILS and visual aids intended for operations down to 60 m (200 feet) decision height and down to an RVR of the order of 800 m.

**c. Precision Approach Runway, Category II**– An instrument runway served by ILS and visual aids intended for operations down to 30 m (100 feet) decision height and down to an RVR of the order of 400 m.

**d. Precision Approach Runway, Category III**– An instrument runway served by ILS to and along the surface of the runway and:

**1.** Intended for operations down to an RVR of the order of 200 m (no decision height being applicable) using visual aids during the final phase of landing;

**2.** Intended for operations down to an RVR of the order of 50 m (no decision height being applicable) using visual aids for taxiing;

**3.** Intended for operations without reliance on visual reference for landing or taxiing.

Note 1: See Annex 10 Volume I, Part I, Chapter 3, for related ILS specifications.

Note 2: Visual aids need not necessarily be matched to the scale of nonvisual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

**INTEGRITY**– The ability of a system to provide timely warnings to users when the system should not be used for navigation.

**INTERMEDIATE APPROACH SEGMENT**–  
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**INTERMEDIATE APPROACH SEGMENT [ICAO]**– That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, race track or dead reckoning track procedure and the final approach fix or point, as appropriate.

**INTERMEDIATE FIX**– The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**INTERMEDIATE LANDING**– On the rare occasion that this option is requested, it should be approved. The departure center, however, must advise the ATCSCC so that the appropriate delay is carried over and assigned at the intermediate airport. An intermediate landing airport within the arrival center will not be accepted without coordination with and the approval of the ATCSCC.

**INTERNATIONAL AIRPORT**– Relating to international flight, it means:

**a.** An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.

**b.** A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.

**c.** Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation.

(See ICAO term INTERNATIONAL AIRPORT.)

(Refer to Chart Supplement U.S.)

(Refer to IFIM.)

**INTERNATIONAL AIRPORT [ICAO]**– Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

**INTERNATIONAL CIVIL AVIATION ORGANIZATION [ICAO]**– A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

**a.** Regions include:

1. African-Indian Ocean Region
2. Caribbean Region
3. European Region

4. Middle East/Asia Region
5. North American Region
6. North Atlantic Region
7. Pacific Region
8. South American Region

**INTERNATIONAL FLIGHT INFORMATION MANUAL (IFIM)**– A publication designed primarily as a pilot’s preflight planning guide for flights into foreign airspace and for flights returning to the U.S. from foreign locations.

**INTERROGATOR**– The ground-based surveillance radar beacon transmitter-receiver, which normally scans in synchronism with a primary radar, transmitting discrete radio signals which repetitiously request all transponders on the mode being used to reply. The replies received are mixed with the primary radar returns and displayed on the same plan position indicator (radar scope). Also, applied to the airborne element of the TACAN/DME system.

(See TRANSPONDER.)

(Refer to AIM.)

**INTERSECTING RUNWAYS**– Two or more runways which cross or meet within their lengths.

(See INTERSECTION.)

**INTERSECTION**–

**a.** A point defined by any combination of courses, radials, or bearings of two or more navigational aids.

**b.** Used to describe the point where two runways, a runway and a taxiway, or two taxiways cross or meet.

**INTERSECTION DEPARTURE**– A departure from any runway intersection except the end of the runway.

(See INTERSECTION.)

**INTERSECTION TAKEOFF**–

(See INTERSECTION DEPARTURE.)

**IR**–

(See IFR MILITARY TRAINING ROUTES.)

**IRREGULAR SURFACE**– A surface that is open for use but not per regulations.

**ISR**–

(See INCREASED SEPARATION REQUIRED.)

# J

**JAMMING**– Electronic or mechanical interference which may disrupt the display of aircraft on radar or the transmission/reception of radio communications/navigation.

**JET BLAST**– Jet engine exhaust (thrust stream turbulence).

(See **WAKE TURBULENCE**.)

**JET ROUTE**– A route designed to serve aircraft operations from 18,000 feet MSL up to and including flight level 450. The routes are referred to as “J” routes with numbering to identify the designated route; e.g., J105.

(See **Class A AIRSPACE**.)

(Refer to 14 CFR Part 71.)

**JET STREAM**– A migrating stream of high-speed winds present at high altitudes.

**JETTISONING OF EXTERNAL STORES**– Airborne release of external stores; e.g., tip tanks, ordnance.

(See **FUEL DUMPING**.)

(Refer to 14 CFR Part 91.)

**JOINT USE RESTRICTED AREA**–

(See **RESTRICTED AREA**.)

**JUMP ZONE**– The airspace directly associated with a Drop Zone. Vertical and horizontal limits may be locally defined.



# K

**KNOWN TRAFFIC**– With respect to ATC clearances, means aircraft whose altitude, position, and intentions are known to ATC.





# L

LAA–

(See LOCAL AIRPORT ADVISORY.)

LAAS–

(See LOW ALTITUDE ALERT SYSTEM.)

LAHSO– An acronym for “Land and Hold Short Operation.” These operations include landing and holding short of an intersecting runway, a taxiway, a predetermined point, or an approach/departure flightpath.

LAHSO-DRY– Land and hold short operations on runways that are dry.

LAHSO-WET– Land and hold short operations on runways that are wet (but not contaminated).

LAND AND HOLD SHORT OPERATIONS– Operations which include simultaneous takeoffs and landings and/or simultaneous landings when a landing aircraft is able and is instructed by the controller to hold-short of the intersecting runway/taxiway or designated hold-short point. Pilots are expected to promptly inform the controller if the hold short clearance cannot be accepted.

(See PARALLEL RUNWAYS.)

(Refer to AIM.)

LAND-BASED AIR DEFENSE IDENTIFICATION ZONE (ADIZ)– An ADIZ over U.S. metropolitan areas, which is activated and deactivated as needed, with dimensions, activation dates, and other relevant information disseminated via NOTAM.

(See AIR DEFENSE IDENTIFICATION ZONE.)

LANDING AREA– Any locality either on land, water, or structures, including airports/heliports and intermediate landing fields, which is used, or intended to be used, for the landing and takeoff of aircraft whether or not facilities are provided for the shelter, servicing, or for receiving or discharging passengers or cargo.

(See ICAO term LANDING AREA.)

LANDING AREA [ICAO]– That part of a movement area intended for the landing or take-off of aircraft.

LANDING DIRECTION INDICATOR– A device which visually indicates the direction in which landings and takeoffs should be made.

(See TETRAHEDRON.)

(Refer to AIM.)

LANDING DISTANCE AVAILABLE (LDA)– The runway length declared available and suitable for a landing airplane.

(See ICAO term LANDING DISTANCE AVAILABLE.)

LANDING DISTANCE AVAILABLE [ICAO]– The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

LANDING MINIMUMS– The minimum visibility prescribed for landing a civil aircraft while using an instrument approach procedure. The minimum applies with other limitations set forth in 14 CFR Part 91 with respect to the Minimum Descent Altitude (MDA) or Decision Height (DH) prescribed in the instrument approach procedures as follows:

a. 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

b. Circling minimums. A statement of MDA and visibility required for the circle-to-land maneuver.

Note: Descent below the MDA or DH must meet the conditions stated in 14 CFR Section 91.175.

(See CIRCLE-TO-LAND MANEUVER.)

(See DECISION HEIGHT.)

(See INSTRUMENT APPROACH PROCEDURE.)

(See MINIMUM DESCENT ALTITUDE.)

(See STRAIGHT-IN LANDING.)

(See VISIBILITY.)

(Refer to 14 CFR Part 91.)

LANDING ROLL– The distance from the point of touchdown to the point where the aircraft can be brought to a stop or exit the runway.

LANDING SEQUENCE– The order in which aircraft are positioned for landing.

(See APPROACH SEQUENCE.)

LAST ASSIGNED ALTITUDE– The last altitude/flight level assigned by ATC and acknowledged by the pilot.

(See MAINTAIN.)

(Refer to 14 CFR Part 91.)

**LATERAL NAVIGATION (LNAV)**– A function of area navigation (RNAV) equipment which calculates, displays, and provides lateral guidance to a profile or path.

**LATERAL SEPARATION**– The lateral spacing of aircraft at the same altitude by requiring operation on different routes or in different geographical locations.

(See SEPARATION.)

**LDA**–

(See LOCALIZER TYPE DIRECTIONAL AID.)

(See LANDING DISTANCE AVAILABLE.)

(See ICAO Term LANDING DISTANCE AVAILABLE.)

**LF**–

(See LOW FREQUENCY.)

**LIGHTED AIRPORT**– An airport where runway and obstruction lighting is available.

(See AIRPORT LIGHTING.)

(Refer to AIM.)

**LIGHT GUN**– A handheld directional light signaling device which emits a brilliant narrow beam of white, green, or red light as selected by the tower controller. The color and type of light transmitted can be used to approve or disapprove anticipated pilot actions where radio communication is not available. The light gun is used for controlling traffic operating in the vicinity of the airport and on the airport movement area.

(Refer to AIM.)

**LIGHT-SPORT AIRCRAFT (LSA)**– An FAA-registered aircraft, other than a helicopter or powered-lift, that meets certain weight and performance. Principally it is a single-engine aircraft with a maximum of two seats and weighing no more than 1,430 pounds if intended for operation on water, or 1,320 pounds if not. It must be of simple design (fixed landing gear (except if intended for operations on water or a glider), piston powered, nonpressurized, with a fixed or ground adjustable propeller). Performance is also limited to a maximum airspeed in level flight of not more than 120 knots calibrated airspeed (CAS), have a maximum never-exceed speed of not more than 120 knots CAS for a glider, and have a maximum stalling speed, without the use of lift-enhancing devices of not more than 45 knots CAS. It may be certificated as either Experimental LSA or as a Special LSA aircraft. A

minimum of a sport pilot certificate is required to operate light-sport aircraft.

(Refer to 14 CFR Part 1, §1.1.)

**LINE UP AND WAIT (LUAW)**– Used by ATC to inform a pilot to taxi onto the departure runway to line up and wait. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued because of traffic or other reasons.

(See CLEARED FOR TAKEOFF.)

**LOCAL AIRPORT ADVISORY (LAA)**– A service available only in Alaska and provided by facilities that are located on the landing airport, have a discrete ground-to-air communication frequency or the tower frequency when the tower is closed, automated weather reporting with voice broadcasting, and a continuous ASOS/AWSS/AWOS data display, other continuous direct reading instruments, or manual observations available to the specialist.

(See AIRPORT ADVISORY AREA.)

**LOCAL TRAFFIC**– Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

(See TRAFFIC PATTERN.)

**LOCALIZER**– The component of an ILS which provides course guidance to the runway.

(See INSTRUMENT LANDING SYSTEM.)

(See ICAO term LOCALIZER COURSE.)

(Refer to AIM.)

**LOCALIZER COURSE [ICAO]**– The locus of points, in any given horizontal plane, at which the DDM (difference in depth of modulation) is zero.

**LOCALIZER OFFSET**– An angular offset of the localizer aligned within 3° of the runway alignment.

**LOCALIZER TYPE DIRECTIONAL AID (LDA)**– A localizer with an angular offset that exceeds 3° of the runway alignment, used for nonprecision instrument approaches with utility and accuracy comparable to a localizer, but which are not part of a complete ILS.

(Refer to AIM.)

**LOCALIZER TYPE DIRECTIONAL AID (LDA) PRECISION RUNWAY MONITOR (PRM) APPROACH**– An approach, which includes a glideslope, used in conjunction with an ILS PRM, RNAV PRM or GLS PRM approach to an adjacent runway to conduct Simultaneous Offset Instrument

Approaches (SOIA) to parallel runways whose centerlines are separated by less than 3,000 feet and at least 750 feet. NTZ monitoring is required to conduct these approaches.

(See SIMULTANEOUS OFFSET INSTRUMENT APPROACH (SOIA).)

(Refer to AIM.)

**LOCALIZER USABLE DISTANCE**– The maximum distance from the localizer transmitter at a specified altitude, as verified by flight inspection, at which reliable course information is continuously received.

(Refer to AIM.)

**LOCATOR [ICAO]**– An LM/MF NDB used as an aid to final approach.

Note: A locator usually has an average radius of rated coverage of between 18.5 and 46.3 km (10 and 25 NM).

**LONG RANGE NAVIGATION**–

(See LORAN.)

**LONGITUDINAL SEPARATION**– The longitudinal spacing of aircraft at the same altitude by a minimum distance expressed in units of time or miles.

(See SEPARATION.)

(Refer to AIM.)

**LORAN**– An electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran A operates in the 1750-1950 kHz frequency band. Loran C and D operate in the 100-110 kHz frequency band. In 2010, the U.S. Coast Guard terminated all U.S. LORAN-C transmissions.

(Refer to AIM.)

**LOST COMMUNICATIONS**– Loss of the ability to communicate by radio. Aircraft are sometimes referred to as NORDO (No Radio). Standard pilot procedures are specified in 14 CFR Part 91. Radar controllers issue procedures for pilots to follow in the event of lost communications during a radar approach when weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach.

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**LOST LINK (LL)**– An interruption or loss of the control link, or when the pilot is unable to effect control of the aircraft and, as a result, the UA will perform a predictable or planned maneuver. Loss of command and control link between the Control Station and the aircraft. There are two types of links:

a. An uplink which transmits command instructions to the aircraft, and

b. A downlink which transmits the status of the aircraft and provides situational awareness to the pilot.

**LOST LINK PROCEDURE**– Preprogrammed or predetermined mitigations to ensure the continued safe operation of the UA in the event of a lost link (LL). In the event positive link cannot be established, flight termination must be implemented.

**LOW ALTITUDE AIRWAY STRUCTURE**– The network of airways serving aircraft operations up to but not including 18,000 feet MSL.

(See AIRWAY.)

(Refer to AIM.)

***LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY***–

(See SAFETY ALERT.)

**LOW APPROACH**– An approach over an airport or runway following an instrument approach or a VFR approach including the go-around maneuver where the pilot intentionally does not make contact with the runway.

(Refer to AIM.)

**LOW FREQUENCY (LF)**– The frequency band between 30 and 300 kHz.

(Refer to AIM.)

**LOCALIZER PERFORMANCE WITH VERTICAL GUIDANCE (LPV)**– A type of approach with vertical guidance (APV) based on WAAS, published on RNAV (GPS) approach charts. This procedure takes advantage of the precise lateral guidance available from WAAS. The minima is published as a decision altitude (DA).

**LUAW**–

(See LINE UP AND WAIT.)



# M

## MAA–

(See MAXIMUM AUTHORIZED ALTITUDE.)

**MACH NUMBER–** The ratio of true airspeed to the speed of sound; e.g., MACH .82, MACH 1.6.

(See AIRSPEED.)

**MACH TECHNIQUE [ICAO]–** Describes a control technique used by air traffic control whereby turbojet aircraft operating successively along suitable routes are cleared to maintain appropriate MACH numbers for a relevant portion of the en route phase of flight. The principle objective is to achieve improved utilization of the airspace and to ensure that separation between successive aircraft does not decrease below the established minima.

**MAHWP–** Missed Approach Holding Waypoint

## **MAINTAIN–**

**a.** Concerning altitude/flight level, the term means to remain at the altitude/flight level specified. The phrase “climb and” or “descend and” normally precedes “maintain” and the altitude assignment; e.g., “descend and maintain 5,000.”

**b.** Concerning other ATC instructions, the term is used in its literal sense; e.g., maintain VFR.

**MAINTENANCE PLANNING FRICTION LEVEL–** The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, which represents the friction value below which the runway pavement surface remains acceptable for any category or class of aircraft operations but which is beginning to show signs of deterioration. This value will vary depending on the particular friction measurement equipment used.

**MAKE SHORT APPROACH–** Used by ATC to inform a pilot to alter his/her traffic pattern so as to make a short final approach.

(See TRAFFIC PATTERN.)

**MAN PORTABLE AIR DEFENSE SYSTEMS (MANPADS)–** MANPADS are lightweight, shoulder-launched, missile systems used to bring down aircraft and create mass casualties. The potential for MANPADS use against airborne aircraft

is real and requires familiarity with the subject. Terrorists choose MANPADS because the weapons are low cost, highly mobile, require minimal set-up time, and are easy to use and maintain. Although the weapons have limited range, and their accuracy is affected by poor visibility and adverse weather, they can be fired from anywhere on land or from boats where there is unrestricted visibility to the target.

**MANDATORY ALTITUDE–** An altitude depicted on an instrument Approach Procedure Chart requiring the aircraft to maintain altitude at the depicted value.

## MANPADS–

(See MAN PORTABLE AIR DEFENSE SYSTEMS.)

## MAP–

(See MISSED APPROACH POINT.)

**MARKER BEACON–** An electronic navigation facility transmitting a 75 MHz vertical fan or boneshaped radiation pattern. Marker beacons are identified by their modulation frequency and keying code, and when received by compatible airborne equipment, indicate to the pilot, both aurally and visually, that he/she is passing over the facility.

(See INNER MARKER.)

(See MIDDLE MARKER.)

(See OUTER MARKER.)

(Refer to AIM.)

## MARSA–

(See MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT.)

**MAWP–** Missed Approach Waypoint

**MAXIMUM AUTHORIZED ALTITUDE–** A published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment. It is the highest altitude on a Federal airway, jet route, area navigation low or high route, or other direct route for which an MEA is designated in 14 CFR Part 95 at which adequate reception of navigation aid signals is assured.

**MAYDAY–** The international radiotelephony distress signal. When repeated three times, it indicates

imminent and grave danger and that immediate assistance is requested.

(See PAN-PAN.)

(Refer to AIM.)

MCA–

(See MINIMUM CROSSING ALTITUDE.)

MDA–

(See MINIMUM DESCENT ALTITUDE.)

MEA–

(See MINIMUM EN ROUTE IFR ALTITUDE.)

MEARTS–

(See MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM.)

METEOROLOGICAL IMPACT STATEMENT–

An unscheduled planning forecast describing conditions expected to begin within 4 to 12 hours which may impact the flow of air traffic in a specific center's (ARTCC) area.

METER FIX ARC– A semicircle, equidistant from a meter fix, usually in low altitude relatively close to the meter fix, used to help CTAS/ERAM calculate a meter time, and determine appropriate sector meter list assignments for aircraft not on an established arrival route or assigned a meter fix.

METER FIX TIME/SLOT TIME (MFT)– A calculated time to depart the meter fix in order to cross the vertex at the ACLT. This time reflects descent speed adjustment and any applicable time that must be absorbed prior to crossing the meter fix.

METER LIST–

(See ARRIVAL SECTOR ADVISORY LIST.)

METER LIST DISPLAY INTERVAL– A dynamic parameter which controls the number of minutes prior to the flight plan calculated time of arrival at the meter fix for each aircraft, at which time the TCLT is frozen and becomes an ACLT; i.e., the VTA is updated and consequently the TCLT modified as appropriate until frozen at which time updating is suspended and an ACLT is assigned. When frozen, the flight entry is inserted into the arrival sector's meter list for display on the sector PVD/MDM. MLDI is used if filed true airspeed is less than or equal to freeze speed parameters (FSPD).

METERING– A method of time-regulating arrival traffic flow into a terminal area so as not to exceed a predetermined terminal acceptance rate.

METERING AIRPORTS– Airports adapted for metering and for which optimum flight paths are defined. A maximum of 15 airports may be adapted.

METERING FIX– A fix along an established route from over which aircraft will be metered prior to entering terminal airspace. Normally, this fix should be established at a distance from the airport which will facilitate a profile descent 10,000 feet above airport elevation (AAE) or above.

METERING POSITION(S)– Adapted PVDs/MDMs and associated "D" positions eligible for display of a metering position list. A maximum of four PVDs/MDMs may be adapted.

METERING POSITION LIST– An ordered list of data on arrivals for a selected metering airport displayed on a metering position PVD/MDM.

MFT–

(See METER FIX TIME/SLOT TIME.)

MHA–

(See MINIMUM HOLDING ALTITUDE.)

MIA–

(See MINIMUM IFR ALTITUDES.)

MICROBURST– A small downburst with outbursts of damaging winds extending 2.5 miles or less. In spite of its small horizontal scale, an intense microburst could induce wind speeds as high as 150 knots

(Refer to AIM.)

MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM (MEARTS)– An automated radar and radar beacon tracking system capable of employing both short-range (ASR) and long-range (ARSR) radars. This microcomputer driven system provides improved tracking, continuous data recording, and use of full digital radar displays.

MID RVR–

(See VISIBILITY.)

MIDDLE COMPASS LOCATOR–

(See COMPASS LOCATOR.)

MIDDLE MARKER– A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95 dot/dash combinations per minute on a

1300 Hz tone, which is received aurally and visually by compatible airborne equipment.

(See INSTRUMENT LANDING SYSTEM.)

(See MARKER BEACON.)

(Refer to AIM.)

**MILES-IN-TRAIL**– A specified distance between aircraft, normally, in the same stratum associated with the same destination or route of flight.

**MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT (MARS)**– A condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. It is used only for required IFR operations which are specified in letters of agreement or other appropriate FAA or military documents.

**MILITARY LANDING ZONE**– A landing strip used exclusively by the military for training. A military landing zone does not carry a runway designation.

**MILITARY OPERATIONS AREA**–

(See SPECIAL USE AIRSPACE.)

**MILITARY TRAINING ROUTES**– Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots IAS.

(See IFR MILITARY TRAINING ROUTES.)

(See VFR MILITARY TRAINING ROUTES.)

**MINIMA**–

(See MINIMUMS.)

**MINIMUM CROSSING ALTITUDE (MCA)**– The lowest altitude at certain fixes at which an aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude (MEA).

(See MINIMUM EN ROUTE IFR ALTITUDE.)

**MINIMUM DESCENT ALTITUDE (MDA)**– 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.

(See NONPRECISION APPROACH PROCEDURE.)

**MINIMUM EN ROUTE IFR ALTITUDE (MEA)**– The lowest published altitude between radio fixes

which assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment thereof, area navigation low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

(Refer to 14 CFR Part 91.)

(Refer to 14 CFR Part 95.)

(Refer to AIM.)

**MINIMUM FRICTION LEVEL**– The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, that represents the minimum recommended wet pavement surface friction value for any turbojet aircraft engaged in LAHSO. This value will vary with the particular friction measurement equipment used.

**MINIMUM FUEL**– Indicates that an aircraft's fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

(Refer to AIM.)

**MINIMUM HOLDING ALTITUDE**– The lowest altitude prescribed for a holding pattern which assures navigational signal coverage, communications, and meets obstacle clearance requirements.

**MINIMUM IFR ALTITUDES (MIA)**– Minimum altitudes for IFR operations as prescribed in 14 CFR Part 91. These altitudes are published on aeronautical charts and prescribed in 14 CFR Part 95 for airways and routes, and in 14 CFR Part 97 for standard instrument approach procedures. If no applicable minimum altitude is prescribed in 14 CFR Part 95 or 14 CFR Part 97, the following minimum IFR altitude applies:

**a.** In designated mountainous areas, 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or

**b.** Other than mountainous areas, 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or

c. As otherwise authorized by the Administrator or assigned by ATC.

(See MINIMUM CROSSING ALTITUDE.)

(See MINIMUM EN ROUTE IFR ALTITUDE.)

(See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE.)

(See MINIMUM SAFE ALTITUDE.)

(See MINIMUM VECTORING ALTITUDE.)

(Refer to 14 CFR Part 91.)

**MINIMUM OBSTRUCTION CLEARANCE ALTITUDE (MOCA)**– The lowest published altitude in effect between radio fixes on VOR airways, off-airway routes, or route segments which meets obstacle clearance requirements for the entire route segment and which assures acceptable navigational signal coverage only within 25 statute (22 nautical) miles of a VOR.

(Refer to 14 CFR Part 91.)

(Refer to 14 CFR Part 95.)

**MINIMUM RECEPTION ALTITUDE (MRA)**– The lowest altitude at which an intersection can be determined.

(Refer to 14 CFR Part 95.)

**MINIMUM SAFE ALTITUDE (MSA)**–

a. The minimum altitude specified in 14 CFR Part 91 for various aircraft operations.

b. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance for emergency use. These altitudes will be identified as Minimum Safe Altitudes or Emergency Safe Altitudes and are established as follows:

1. **Minimum Safe Altitude (MSA)**. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance within a 25-mile radius of the navigation facility, waypoint, or airport reference point upon which the MSA is predicated. MSAs are for emergency use only and do not necessarily assure acceptable navigational signal coverage.

(See ICAO term Minimum Sector Altitude.)

2. **Emergency Safe Altitude (ESA)**. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance in nonmountainous areas and 2,000 feet of obstacle clearance in designated mountainous areas within a 100-mile radius of the navigation facility or waypoint used as the ESA center. These altitudes are normally used only in military procedures and are identified on

published procedures as “Emergency Safe Altitudes.”

**MINIMUM SAFE ALTITUDE WARNING (MSAW)**– A function of the ARTS III computer that aids the controller by alerting him/her when a tracked Mode C equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.

(Refer to AIM.)

**MINIMUM SECTOR ALTITUDE [ICAO]**– The lowest altitude which may be used under emergency conditions which will provide a minimum clearance of 300 m (1,000 feet) above all obstacles located in an area contained within a sector of a circle of 46 km (25 NM) radius centered on a radio aid to navigation.

**MINIMUMS**– Weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.

(See IFR CONDITIONS.)

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(See LANDING MINIMUMS.)

(See VFR CONDITIONS.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**MINIMUM VECTORING ALTITUDE (MVA)**– 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. It may be lower than the published MEA along an airway or J-route segment. It may be utilized for radar vectoring only upon the controller’s determination that an adequate radar return is being received from the aircraft being controlled. Charts depicting minimum vectoring altitudes are normally available only to the controllers and not to pilots.

(Refer to AIM.)

**MINUTES-IN-TRAIL**– A specified interval between aircraft expressed in time. This method would more likely be utilized regardless of altitude.

**MIS**–

(See METEOROLOGICAL IMPACT STATEMENT.)

**MISSED APPROACH**–

a. 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.

**b.** A term used by the pilot to inform ATC that he/she is executing the missed approach.

**c.** 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.

(See MISSED APPROACH POINT.)

(Refer to AIM.)

**MISSED APPROACH POINT (MAP)**– 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.

(See MISSED APPROACH.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**MISSED APPROACH PROCEDURE [ICAO]**– The procedure to be followed if the approach cannot be continued.

**MISSED APPROACH SEGMENT**–

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**MLDI**–

(See METER LIST DISPLAY INTERVAL.)

**MM**–

(See MIDDLE MARKER.)

**MOA**–

(See MILITARY OPERATIONS AREA.)

**MOCA**–

(See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE.)

**MODE**– The letter or number assigned to a specific pulse spacing of radio signals transmitted or received by ground interrogator or airborne transponder components of the Air Traffic Control Radar Beacon System (ATCRBS). Mode A (military Mode 3) and

Mode C (altitude reporting) are used in air traffic control.

(See INTERROGATOR.)

(See RADAR.)

(See TRANSPONDER.)

(See ICAO term MODE.)

(Refer to AIM.)

**MODE (SSR MODE) [ICAO]**– The letter or number assigned to a specific pulse spacing of the interrogation signals transmitted by an interrogator. There are 4 modes, A, B, C and D specified in Annex 10, corresponding to four different interrogation pulse spacings.

**MODE C INTRUDER ALERT**– A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between a tracked target (known IFR or VFR aircraft) and an untracked target (unknown IFR or VFR aircraft) that requires immediate attention/action.

(See CONFLICT ALERT.)

**MODEL AIRCRAFT**– An unmanned aircraft that is: (1) capable of sustained flight in the atmosphere; (2) flown within visual line of sight of the person operating the aircraft; and (3) flown for hobby or recreational purposes.

**MONITOR**– (When used with communication transfer) listen on a specific frequency and stand by for instructions. Under normal circumstances do not establish communications.

**MONITOR ALERT (MA)**– A function of the TFMS that provides traffic management personnel with a tool for predicting potential capacity problems in individual operational sectors. The MA is an indication that traffic management personnel need to analyze a particular sector for actual activity and to determine the required action(s), if any, needed to control the demand.

**MONITOR ALERT PARAMETER (MAP)**– The number designated for use in monitor alert processing by the TFMS. The MAP is designated for each operational sector for increments of 15 minutes.

**MOSAIC/MULTI-SENSOR MODE**– Accepts positional data from multiple radar or ADS-B sites. Targets are displayed from a single source within a radar sort box according to the hierarchy of the sources assigned.

**MOUNTAIN WAVE**– Mountain waves occur when air is being blown over a mountain range or even the

ridge of a sharp bluff area. As the air hits the upwind side of the range, it starts to climb, thus creating what is generally a smooth updraft which turns into a turbulent downdraft as the air passes the crest of the ridge. Mountain Wave can cause significant fluctuations in airspeed and altitude with or without associated turbulence.

(Refer to AIM.)

**MOVEMENT AREA**– The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

(See ICAO term MOVEMENT AREA.)

**MOVEMENT AREA [ICAO]**– That part of an aerodrome to be used for the takeoff, landing and taxiing of aircraft, consisting of the maneuvering area and the apron(s).

**MOVING TARGET INDICATOR**– An electronic device which will permit radar scope presentation only from targets which are in motion. A partial remedy for ground clutter.

**MRA**–

(See MINIMUM RECEPTION ALTITUDE.)

**MSA**–

(See MINIMUM SAFE ALTITUDE.)

**MSAW**–

(See MINIMUM SAFE ALTITUDE WARNING.)

**MTI**–

(See MOVING TARGET INDICATOR.)

**MTR**–

(See MILITARY TRAINING ROUTES.)

**MULTICOM**– A mobile service not open to public correspondence used to provide communications essential to conduct the activities being performed by or directed from private aircraft.

**MULTIPLE RUNWAYS**– The utilization of a dedicated arrival runway(s) for departures and a dedicated departure runway(s) for arrivals when feasible to reduce delays and enhance capacity.

**MVA**–

(See MINIMUM VECTORING ALTITUDE.)

# N

## NAS–

(See NATIONAL AIRSPACE SYSTEM.)

## NAT HLA–

(See NORTH ATLANTIC HIGH LEVEL AIRSPACE.)

**NATIONAL AIRSPACE SYSTEM–** The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.

**NATIONAL BEACON CODE ALLOCATION PLAN AIRSPACE (NBCAP)–** Airspace over United States territory located within the North American continent between Canada and Mexico, including adjacent territorial waters outward to about boundaries of oceanic control areas (CTA)/Flight Information Regions (FIR).

(See FLIGHT INFORMATION REGION.)

**NATIONAL FLIGHT DATA CENTER (NFDC)–** A facility in Washington D.C., established by FAA to operate a central aeronautical information service for the collection, validation, and dissemination of aeronautical data in support of the activities of government, industry, and the aviation community. The information is published in the National Flight Data Digest.

(See NATIONAL FLIGHT DATA DIGEST.)

**NATIONAL FLIGHT DATA DIGEST (NFDD)–** A daily (except weekends and Federal holidays) publication of flight information appropriate to aeronautical charts, aeronautical publications, Notices to Airmen, or other media serving the purpose of providing operational flight data essential to safe and efficient aircraft operations.

**NATIONAL SEARCH AND RESCUE PLAN–** An interagency agreement which provides for the effective utilization of all available facilities in all types of search and rescue missions.

## NAVAID–

(See NAVIGATIONAL AID.)

**NAVAID CLASSES–** VOR, VORTAC, and TACAN aids are classed according to their operational use. The three classes of NAVAIDs are:

- a. T– Terminal.
- b. L– Low altitude.
- c. H– High altitude.

**Note:** The normal service range for T, L, and H class aids is found in the AIM. Certain operational requirements make it necessary to use some of these aids at greater service ranges than specified. Extended range is made possible through flight inspection determinations. Some aids also have lesser service range due to location, terrain, frequency protection, etc. Restrictions to service range are listed in Chart Supplement U.S.

**NAVIGABLE AIRSPACE–** Airspace at and above the minimum flight altitudes prescribed in the CFRs including airspace needed for safe takeoff and landing.

(Refer to 14 CFR Part 91.)

**NAVIGATION REFERENCE SYSTEM (NRS)–** The NRS is a system of waypoints developed for use within the United States for flight planning and navigation without reference to ground based navigational aids. The NRS waypoints are located in a grid pattern along defined latitude and longitude lines. The initial use of the NRS will be in the high altitude environment in conjunction with the High Altitude Redesign initiative. The NRS waypoints are intended for use by aircraft capable of point-to-point navigation.

**NAVIGATION SPECIFICATION [ICAO]–** A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

a. **RNP specification.** A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP; e.g., RNP 4, RNP APCH.

b. **RNAV specification.** A navigation specification based on area navigation that does not include the requirement for performance monitoring and alert-

ing, designated by the prefix RNAV; e.g., RNAV 5, RNAV 1.

Note: The Performance-based Navigation Manual (Doc 9613), Volume II contains detailed guidance on navigation specifications.

**NAVIGATIONAL AID**– Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight.

(See AIR NAVIGATION FACILITY.)

**NBCAP AIRSPACE**–

(See NATIONAL BEACON CODE ALLOCATION PLAN AIRSPACE.)

**NDB**–

(See NONDIRECTIONAL BEACON.)

**NEGATIVE**– “No,” or “permission not granted,” or “that is not correct.”

**NEGATIVE CONTACT**– Used by pilots to inform ATC that:

a. Previously issued traffic is not in sight. It may be followed by the pilot’s request for the controller to provide assistance in avoiding the traffic.

b. They were unable to contact ATC on a particular frequency.

**NFDC**–

(See NATIONAL FLIGHT DATA CENTER.)

**NFDD**–

(See NATIONAL FLIGHT DATA DIGEST.)

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

(See ICAO term NIGHT.)

**NIGHT [ICAO]**– The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise as may be specified by the appropriate authority.

Note: Civil twilight ends in the evening when the center of the sun’s disk is 6 degrees below the horizon and begins in the morning when the center of the sun’s disk is 6 degrees below the horizon.

**NO GYRO APPROACH**– A radar approach/vector provided in case of a malfunctioning gyro-compass or directional gyro. Instead of providing the pilot

with headings to be flown, the controller observes the radar track and issues control instructions “turn right/left” or “stop turn” as appropriate.

(Refer to AIM.)

**NO GYRO VECTOR**–

(See NO GYRO APPROACH.)

**NO TRANSGRESSION ZONE (NTZ)**– The NTZ is a 2,000 foot wide zone, located equidistant between parallel runway or SOIA final approach courses, in which flight is normally not allowed.

**NONAPPROACH CONTROL TOWER**– Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace. The primary function of a nonapproach control tower is the sequencing of aircraft in the traffic pattern and on the landing area. Nonapproach control towers also separate aircraft operating under instrument flight rules clearances from approach controls and centers. They provide ground control services to aircraft, vehicles, personnel, and equipment on the airport movement area.

**NONCOMMON ROUTE/PORTION**– That segment of a North American Route between the inland navigation facility and a designated North American terminal.

**NONCOMPOSITE SEPARATION**– Separation in accordance with minima other than the composite separation minimum specified for the area concerned.

**NONDIRECTIONAL BEACON**– An L/MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his/her 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.

(See AUTOMATIC DIRECTION FINDER.)

(See COMPASS LOCATOR.)

**NONMOVEMENT AREAS**– Taxiways and apron (ramp) areas not under the control of air traffic.

**NONPRECISION APPROACH**–

(See NONPRECISION APPROACH PROCEDURE.)

**NONPRECISION APPROACH PROCEDURE**– A standard instrument approach procedure in which no

electronic glideslope is provided; e.g., VOR, TACAN, NDB, LOC, ASR, LDA, or SDF approaches.

**NONRADAR**– Precedes other terms and generally means without the use of radar, such as:

**a. Nonradar Approach.** Used to describe instrument approaches for which course guidance on final approach is not provided by ground-based precision or surveillance radar. Radar vectors to the final approach course may or may not be provided by ATC. Examples of nonradar approaches are VOR, NDB, TACAN, ILS, RNAV, and GLS approaches.

(See FINAL APPROACH COURSE.)

(See FINAL APPROACH-IFR.)

(See INSTRUMENT APPROACH PROCEDURE.)

(See RADAR APPROACH.)

**b. Nonradar Approach Control.** An ATC facility providing approach control service without the use of radar.

(See APPROACH CONTROL FACILITY.)

(See APPROACH CONTROL SERVICE.)

**c. Nonradar Arrival.** An aircraft arriving at an airport without radar service or at an airport served by a radar facility and radar contact has not been established or has been terminated due to a lack of radar service to the airport.

(See RADAR ARRIVAL.)

(See RADAR SERVICE.)

**d. Nonradar Route.** A flight path or route over which the pilot is performing his/her own navigation. The pilot may be receiving radar separation, radar monitoring, or other ATC services while on a nonradar route.

(See RADAR ROUTE.)

**e. Nonradar Separation.** The spacing of aircraft in accordance with established minima without the use of radar; e.g., vertical, lateral, or longitudinal separation.

(See RADAR SEPARATION.)

**NON-RESTRICTIVE ROUTING (NRR)**– Portions of a proposed route of flight where a user can flight plan the most advantageous flight path with no requirement to make reference to ground-based NAVAIDs.

**NOPAC**–

(See NORTH PACIFIC.)

**NORDO (No Radio)**– Aircraft that cannot or do not communicate by radio when radio communication is required are referred to as “NORDO.”

(See LOST COMMUNICATIONS.)

**NORMAL OPERATING ZONE (NOZ)**– The NOZ is the operating zone within which aircraft flight remains during normal independent simultaneous parallel ILS approaches.

**NORTH AMERICAN ROUTE**– A numerically coded route preplanned over existing airway and route systems to and from specific coastal fixes serving the North Atlantic. North American Routes consist of the following:

**a. Common Route/Portion.** That segment of a North American Route between the inland navigation facility and the coastal fix.

**b. Noncommon Route/Portion.** That segment of a North American Route between the inland navigation facility and a designated North American terminal.

**c. Inland Navigation Facility.** A navigation aid on a North American Route at which the common route and/or the noncommon route begins or ends.

**d. Coastal Fix.** A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

**NORTH AMERICAN ROUTE PROGRAM (NRP)**– The NRP is a set of rules and procedures which are designed to increase the flexibility of user flight planning within published guidelines.

**NORTH ATLANTIC HIGH LEVEL AIRSPACE (NAT HLA)**– That volume of airspace (as defined in ICAO Document 7030) between FL 285 and FL 420 within the Oceanic Control Areas of Bodo Oceanic, Gander Oceanic, New York Oceanic East, Reykjavik, Santa Maria, and Shanwick, excluding the Shannon and Brest Ocean Transition Areas. ICAO Doc 007 *North Atlantic Operations and Airspace Manual* provides detailed information on related aircraft and operational requirements.

**NORTH MARK**– A beacon data block sent by the host computer to be displayed by the ARTS on a 360 degree bearing at a locally selected radar azimuth and distance. The North Mark is used to ensure correct range/azimuth orientation during periods of CENRAP.

**NORTH PACIFIC**– An organized route system between the Alaskan west coast and Japan.

**NOT STANDARD**– Varying from what is expected or published. For use in NOTAMs only.

**NOT STD-**

(See NOT STANDARD.)

**NOTAM**–

(See NOTICE TO AIRMEN.)

**NOTAM [ICAO]**– A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

**a. I Distribution**– Distribution by means of telecommunication.

**b. II Distribution**– Distribution by means other than telecommunications.

**NOTICE TO AIRMEN (NOTAM)**– 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.

**NOTAM(D)**– A NOTAM given (in addition to local dissemination) distant dissemination beyond the area

of responsibility of the Flight Service Station. These NOTAMs will be stored and available until canceled.

**c. FDC NOTAM**– A NOTAM regulatory in nature, transmitted by USNOF and given system wide dissemination.

(See ICAO term NOTAM.)

**NOTICES TO AIRMEN PUBLICATION**– A publication issued every 28 days, designed primarily for the pilot, which contains current NOTAM information considered essential to the safety of flight as well as supplemental data to other aeronautical publications. The contraction NTAP is used in NOTAM text.

(See NOTICE TO AIRMEN.)

**NRR**–

(See NON-RESTRICTIVE ROUTING.)

**NRS**–

(See NAVIGATION REFERENCE SYSTEM.)

**NTAP**–

(See NOTICES TO AIRMEN PUBLICATION.)

***NUMEROUS TARGETS VICINITY (LOCATION)***– A traffic advisory issued by ATC to advise pilots that targets on the radar scope are too numerous to issue individually.

(See TRAFFIC ADVISORIES.)

# O

**OBSTACLE**– An existing object, object of natural growth, or terrain at a fixed geographical location or which 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.

**OBSTACLE DEPARTURE PROCEDURE (ODP)**– A preplanned instrument flight rule (IFR) departure procedure printed for pilot use in textual or graphic form to provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ODPs are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC.

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(See STANDARD INSTRUMENT DEPARTURES.)

(Refer to AIM.)

**OBSTACLE FREE ZONE**– The OFZ is a three-dimensional volume of airspace which protects for the transition of aircraft to and from the runway. The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible NAVAID locations that are fixed by function. Additionally, vehicles, equipment, and personnel may be authorized by air traffic control to enter the area using the provisions of FAA Order JO 7110.65, Paragraph 3–1–5, Vehicles/Equipment/Personnel Near/On Runways. The runway OFZ and when applicable, the inner-approach OFZ, and the inner-transitional OFZ, comprise the OFZ.

**a. Runway OFZ.** The runway OFZ is a defined volume of airspace centered above the runway. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway. The width is as follows:

**1.** For runways serving large airplanes, the greater of:

**(a)** 400 feet, or

**(b)** 180 feet, plus the wingspan of the most demanding airplane, plus 20 feet per 1,000 feet of airport elevation.

**2.** For runways serving only small airplanes:

**(a)** 300 feet for precision instrument runways.

**(b)** 250 feet for other runways serving small airplanes with approach speeds of 50 knots, or more.

**(c)** 120 feet for other runways serving small airplanes with approach speeds of less than 50 knots.

**b. Inner-approach OFZ.** The inner-approach OFZ is a defined volume of airspace centered on the approach area. The inner-approach OFZ applies only to runways with an approach lighting system. The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the approach lighting system. The width of the inner-approach OFZ is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from the beginning.

**c. Inner-transitional OFZ.** The inner transitional surface OFZ is a defined volume of airspace along the sides of the runway and inner-approach OFZ and applies only to precision instrument runways. The inner-transitional surface OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner-approach OFZ to a height of 150 feet above the established airport elevation.

(Refer to AC 150/5300-13, Chapter 3.)

(Refer to FAA Order JO 7110.65, Para 3–1–5, Vehicles/Equipment/Personnel Near/On Runways.)

**OBSTRUCTION**– Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, Subpart C.

**OBSTRUCTION LIGHT**– A light or one of a group of lights, usually red or white, frequently mounted on a surface structure or natural terrain to warn pilots of the presence of an obstruction.

**OCEANIC AIRSPACE**– Airspace over the oceans of the world, considered international airspace, where oceanic separation and procedures per the International Civil Aviation Organization are applied. Responsibility for the provisions of air traffic control

service in this airspace is delegated to various countries, based generally upon geographic proximity and the availability of the required resources.

**OCEANIC ERROR REPORT**– A report filed when ATC observes an Oceanic Error as defined by FAA Order 7110.82, Reporting Oceanic Errors.

**OCEANIC PUBLISHED ROUTE**– A route established in international airspace and charted or described in flight information publications, such as Route Charts, DOD En route Charts, Chart Supplements, NOTAMs, and Track Messages.

**OCEANIC TRANSITION ROUTE**– An ATS route established for the purpose of transitioning aircraft to/from an organized track system.

**ODP**–

(See OBSTACLE DEPARTURE PROCEDURE.)

**OFF COURSE**– A term used to describe a situation where an aircraft 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 which takes an aircraft off a previously assigned route. Altitudes assigned by ATC during such vectors provide required obstacle clearance.

**OFFSET PARALLEL RUNWAYS**– Staggered runways having centerlines which are parallel.

**OFFSHORE/CONTROL AIRSPACE AREA**– That portion of airspace between the U.S. 12 NM limit and the oceanic CTA/FIR boundary within which air traffic control is exercised. These areas are established to provide air traffic control services. Offshore/Control Airspace Areas may be classified as either Class A airspace or Class E airspace.

**OFT**–

(See OUTER FIX TIME.)

**OM**–

(See OUTER MARKER.)

**ON COURSE**–

**a.** Used to indicate that an aircraft is established on the route centerline.

**b.** Used by ATC to advise a pilot making a radar approach that his/her aircraft is lined up on the final approach course.

(See ON-COURSE INDICATION.)

**ON-COURSE INDICATION**– An indication on an instrument, which provides the pilot a visual means of determining that the aircraft is located on the centerline of a given navigational track, or an indication on a radar scope that an aircraft is on a given track.

**ONE-MINUTE WEATHER**– The most recent one minute updated weather broadcast received by a pilot from an uncontrolled airport ASOS/AWSS/AWOS.

**ONER**–

(See OCEANIC NAVIGATIONAL ERROR REPORT.)

**OPERATIONAL**–

(See DUE REGARD.)

**OPERATIONS SPECIFICATIONS [ICAO]**– The authorizations, conditions and limitations associated with the air operator certificate and subject to the conditions in the operations manual.

**OPPOSITE DIRECTION AIRCRAFT**– Aircraft are operating in opposite directions when:

**a.** They are following the same track in reciprocal directions; or

**b.** Their tracks are parallel and the aircraft are flying in reciprocal directions; or

**c.** Their tracks intersect at an angle of more than 135°.

**OPTION APPROACH**– An approach requested and conducted by a pilot which will result in either a touch-and-go, missed approach, low approach, stop-and-go, or full stop landing. Pilots should advise ATC if they decide to remain on the runway, of any delay in their stop and go, delay clearing the runway, or are unable to comply with the instruction(s).

(See CLEARED FOR THE OPTION.)

(Refer to AIM.)

**ORGANIZED TRACK SYSTEM**– A series of ATS routes which are fixed and charted; i.e., CEP, NOPAC, or flexible and described by NOTAM; i.e., NAT TRACK MESSAGE.



**OFF-ROUTE OBSTRUCTION CLEARANCE ALTITUDE (OROCA)**– An off-route altitude which provides obstruction clearance with a 1,000 foot buffer in non-mountainous terrain areas and a 2,000 foot buffer in designated mountainous areas within the United States. This altitude may not provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage.

**OTR**–

(See OCEANIC TRANSITION ROUTE.)

**OTS**–

(See ORGANIZED TRACK SYSTEM.)

**OUT**– The conversation is ended and no response is expected.

**OUT OF SERVICE**– When a piece of equipment, a system, a facility or a service is not operational, certified (if required) and immediately “available” for Air Traffic or public use.

**OUTER AREA** (associated with Class C airspace)– Non-regulatory airspace surrounding designated Class C airspace airports wherein ATC provides radar vectoring and sequencing on a full-time basis for all IFR and participating VFR aircraft. The service provided in the outer area is called Class C service which includes: IFR/IFR-IFR separation; IFR/VFR-traffic advisories and conflict resolution; and VFR/VFR-traffic advisories and, as appropriate, safety alerts. The normal radius will be 20 nautical miles with some variations based on site-specific requirements. The outer area extends outward from the primary Class C airspace airport and extends from the lower limits of radar/radio coverage up to the ceiling of the approach control’s delegated airspace excluding the Class C charted area and other airspace as appropriate.

(See CONFLICT RESOLUTION.)

(See CONTROLLED AIRSPACE.)

**OUTER COMPASS LOCATOR**–

(See COMPASS LOCATOR.)

**OUTER FIX**– A general term used within ATC to describe fixes in the terminal area, other than the final approach fix. Aircraft are normally cleared to these fixes by an Air Route Traffic Control Center or an Approach Control Facility. Aircraft are normally cleared from these fixes to the final approach fix or final approach course.

## OR

**OUTER FIX**– An adapted fix along the converted route of flight, prior to the meter fix, for which crossing times are calculated and displayed in the metering position list.

**OUTER FIX ARC**– A semicircle, usually about a 50–70 mile radius from a meter fix, usually in high altitude, which is used by CTAS/ERAM to calculate outer fix times and determine appropriate sector meter list assignments for aircraft on an established arrival route that will traverse the arc.

**OUTER FIX TIME**– A calculated time to depart the outer fix in order to cross the vertex at the ACLT. The time reflects descent speed adjustments and any applicable delay time that must be absorbed prior to crossing the meter fix.

**OUTER MARKER**– A marker beacon at or near the glideslope intercept altitude of an ILS approach. It is keyed to transmit two dashes per second on a 400 Hz tone, which is received aurally and visually by compatible airborne equipment. The OM is normally located four to seven miles from the runway threshold on the extended centerline of the runway.

(See INSTRUMENT LANDING SYSTEM.)

(See MARKER BEACON.)

(Refer to AIM.)

**OVER**– My transmission is ended; I expect a response.

**OVERHEAD MANEUVER**– A series of predetermined maneuvers prescribed for aircraft (often in formation) for entry into the visual flight rules (VFR) traffic pattern and to proceed to a landing. An overhead maneuver is not an instrument flight rules (IFR) approach procedure. An aircraft executing an overhead maneuver is considered VFR and the IFR flight plan is cancelled when the aircraft reaches the “initial point” on the initial approach portion of the maneuver. The pattern usually specifies the following:

- a. The radio contact required of the pilot.
- b. The speed to be maintained.
- c. An initial approach 3 to 5 miles in length.
- d. An elliptical pattern consisting of two 180 degree turns.
- e. A break point at which the first 180 degree turn is started.
- f. The direction of turns.

**g.** Altitude (at least 500 feet above the conventional pattern).

**h.** A “Roll-out” on final approach not less than 1/4 mile from the landing threshold and not less than 300 feet above the ground.

**OVERLYING CENTER**– The ARTCC facility that is responsible for arrival/departure operations at a specific terminal.

# P

## P TIME–

(See PROPOSED DEPARTURE TIME.)

## P-ACP–

(See PREARRANGED COORDINATION PROCEDURES.)

**PAN-PAN**– The international radio-telephony urgency signal. When repeated three times, indicates uncertainty or alert followed by the nature of the urgency.

(See MAYDAY.)

(Refer to AIM.)

## PAR–

(See PRECISION APPROACH RADAR.)

## PAR [ICAO]–

(See ICAO Term PRECISION APPROACH RADAR.)

**PARALLEL ILS APPROACHES**– Approaches to parallel runways by IFR aircraft which, when established inbound toward the airport on the adjacent final approach courses, are radar-separated by at least 2 miles.

(See FINAL APPROACH COURSE.)

(See SIMULTANEOUS ILS APPROACHES.)

**PARALLEL OFFSET ROUTE**– A parallel track to the left or right of the designated or established airway/route. Normally associated with Area Navigation (RNAV) operations.

(See AREA NAVIGATION.)

**PARALLEL RUNWAYS**– Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).

## PBCT–

(See PROPOSED BOUNDARY CROSSING TIME.)

## PBN–

(See ICAO Term PERFORMANCE–BASED NAVIGATION.)

## PDC–

(See PRE–DEPARTURE CLEARANCE.)

**PERFORMANCE–BASED NAVIGATION (PBN) [ICAO]**– Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note: Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability, and functionality needed for the proposed operation in the context of a particular airspace concept.

**PERMANENT ECHO**– Radar signals reflected from fixed objects on the earth’s surface; e.g., buildings, towers, terrain. Permanent echoes are distinguished from “ground clutter” by being definable locations rather than large areas. Under certain conditions they may be used to check radar alignment.

**PHOTO RECONNAISSANCE**– Military activity that requires locating individual photo targets and navigating to the targets at a preplanned angle and altitude. The activity normally requires a lateral route width of 16 NM and altitude range of 1,500 feet to 10,000 feet AGL.

**PILOT BRIEFING**– A service provided by the FSS to assist pilots in flight planning. Briefing items may include weather information, NOTAMS, military activities, flow control information, and other items as requested.

(Refer to AIM.)

**PILOT IN COMMAND**– The pilot responsible for the operation and safety of an aircraft during flight time.

(Refer to 14 CFR Part 91.)

**PILOT WEATHER REPORT**– A report of meteorological phenomena encountered by aircraft in flight.

(Refer to AIM.)

**PILOT’S DISCRETION**– When used in conjunction with altitude assignments, means that ATC has offered the pilot the option of starting climb or descent whenever he/she wishes and conducting the climb or descent at any rate he/she wishes. He/she may temporarily level off at any intermediate altitude. However, once he/she has vacated an altitude, he/she may not return to that altitude.

**PIREP–**

(See PILOT WEATHER REPORT.)

**PITCH POINT–** A fix/waypoint that serves as a transition point from a departure procedure or the low altitude ground-based navigation structure into the high altitude waypoint system.

**PLANS DISPLAY–** A display available in EDST that provides detailed flight plan and predicted conflict information in textual format for requested Current Plans and all Trial Plans.

(See EN ROUTE DECISION SUPPORT TOOL)

**POFZ–**

(See PRECISION OBSTACLE FREE ZONE.)

**POINT OUT–**

(See RADAR POINT OUT.)

**POINT-TO-POINT (PTP)–** A level of NRR service for aircraft that is based on traditional waypoints in their FMSs or RNAV equipage.

**POLAR TRACK STRUCTURE–** A system of organized routes between Iceland and Alaska which overlie Canadian MNPS Airspace.

**POSITION REPORT–** A report over a known location as transmitted by an aircraft to ATC.

(Refer to AIM.)

**POSITION SYMBOL–** A computer-generated indication shown on a radar display to indicate the mode of tracking.

**POSITIVE CONTROL–** The separation of all air traffic within designated airspace by air traffic control.

**PRACTICE INSTRUMENT APPROACH–** An instrument approach procedure conducted by a VFR or an IFR aircraft for the purpose of pilot training or proficiency demonstrations.

**PRE-DEPARTURE CLEARANCE–** An application with the Terminal Data Link System (TDLS) that provides clearance information to subscribers, through a service provider, in text to the cockpit or gate printer.

**PREARRANGED COORDINATION–** A standardized procedure which permits an air traffic controller to enter the airspace assigned to another air traffic controller without verbal coordination. The procedures are defined in a facility directive which ensures approved separation between aircraft.

**PREARRANGED COORDINATION PROCEDURES–** A facility's standardized procedure that describes the process by which one controller shall allow an aircraft to penetrate or transit another controller's airspace in a manner that assures approved separation without individual coordination for each aircraft.

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

**PRECIPITATION RADAR WEATHER DESCRIPTIONS–** Existing radar systems cannot detect turbulence. However, there is a direct correlation between the degree of turbulence and other weather features associated with thunderstorms and the weather radar precipitation intensity. Controllers will issue (where capable) precipitation intensity as observed by radar when using weather and radar processor (WARP) or NAS ground-based digital radars with weather capabilities. When precipitation intensity information is not available, the intensity will be described as UNKNOWN. When intensity levels can be determined, they shall be described as:

- a. LIGHT (< 26 dBZ)
- b. MODERATE (26 to 40 dBZ)
- c. HEAVY (> 40 to 50 dBZ)
- d. EXTREME (> 50 dBZ)

(Refer to AC 00-45, Aviation Weather Services.)

**PRECISION APPROACH–**

(See PRECISION APPROACH PROCEDURE.)

**PRECISION APPROACH PROCEDURE–** A standard instrument approach procedure in which an electronic glideslope or other type of glidepath is provided; e.g., ILS, PAR, and GLS.

(See INSTRUMENT LANDING SYSTEM.)

(See PRECISION APPROACH RADAR.)

**PRECISION APPROACH RADAR**– Radar equipment in some ATC facilities operated by the FAA and/or the military services at joint-use civil/military locations and separate military installations to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway. This equipment may be used to monitor certain non-radar approaches, but is primarily used to conduct a precision instrument approach (PAR) wherein the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course (azimuth), the glidepath (elevation), and the distance (range) from the touchdown point on the runway as displayed on the radar scope.

Note: The abbreviation "PAR" is also used to denote preferential arrival routes in ARTCC computers.

(See GLIDEPATH.)

(See PAR.)

(See PREFERENTIAL ROUTES.)

(See ICAO term PRECISION APPROACH RADAR.)

(Refer to AIM.)

**PRECISION APPROACH RADAR [ICAO]**– Primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown.

Note: Precision approach radars are designed to enable pilots of aircraft to be given guidance by radio communication during the final stages of the approach to land.

**PRECISION OBSTACLE FREE ZONE (POFZ)**– An 800 foot wide by 200 foot long area centered on the runway centerline adjacent to the threshold designed to protect aircraft flying precision approaches from ground vehicles and other aircraft when ceiling is less than 250 feet or visibility is less than 3/4 statute mile (or runway visual range below 4,000 feet.)

**PRECISION RUNWAY MONITOR (PRM) SYSTEM**– Provides air traffic controllers monitoring the NTZ during simultaneous close parallel PRM approaches with precision, high update rate secondary surveillance data. The high update rate surveillance sensor component of the PRM system is only required for specific runway or approach course separation. The high resolution color monitoring display, Final Monitor Aid (FMA) of the PRM

system, or other FMA with the same capability, presents NTZ surveillance track data to controllers along with detailed maps depicting approaches and no transgression zone and is required for all simultaneous close parallel PRM NTZ monitoring operations.

(Refer to AIM)

**PREDICTIVE WIND SHEAR ALERT SYSTEM (PWS)**– A self-contained system used on board some aircraft to alert the flight crew to the presence of a potential wind shear. PWS systems typically monitor 3 miles ahead and 25 degrees left and right of the aircraft's heading at or below 1200' AGL. Departing flights may receive a wind shear alert after they start the takeoff roll and may elect to abort the takeoff. Aircraft on approach receiving an alert may elect to go around or perform a wind shear escape maneuver.

**PREFERENTIAL ROUTES**– Preferential routes (PDRs, PARs, and PDARs) are adapted in ARTCC computers to accomplish inter/intrafacility controller coordination and to assure that flight data is posted at the proper control positions. Locations having a need for these specific inbound and outbound routes normally publish such routes in local facility bulletins, and their use by pilots minimizes flight plan route amendments. When the workload or traffic situation permits, controllers normally provide radar vectors or assign requested routes to minimize circuitous routing. Preferential routes are usually confined to one ARTCC's area and are referred to by the following names or acronyms:

**a.** Preferential Departure Route (PDR). A specific departure route from an airport or terminal area to an en route point where there is no further need for flow control. It may be included in an Instrument Departure Procedure (DP) or a Preferred IFR Route.

**b.** Preferential Arrival Route (PAR). A specific arrival route from an appropriate en route point to an airport or terminal area. It may be included in a Standard Terminal Arrival (STAR) or a Preferred IFR Route. The abbreviation "PAR" is used primarily within the ARTCC and should not be confused with the abbreviation for Precision Approach Radar.

**c.** Preferential Departure and Arrival Route (PDAR). A route between two terminals which are within or immediately adjacent to one ARTCC's area. PDARs are not synonymous with Preferred IFR Routes but may be listed as such as they do accomplish essentially the same purpose.

(See PREFERRED IFR ROUTES.)

**PREFERRED IFR ROUTES**– Routes established between busier airports to increase system efficiency and capacity. They normally extend through one or more ARTCC areas and are designed to achieve balanced traffic flows among high density terminals. IFR clearances are issued on the basis of these routes except when severe weather avoidance procedures or other factors dictate otherwise. Preferred IFR Routes are listed in the Chart Supplement U.S. If a flight is planned to or from an area having such routes but the departure or arrival point is not listed in the Chart Supplement U.S., pilots may use that part of a Preferred IFR Route which is appropriate for the departure or arrival point that is listed. Preferred IFR Routes are correlated with DPs and STARs and may be defined by airways, jet routes, direct routes between NAVAIDs, Waypoints, NAVAID radials/DME, or any combinations thereof.

(See CENTER'S AREA.)

(See INSTRUMENT DEPARTURE PROCEDURE.)

(See PREFERENTIAL ROUTES.)

(See STANDARD TERMINAL ARRIVAL.)

(Refer to CHART SUPPLEMENT U.S.)

(Refer to NOTICES TO AIRMEN PUBLICATION.)

**PRE-FLIGHT PILOT BRIEFING**–

(See PILOT BRIEFING.)

**PREVAILING VISIBILITY**–

(See VISIBILITY.)

**PRIMARY RADAR TARGET**– An analog or digital target, exclusive of a secondary radar target, presented on a radar display.

**PRM**–

(See ILS PRM APPROACH and PRECISION RUNWAY MONITOR SYSTEM.)

**PROCEDURAL CONTROL [ICAO]**– Term used to indicate that information derived from an ATS surveillance system is not required for the provision of air traffic control service.

**PROCEDURAL SEPARATION [ICAO]**– The separation used when providing procedural control.

**PROCEDURE TURN**– The maneuver prescribed when it is necessary to reverse direction to establish an aircraft 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. However, unless otherwise restricted, the point at which the turn may be commenced and the type and rate of turn are left to the discretion of the pilot.

(See ICAO term PROCEDURE TURN.)

**PROCEDURE TURN [ICAO]**– A maneuver in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Note 1: Procedure turns are designated “left” or “right” according to the direction of the initial turn.

Note 2: Procedure turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual approach procedure.

**PROCEDURE TURN INBOUND**– That point of a procedure turn maneuver where course reversal has been completed and an aircraft 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.

(See FINAL APPROACH COURSE.)

(See PROCEDURE TURN.)

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

**PROFILE DESCENT**– An uninterrupted descent (except where level flight is required for speed adjustment; e.g., 250 knots at 10,000 feet MSL) from cruising altitude/level to interception of a glideslope or to a minimum altitude specified for the initial or intermediate approach segment of a nonprecision instrument approach. The profile descent normally terminates at the approach gate or where the glideslope or other appropriate minimum altitude is intercepted.

**PROGRESS REPORT**–

(See POSITION REPORT.)

**PROGRESSIVE TAXI**– Precise taxi instructions given to a pilot unfamiliar with the airport or issued in stages as the aircraft proceeds along the taxi route.

**PROHIBITED AREA**–

(See SPECIAL USE AIRSPACE.)

(See ICAO term PROHIBITED AREA.)

**PROHIBITED AREA [ICAO]**– An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

**PROMINENT OBSTACLE**– An obstacle that meets one or more of the following conditions:

**a.** An obstacle which stands out beyond the adjacent surface of surrounding terrain and immediately projects a noticeable hazard to aircraft in flight.

**b.** An obstacle, not characterized as low and close in, whose height is no less than 300 feet above the departure end of takeoff runway (DER) elevation, is within 10NM from the DER, and that penetrates that airport/heliport's diverse departure obstacle clearance surface (OCS).

**c.** An obstacle beyond 10NM from an airport/heliport that requires an obstacle departure procedure (ODP) to ensure obstacle avoidance.

(See OBSTACLE.)

(See OBSTRUCTION.)

**PROPOSED BOUNDARY CROSSING TIME**– Each center has a PBCT parameter for each internal airport. Proposed internal flight plans are transmitted to the adjacent center if the flight time along the proposed route from the departure airport to the center boundary is less than or equal to the value of PBCT or if airport adaptation specifies transmission regardless of PBCT.

**PROPOSED DEPARTURE TIME**– The time that the aircraft expects to become airborne.

**PROTECTED AIRSPACE**– The airspace on either side of an oceanic route/track that is equal to one-half

the lateral separation minimum except where reduction of protected airspace has been authorized.

**PROTECTED SEGMENT**- The protected segment is a segment on the amended TFM route that is to be inhibited from automatic adapted route alteration by ERAM.

**PT**–

(See PROCEDURE TURN.)

**PTP**–

(See POINT-TO-POINT.)

**PTS**–

(See POLAR TRACK STRUCTURE.)

**PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT**– A segment on an IAP chart annotated as “Fly Visual to Airport” or “Fly Visual.” A dashed arrow will indicate the visual flight path on the profile and plan view with an associated note on the approximate heading and distance. The visual segment should be flown as a dead reckoning course while maintaining visual conditions.

**PUBLISHED ROUTE**– A route for which an IFR altitude has been established and published; e.g., Federal Airways, Jet Routes, Area Navigation Routes, Specified Direct Routes.

**PWS**–

(See PREDICTIVE WIND SHEAR ALERT SYSTEM.)





# Q

**Q ROUTE**– ‘Q’ is the designator assigned to published RNAV routes used by the United States.

**QNE**– The barometric pressure used for the standard altimeter setting (29.92 inches Hg.).

**QNH**– The barometric pressure as reported by a particular station.

**QUADRANT**– A quarter part of a circle, centered on a NAVAID, oriented clockwise from magnetic north

as follows: NE quadrant 000-089, SE quadrant 090-179, SW quadrant 180-269, NW quadrant 270-359.

**QUEUING**–  
(See STAGING/QUEUING.)

**QUICK LOOK**– A feature of the EAS and ARTS which provides the controller the capability to display full data blocks of tracked aircraft from other control positions.



# R

**RADAR**– A device which, by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation, provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulses.

**a. Primary Radar**– A radar system in which a minute portion of a radio pulse transmitted from a site is reflected by an object and then received back at that site for processing and display at an air traffic control facility.

**b. Secondary Radar/Radar Beacon (ATCRBS)**– A radar system in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching transmitter/receiver (interrogator) site are received in the cooperative equipment and used to trigger a distinctive transmission from the transponder. This reply transmission, rather than a reflected signal, is then received back at the transmitter/receiver site for processing and display at an air traffic control facility.

(See INTERROGATOR.)

(See TRANSPONDER.)

(See ICAO term RADAR.)

(Refer to AIM.)

**RADAR [ICAO]**– A radio detection device which provides information on range, azimuth and/or elevation of objects.

**a. Primary Radar**– Radar system which uses reflected radio signals.

**b. Secondary Radar**– Radar system wherein a radio signal transmitted from a radar station initiates the transmission of a radio signal from another station.

**RADAR ADVISORY**– The provision of advice and information based on radar observations.

(See ADVISORY SERVICE.)

**RADAR ALTIMETER**–

(See RADIO ALTIMETER.)

**RADAR APPROACH**– An instrument approach procedure which utilizes Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR).

(See AIRPORT SURVEILLANCE RADAR.)

(See INSTRUMENT APPROACH PROCEDURE.)

(See PRECISION APPROACH RADAR.)

(See SURVEILLANCE APPROACH.)

(See ICAO term RADAR APPROACH.)

(Refer to AIM.)

**RADAR APPROACH [ICAO]**– An approach, executed by an aircraft, under the direction of a radar controller.

**RADAR APPROACH CONTROL FACILITY**– A terminal ATC facility that uses radar and nonradar capabilities to provide approach control services to aircraft arriving, departing, or transiting airspace controlled by the facility.

(See APPROACH CONTROL SERVICE.)

**a. Provides radar ATC services to aircraft operating in the vicinity of one or more civil and/or military airports in a terminal area. The facility may provide services of a ground controlled approach (GCA); i.e., ASR and PAR approaches. A radar approach control facility may be operated by FAA, USAF, US Army, USN, USMC, or jointly by FAA and a military service. Specific facility nomenclatures are used for administrative purposes only and are related to the physical location of the facility and the operating service generally as follows:**

**1. Army Radar Approach Control (ARAC) (Army).**

**2. Radar Air Traffic Control Facility (RATCF) (Navy/FAA).**

**3. Radar Approach Control (RAPCON) (Air Force/FAA).**

**4. Terminal Radar Approach Control (TRACON) (FAA).**

**5. Air Traffic Control Tower (ATCT) (FAA). (Only those towers delegated approach control authority.)**

**RADAR ARRIVAL**– An aircraft arriving at an airport served by a radar facility and in radar contact with the facility.

(See NONRADAR.)

**RADAR BEACON–**

(See RADAR.)

**RADAR CLUTTER [ICAO]–** The visual indication on a radar display of unwanted signals.

***RADAR CONTACT–***

**a.** Used by ATC to inform an aircraft that it is identified using an approved ATC surveillance source on an air traffic controller’s display and that radar flight following will be provided until radar service is terminated. Radar service may also be provided within the limits of necessity and capability. When a pilot is informed of “radar contact,” he/she automatically discontinues reporting over compulsory reporting points.

(See ATC SURVEILLANCE SOURCE.)

(See RADAR CONTACT LOST.)

(See RADAR FLIGHT FOLLOWING.)

(See RADAR SERVICE.)

(See RADAR SERVICE TERMINATED.)

(Refer to AIM.)

**b.** The term used to inform the controller that the aircraft is identified and approval is granted for the aircraft to enter the receiving controllers airspace.

(See ICAO term RADAR CONTACT.)

**RADAR CONTACT [ICAO]–** The situation which exists when the radar blip or radar position symbol of a particular aircraft is seen and identified on a radar display.

***RADAR CONTACT LOST–*** Used by ATC to inform a pilot that the surveillance data used to determine the aircraft’s position is no longer being received, or is no longer reliable and radar service is no longer being provided. The loss may be attributed to several factors including the aircraft merging with weather or ground clutter, the aircraft operating below radar line of sight coverage, the aircraft entering an area of poor radar return, failure of the aircraft’s equipment, or failure of the surveillance equipment.

(See CLUTTER.)

(See RADAR CONTACT.)

**RADAR ENVIRONMENT–** An area in which radar service may be provided.

(See ADDITIONAL SERVICES.)

(See RADAR CONTACT.)

(See RADAR SERVICE.)

(See TRAFFIC ADVISORIES.)

**RADAR FLIGHT FOLLOWING–** The observation of the progress of radar-identified aircraft, whose primary navigation is being provided by the pilot, wherein the controller retains and correlates the aircraft identity with the appropriate target or target symbol displayed on the radar scope.

(See RADAR CONTACT.)

(See RADAR SERVICE.)

(Refer to AIM.)

**RADAR IDENTIFICATION–** The process of ascertaining that an observed radar target is the radar return from a particular aircraft.

(See RADAR CONTACT.)

(See RADAR SERVICE.)

**RADAR IDENTIFIED AIRCRAFT–** An aircraft, the position of which has been correlated with an observed target or symbol on the radar display.

(See RADAR CONTACT.)

(See RADAR CONTACT LOST.)

**RADAR MONITORING–**

(See RADAR SERVICE.)

**RADAR NAVIGATIONAL GUIDANCE–**

(See RADAR SERVICE.)

**RADAR POINT OUT–** An action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

**RADAR REQUIRED–** A term displayed on charts and approach plates and included in FDC NOTAMS to alert pilots that segments of either an instrument approach procedure or a route are not navigable because of either the absence or unusability of a NAVAID. The pilot can expect to be provided radar navigational guidance while transiting segments labeled with this term.

(See RADAR ROUTE.)

(See RADAR SERVICE.)

**RADAR ROUTE–** A flight path or route over which an aircraft is vectored. Navigational guidance and altitude assignments are provided by ATC.

(See FLIGHT PATH.)

(See ROUTE.)

**RADAR SEPARATION–**

(See RADAR SERVICE.)

**RADAR SERVICE–** A term which encompasses one or more of the following services based on the use of

radar which can be provided by a controller to a pilot of a radar identified aircraft.

**a. Radar Monitoring**– The radar flight-following of aircraft, whose primary navigation is being performed by the pilot, to observe and note deviations from its authorized flight path, airway, or route. When being applied specifically to radar monitoring of instrument approaches; i.e., with precision approach radar (PAR) or radar monitoring of simultaneous ILS, RNAV and GLS approaches, it includes advice and instructions whenever an aircraft nears or exceeds the prescribed PAR safety limit or simultaneous ILS RNAV and GLS no transgression zone.

(See ADDITIONAL SERVICES.)

(See TRAFFIC ADVISORIES.)

**b. Radar Navigational Guidance**– Vectoring aircraft to provide course guidance.

**c. Radar Separation**– Radar spacing of aircraft in accordance with established minima.

(See ICAO term RADAR SERVICE.)

**RADAR SERVICE [ICAO]**– Term used to indicate a service provided directly by means of radar.

**a. Monitoring**– The use of radar for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path.

**b. Separation**– The separation used when aircraft position information is derived from radar sources.

***RADAR SERVICE TERMINATED***– Used by ATC to inform a pilot that he/she will no longer be provided any of the services that could be received while in radar contact. Radar service is automatically terminated, and the pilot is not advised in the following cases:

**a.** An aircraft cancels its IFR flight plan, except within Class B airspace, Class C airspace, a TRSA, or where Basic Radar service is provided.

**b.** An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

**c.** An arriving VFR aircraft, receiving radar service to a tower-controlled airport within Class B airspace, Class C airspace, a TRSA, or where sequencing service is provided, has landed; or to all other airports, is instructed to change to tower or advisory frequency.

**d.** An aircraft completes a radar approach.

**RADAR SURVEILLANCE**– The radar observation of a given geographical area for the purpose of performing some radar function.

**RADAR TRAFFIC ADVISORIES**– Advisories issued to alert pilots to known or observed radar traffic which may affect the intended route of flight of their aircraft.

(See TRAFFIC ADVISORIES.)

**RADAR TRAFFIC INFORMATION SERVICE**–

(See TRAFFIC ADVISORIES.)

**RADAR VECTORING [ICAO]**– Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

**RADIAL**– A magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

**RADIO**–

**a.** A device used for communication.

**b.** Used to refer to a flight service station; e.g., “Seattle Radio” is used to call Seattle FSS.

**RADIO ALTIMETER**– Aircraft equipment which makes use of the reflection of radio waves from the ground to determine the height of the aircraft above the surface.

**RADIO BEACON**–

(See NONDIRECTIONAL BEACON.)

**RADIO DETECTION AND RANGING**–

(See RADAR.)

**RADIO MAGNETIC INDICATOR**– An aircraft navigational instrument coupled with a gyro compass or similar compass that indicates the direction of a selected NAVAID and indicates bearing with respect to the heading of the aircraft.

**RAIS**–

(See REMOTE AIRPORT INFORMATION SERVICE.)

**RAMP**–

(See APRON.)

**RANDOM ALTITUDE**– An altitude inappropriate for direction of flight and/or not in accordance with FAA Order JO 7110.65, Paragraph 4–5–1, VERTICAL SEPARATION MINIMA.

**RANDOM ROUTE**– Any route not established or charted/published or not otherwise available to all users.

**RC**–

(See ROAD RECONNAISSANCE.)

**RCAG–**

(See REMOTE COMMUNICATIONS AIR/GROUND FACILITY.)

**RCC–**

(See RESCUE COORDINATION CENTER.)

**RCO–**

(See REMOTE COMMUNICATIONS OUTLET.)

**RCR–**

(See RUNWAY CONDITION READING.)

**READ BACK–** Repeat my message back to me.

**RECEIVER AUTONOMOUS INTEGRITY MONITORING (RAIM)–** A technique whereby a civil GNSS receiver/processor determines the integrity of the GNSS navigation signals without reference to sensors or non-DoD integrity systems other than the receiver itself. This determination is achieved by a consistency check among redundant pseudorange measurements.

**RECEIVING CONTROLLER–** A controller/facility receiving control of an aircraft from another controller/facility.

**RECEIVING FACILITY–**

(See RECEIVING CONTROLLER.)

**RECONFORMANCE–** The automated process of bringing an aircraft's Current Plan Trajectory into conformance with its track.

**REDUCE SPEED TO (SPEED)–**

(See SPEED ADJUSTMENT.)

**REIL–**

(See RUNWAY END IDENTIFIER LIGHTS.)

**RELEASE TIME–** A departure time restriction issued to a pilot by ATC (either directly or through an authorized relay) when necessary to separate a departing aircraft from other traffic.

(See ICAO term RELEASE TIME.)

**RELEASE TIME [ICAO]–** Time prior to which an aircraft should be given further clearance or prior to which it should not proceed in case of radio failure.

**REMOTE AIRPORT INFORMATION SERVICE (RAIS)–** A temporary service provided by facilities, which are not located on the landing airport, but have communication capability and automated weather reporting available to the pilot at the landing airport.

**REMOTE COMMUNICATIONS AIR/GROUND FACILITY–** An unmanned VHF/UHF transmitter/receiver facility which is used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. RCAG facilities are sometimes not equipped with emergency frequencies 121.5 MHz and 243.0 MHz.

(Refer to AIM.)

**REMOTE COMMUNICATIONS OUTLET (RCO)–** An unmanned communications facility remotely controlled by air traffic personnel. RCOs serve FSSs. Remote Transmitter/Receivers (RTR) serve terminal ATC facilities. An RCO or RTR may be UHF or VHF and will extend the communication range of the air traffic facility. There are several classes of RCOs and RTRs. The class is determined by the number of transmitters or receivers. Classes A through G are used primarily for air/ground purposes. RCO and RTR class O facilities are nonprotected outlets subject to undetected and prolonged outages. RCO (O's) and RTR (O's) were established for the express purpose of providing ground-to-ground communications between air traffic control specialists and pilots located at a satellite airport for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times. As a secondary function, they may be used for advisory purposes whenever the aircraft is below the coverage of the primary air/ground frequency.

**REMOTE TRANSMITTER/RECEIVER (RTR)–**

(See REMOTE COMMUNICATIONS OUTLET.)

**REPORT–** Used to instruct pilots to advise ATC of specified information; e.g., "Report passing Hamilton VOR."

**REPORTING POINT–** A geographical location in relation to which the position of an aircraft is reported.

(See COMPULSORY REPORTING POINTS.)

(See ICAO term REPORTING POINT.)

(Refer to AIM.)

**REPORTING POINT [ICAO]–** A specified geographical location in relation to which the position of an aircraft can be reported.

**REQUEST FULL ROUTE CLEARANCE–** Used by pilots to request that the entire route of flight be read verbatim in an ATC clearance. Such request should be made to preclude receiving an ATC clearance based on the original filed flight plan when

a filed IFR flight plan has been revised by the pilot, company, or operations prior to departure.

**REQUIRED NAVIGATION PERFORMANCE (RNP)**– A statement of the navigational performance necessary for operation within a defined airspace. The following terms are commonly associated with RNP:

**a. Required Navigation Performance Level or Type (RNP-X).** A value, in nautical miles (NM), from the intended horizontal position within which an aircraft would be at least 95-percent of the total flying time.

**b. Required Navigation Performance (RNP) Airspace.** A generic term designating airspace, route(s), leg(s), operation(s), or procedure(s) where minimum required navigational performance (RNP) have been established.

**c. Actual Navigation Performance (ANP).** A measure of the current estimated navigational performance. Also referred to as Estimated Position Error (EPE).

**d. Estimated Position Error (EPE).** A measure of the current estimated navigational performance. Also referred to as Actual Navigation Performance (ANP).

**e. Lateral Navigation (LNAV).** A function of area navigation (RNAV) equipment which calculates, displays, and provides lateral guidance to a profile or path.

**f. Vertical Navigation (VNAV).** A function of area navigation (RNAV) equipment which calculates, displays, and provides vertical guidance to a profile or path.

**RESCUE COORDINATION CENTER (RCC)**– A search and rescue (SAR) facility equipped and manned to coordinate and control SAR operations in an area designated by the SAR plan. The U.S. Coast Guard and the U.S. Air Force have responsibility for the operation of RCCs.

(See ICAO term **RESCUE CO-ORDINATION CENTRE**.)

**RESCUE CO-ORDINATION CENTRE [ICAO]**– A unit responsible for promoting efficient organization of search and rescue service and for coordinating the conduct of search and rescue operations within a search and rescue region.

**RESOLUTION ADVISORY**– A display indication given to the pilot by the Traffic alert and Collision

Avoidance System (TCAS II) recommending a maneuver to increase vertical separation relative to an intruding aircraft. Positive, negative, and vertical speed limit (VSL) advisories constitute the resolution advisories. A resolution advisory is also classified as corrective or preventive.

**RESTRICTED AREA**–

(See **SPECIAL USE AIRSPACE**.)

(See ICAO term **RESTRICTED AREA**.)

**RESTRICTED AREA [ICAO]**– An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

**RESUME NORMAL SPEED**– Used by ATC to advise a pilot to resume an aircraft's normal operating speed. It is issued to terminate a speed adjustment where no published speed restrictions apply. It does not delete speed restrictions in published procedures of upcoming segments of flight. This does not relieve the pilot of those speed restrictions that are applicable to 14 CFR Section 91.117.

**RESUME OWN NAVIGATION**– Used by ATC to advise a pilot to resume his/her own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored.

(See **RADAR CONTACT LOST**.)

(See **RADAR SERVICE TERMINATED**.)

**RESUME PUBLISHED SPEED**– Used by ATC to advise a pilot to resume published speed restrictions that are applicable to a SID, STAR, or other instrument procedure. It is issued to terminate a speed adjustment where speed restrictions are published on a charted procedure.

**RMI**–

(See **RADIO MAGNETIC INDICATOR**.)

**RNAV**–

(See **AREA NAVIGATION (RNAV)**.)

**RNAV APPROACH**– An instrument approach procedure which relies on aircraft area navigation equipment for navigational guidance.

(See **AREA NAVIGATION (RNAV)**.)

(See **INSTRUMENT APPROACH PROCEDURE**.)

**ROAD RECONNAISSANCE (RC)**– Military activity requiring navigation along roads, railroads, and

ivers. Reconnaissance route/route segments are seldom along a straight line and normally require a lateral route width of 10 NM to 30 NM and an altitude range of 500 feet to 10,000 feet AGL.

**ROGER**– I have received all of your last transmission. It should not be used to answer a question requiring a yes or a no answer.

(See AFFIRMATIVE.)

(See NEGATIVE.)

**ROLLOUT RVR**–

(See VISIBILITY.)

**ROUTE**– A defined path, consisting of one or more courses in a horizontal plane, which aircraft traverse over the surface of the earth.

(See AIRWAY.)

(See JET ROUTE.)

(See PUBLISHED ROUTE.)

(See UNPUBLISHED ROUTE.)

**ROUTE ACTION NOTIFICATION**– EDST notification that a PAR/PDR/PDAR has been applied to the flight plan.

(See ATC PREFERRED ROUTE NOTIFICATION.)

(See EN ROUTE DECISION SUPPORT TOOL.)

**ROUTE SEGMENT**– As used in Air Traffic Control, a part of a route that can be defined by two navigational fixes, two NAVAIDs, or a fix and a NAVAID.

(See FIX.)

(See ROUTE.)

(See ICAO term ROUTE SEGMENT.)

**ROUTE SEGMENT [ICAO]**– A portion of a route to be flown, as defined by two consecutive significant points specified in a flight plan.

**RSA**–

(See RUNWAY SAFETY AREA.)

**RTR**–

(See REMOTE TRANSMITTER/RECEIVER.)

**RUNWAY**– A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees; e.g., Runway 1, Runway 25.

(See PARALLEL RUNWAYS.)

(See ICAO term RUNWAY.)

**RUNWAY [ICAO]**– A defined rectangular area on a land aerodrome prepared for the landing and takeoff of aircraft.

**RUNWAY CENTERLINE LIGHTING**–

(See AIRPORT LIGHTING.)

**RUNWAY CONDITION CODES (RwyCC)**– Numerical readings, provided by airport operators, that indicate runway surface contamination (for example, slush, ice, rain, etc.). These values range from “1” (poor) to “6” (dry) and must be included on the ATIS when the reportable condition is less than 6 in any one or more of the three runway zones (touchdown, midpoint, rollout).

**RUNWAY CONDITION READING**– Numerical decelerometer readings relayed by air traffic controllers at USAF and certain civil bases for use by the pilot in determining runway braking action. These readings are routinely relayed only to USAF and Air National Guard Aircraft.

(See BRAKING ACTION.)

**RUNWAY CONDITION REPORT (RwyCR)**– A data collection worksheet used by airport operators that correlates the runway percentage of coverage along with the depth and type of contaminant for the purpose of creating a FICON NOTAM.

(See RUNWAY CONDITION CODES.)

**RUNWAY END IDENTIFIER LIGHTS (REIL)**–

(See AIRPORT LIGHTING.)

**RUNWAY ENTRANCE LIGHTS (REL)**–An array of red lights which include the first light at the hold line followed by a series of evenly spaced lights to the runway edge aligned with the taxiway centerline, and one additional light at the runway centerline in line with the last two lights before the runway edge.

**RUNWAY GRADIENT**– The average slope, measured in percent, between two ends or points on a runway. Runway gradient is depicted on Government aerodrome sketches when total runway gradient exceeds 0.3%.

**RUNWAY HEADING**– The magnetic direction that corresponds with the runway centerline extended, not the painted runway number. When cleared to “fly or maintain runway heading,” pilots are expected to fly or maintain the heading that corresponds with the extended centerline of the departure runway. Drift correction shall not be applied; e.g., Runway 4, actual magnetic heading of the runway centerline 044, fly 044.



**RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY**– Any runway or runways currently being used for takeoff or landing. When multiple runways are used, they are all considered active runways. In the metering sense, a selectable adapted item which specifies the landing runway configuration or direction of traffic flow. The adapted optimum flight plan from each transition fix to the vertex is determined by the runway configuration for arrival metering processing purposes.

**RUNWAY LIGHTS**–

(See AIRPORT LIGHTING.)

**RUNWAY MARKINGS**–

(See AIRPORT MARKING AIDS.)

**RUNWAY OVERRUN**– In military aviation exclusively, a stabilized or paved area beyond the end of a runway, of the same width as the runway plus shoulders, centered on the extended runway centerline.

**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 en route 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.

(Refer to AIM.)

**RUNWAY SAFETY AREA**– A defined surface surrounding the runway prepared, or suitable, for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The dimensions of the RSA vary and can be determined by using the criteria contained within AC 150/5300-13, Airport Design, Chapter 3. Figure 3–1 in AC 150/5300-13 depicts the RSA. The design standards dictate that the RSA shall be:

- a.** Cleared, graded, and have no potentially hazardous ruts, humps, depressions, or other surface variations;
- b.** Drained by grading or storm sewers to prevent water accumulation;
- c.** Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of

aircraft without causing structural damage to the aircraft; and,

- d.** Free of objects, except for objects that need to be located in the runway safety area because of their function. These objects shall be constructed on low impact resistant supports (frangible mounted structures) to the lowest practical height with the frangible point no higher than 3 inches above grade.

(Refer to AC 150/5300-13, Airport Design, Chapter 3.)

**RUNWAY STATUS LIGHTS (RWSL) SYSTEM**– The RWSL is a system of runway and taxiway lighting to provide pilots increased situational awareness by illuminating runway entry lights (REL) when the runway is unsafe for entry or crossing, and take-off hold lights (THL) when the runway is unsafe for departure.

**RUNWAY TRANSITION**–

**a.** Conventional STARs/SIDs. The portion of a STAR/SID that serves a particular runway or runways at an airport.

**b.** RNAV STARs/SIDs. Defines a path(s) from the common route to the final point(s) on a STAR. For a SID, the common route that serves a particular runway or runways at an airport.

**RUNWAY USE PROGRAM**– A noise abatement runway selection plan designed to enhance noise abatement efforts with regard to airport communities for arriving and departing aircraft. These plans are developed into runway use programs and apply to all turbojet aircraft 12,500 pounds or heavier; turbojet aircraft less than 12,500 pounds are included only if the airport proprietor determines that the aircraft creates a noise problem. Runway use programs are coordinated with FAA offices, and safety criteria used in these programs are developed by the Office of Flight Operations. Runway use programs are administered by the Air Traffic Service as “Formal” or “Informal” programs.

**a.** Formal Runway Use Program– An approved noise abatement program which is defined and acknowledged in a Letter of Understanding between Flight Operations, Air Traffic Service, the airport proprietor, and the users. Once established, participation in the program is mandatory for aircraft operators and pilots as provided for in 14 CFR Section 91.129.

**b.** Informal Runway Use Program– An approved noise abatement program which does not require a

Letter of Understanding, and participation in the program is voluntary for aircraft operators/pilots.

RUNWAY VISIBILITY VALUE (RVV)–  
(See VISIBILITY.)

RUNWAY VISUAL RANGE (RVR)–  
(See VISIBILITY.)

RwyCC–  
(See RUNWAY CONDITION CODES.)

RwyCR–  
(See RUNWAY CONDITION REPORT.)

# S

## SAA–

(See SPECIAL ACTIVITY AIRSPACE.)

**SAFETY ALERT–** A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller’s judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. The controller may discontinue the issuance of further alerts if the pilot advises he/she is taking action to correct the situation or has the other aircraft in sight.

**a. Terrain/Obstruction Alert–** A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller’s judgment, places the aircraft in unsafe proximity to terrain/obstructions; e.g., “Low Altitude Alert, check your altitude immediately.”

**b. Aircraft Conflict Alert–** A safety alert issued by ATC to aircraft under their control if ATC is aware of an aircraft that is not under their control at an altitude which, in the controller’s judgment, places both aircraft in unsafe proximity to each other. With the alert, ATC will offer the pilot an alternate course of action when feasible; e.g., “Traffic Alert, advise you turn right heading zero niner zero or climb to eight thousand immediately.”

**Note:** The issuance of a safety alert is contingent upon the capability of the controller to have an awareness of an unsafe condition. The course of action provided will be predicated on other traffic under ATC control. Once the alert is issued, it is solely the pilot’s prerogative to determine what course of action, if any, he/she will take.

**SAFETY LOGIC SYSTEM–** A software enhancement to ASDE–3, ASDE–X, and ASSC, that predicts the path of aircraft landing and/or departing, and/or vehicular movements on runways. Visual and aural alarms are activated when the safety logic projects a potential collision. The Airport Movement Area Safety System (AMASS) is a safety logic system enhancement to the ASDE–3. The Safety Logic System for ASDE–X and ASSC is an integral part of the software program.

## SAFETY LOGIC SYSTEM ALERTS–

**a. ALERT–** An actual situation involving two real safety logic tracks (aircraft/aircraft, aircraft/vehicle,

or aircraft/other tangible object) that safety logic has predicted will result in an imminent collision, based upon the current set of Safety Logic parameters.

### **b. FALSE ALERT–**

**1.** Alerts generated by one or more false surface–radar targets that the system has interpreted as real tracks and placed into safety logic.

**2.** Alerts in which the safety logic software did not perform correctly, based upon the design specifications and the current set of Safety Logic parameters.

**3.** The alert is generated by surface radar targets caused by moderate or greater precipitation.

**c. NUISANCE ALERT–** An alert in which one or more of the following is true:

**1.** The alert is generated by a known situation that is not considered an unsafe operation, such as LAHSO or other approved operations.

**2.** The alert is generated by inaccurate secondary radar data received by the Safety Logic System.

**3.** One or more of the aircraft involved in the alert is not intending to use a runway (for example, helicopter, pipeline patrol, non–Mode C overflight, etc.).

**d. VALID NON–ALERT–** A situation in which the safety logic software correctly determines that an alert is not required, based upon the design specifications and the current set of Safety Logic parameters.

**e. INVALID NON–ALERT–** A situation in which the safety logic software did not issue an alert when an alert was required, based upon the design specifications.

**SAIL BACK–** A maneuver during high wind conditions (usually with power off) where float plane movement is controlled by water rudders/opening and closing cabin doors.

**SAME DIRECTION AIRCRAFT–** Aircraft are operating in the same direction when:

**a.** They are following the same track in the same direction; or

**b.** Their tracks are parallel and the aircraft are flying in the same direction; or

**c.** Their tracks intersect at an angle of less than 45 degrees.

**SAR**–

(See **SEARCH AND RESCUE**.)

**SAY AGAIN**– Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received; e.g., “Say again all after **ABRAM VOR**.”

**SAY ALTITUDE**– Used by ATC to ascertain an aircraft’s specific altitude/flight level. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.

**SAY HEADING**– Used by ATC to request an aircraft heading. The pilot should state the actual heading of the aircraft.

**SCHEDULED TIME OF ARRIVAL (STA)**– A STA is the desired time that an aircraft should cross a certain point (landing or metering fix). It takes other traffic and airspace configuration into account. A STA time shows the results of the TBFM scheduler that has calculated an arrival time according to parameters such as optimized spacing, aircraft performance, and weather.

**SDF**–

(See **SIMPLIFIED DIRECTIONAL FACILITY**.)

**SEA LANE**– A designated portion of water outlined by visual surface markers for and intended to be used by aircraft designed to operate on water.

**SEARCH AND RESCUE**– A service which seeks missing aircraft and assists those found to be in need of assistance. It is a cooperative effort using the facilities and services of available Federal, state and local agencies. The U.S. Coast Guard is responsible for coordination of search and rescue for the Maritime Region, and the U.S. Air Force is responsible for search and rescue for the Inland Region. Information pertinent to search and rescue should be passed through any air traffic facility or be transmitted directly to the Rescue Coordination Center by telephone.

(See **FLIGHT SERVICE STATION**.)

(See **RESCUE COORDINATION CENTER**.)

(Refer to **AIM**.)

**SEARCH AND RESCUE FACILITY**– A facility responsible for maintaining and operating a search and rescue (SAR) service to render aid to persons and property in distress. It is any SAR unit, station, NET, or other operational activity which can be usefully

employed during an SAR Mission; e.g., a Civil Air Patrol Wing, or a Coast Guard Station.

(See **SEARCH AND RESCUE**.)

**SECNOT**–

(See **SECURITY NOTICE**.)

**SECONDARY RADAR TARGET**– A target derived from a transponder return presented on a radar display.

**SECTIONAL AERONAUTICAL CHARTS**–

(See **AERONAUTICAL CHART**.)

**SECTOR LIST DROP INTERVAL**– A parameter number of minutes after the meter fix time when arrival aircraft will be deleted from the arrival sector list.

**SECURITY NOTICE (SECNOT)** – A SECNOT is a request originated by the Air Traffic Security Coordinator (ATSC) for an extensive communications search for aircraft involved, or suspected of being involved, in a security violation, or are considered a security risk. A SECNOT will include the aircraft identification, search area, and expiration time. The search area, as defined by the ATSC, could be a single airport, multiple airports, a radius of an airport or fix, or a route of flight. Once the expiration time has been reached, the SECNOT is considered to be cancelled.

**SECURITY SERVICES AIRSPACE** – Areas established through the regulatory process or by NOTAM, issued by the Administrator under title 14, CFR, sections 99.7, 91.141, and 91.139, which specify that ATC security services are required; i.e., ADIZ or temporary flight rules areas.

**SEE AND AVOID**– When weather conditions permit, pilots operating IFR or VFR are required to observe and maneuver to avoid other aircraft. Right-of-way rules are contained in 14 CFR Part 91.

**SEGMENTED CIRCLE**– A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

(Refer to **AIM**.)

**SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE**– An instrument approach procedure may have as many as four separate segments depending on how the approach procedure is structured.

**a. Initial Approach**– The segment between the initial approach fix and the intermediate fix or the

point where the aircraft is established on the intermediate course or final approach course.

(See ICAO term INITIAL APPROACH SEGMENT.)

**b. Intermediate Approach**– The segment between the intermediate fix or point and the final approach fix.

(See ICAO term INTERMEDIATE APPROACH SEGMENT.)

**c. Final Approach**– The segment between the final approach fix or point and the runway, airport, or missed approach point.

(See ICAO term FINAL APPROACH SEGMENT.)

**d. Missed Approach**– The segment between the missed approach point or the point of arrival at decision height and the missed approach fix at the prescribed altitude.

(Refer to 14 CFR Part 97.)

(See ICAO term MISSED APPROACH PROCEDURE.)

**SEPARATION**– In air traffic control, the spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.

(See SEPARATION MINIMA.)

(See ICAO term SEPARATION.)

**SEPARATION [ICAO]**– Spacing between aircraft, levels or tracks.

**SEPARATION MINIMA**– The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

(See SEPARATION.)

**SERVICE**– A generic term that designates functions or assistance available from or rendered by air traffic control. For example, Class C service would denote the ATC services provided within a Class C airspace area.

**SEVERE WEATHER AVOIDANCE PLAN (SWAP)**– An approved plan to minimize the affect of severe weather on traffic flows in impacted terminal and/or ARTCC areas. A SWAP is normally implemented to provide the least disruption to the ATC system when flight through portions of airspace is difficult or impossible due to severe weather.

**SEVERE WEATHER FORECAST ALERTS**– Preliminary messages issued in order to alert users that a Severe Weather Watch Bulletin (WW) is being issued. These messages define areas of possible severe thunderstorms or tornado activity. The messages are unscheduled and issued as required by the Storm Prediction Center (SPC) at Norman, Oklahoma.

(See AIRMET.)

(See CONVECTIVE SIGMET.)

(See CWA.)

(See SIGMET.)

**SFA**–

(See SINGLE FREQUENCY APPROACH.)

**SFO**–

(See SIMULATED FLAMEOUT.)

**SHF**–

(See SUPER HIGH FREQUENCY.)

**SHORT RANGE CLEARANCE**– A clearance issued to a departing IFR flight which authorizes IFR flight to a specific fix short of the destination while air traffic control facilities are coordinating and obtaining the complete clearance.

**SHORT TAKEOFF AND LANDING AIRCRAFT (STOL)**– An aircraft which, at some weight within its approved operating weight, is capable of operating from a runway in compliance with the applicable STOL characteristics, airworthiness, operations, noise, and pollution standards.

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT.)

**SIAP**–

(See STANDARD INSTRUMENT APPROACH PROCEDURE.)

**SID**–

(See STANDARD INSTRUMENT DEPARTURE.)

**SIDESTEP MANEUVER**– A visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than 1,200 feet to either side of the runway to which the instrument approach was conducted.

(Refer to AIM.)

**SIGMET**– A weather advisory issued concerning weather significant to the safety of all aircraft.

SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles.

(See AIRMET.)

(See AWW.)

(See CONVECTIVE SIGMET.)

(See CWA.)

(See ICAO term SIGMET INFORMATION.)

(Refer to AIM.)

**SIGMET INFORMATION [ICAO]**– Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

***SIGNIFICANT METEOROLOGICAL INFORMATION***–

(See SIGMET.)

**SIGNIFICANT POINT**– A point, whether a named intersection, a NAVAID, a fix derived from a NAVAID(s), or geographical coordinate expressed in degrees of latitude and longitude, which is established for the purpose of providing separation, as a reporting point, or to delineate a route of flight.

**SIMPLIFIED DIRECTIONAL FACILITY (SDF)**– A NAVAID used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.

(Refer to AIM.)

**SIMULATED FLAMEOUT**– A practice approach by a jet aircraft (normally military) at idle thrust to a runway. The approach may start at a runway (high key) and may continue on a relatively high and wide downwind leg with a continuous turn to final. It terminates in landing or low approach. The purpose of this approach is to simulate a flameout.

(See FLAMEOUT.)

**SIMULTANEOUS CLOSE PARALLEL APPROACHES**– A simultaneous, independent approach operation permitting ILS/RNAV/GLS approaches to airports having parallel runways separated by at least 3,000 feet and less than 4,300–feet between centerlines. Aircraft are permitted to pass each other during these simultaneous operations. Integral parts of a total system are radar, NTZ monitoring with enhanced FMA color displays

that include aural and visual alerts and predictive aircraft position software, communications override, ATC procedures, an Attention All Users Page (AAUP), PRM in the approach name, and appropriate ground based and airborne equipment. High update rate surveillance sensor required for certain runway or approach course separations.

**SIMULTANEOUS (CONVERGING) DEPENDENT APPROACHES**– An approach operation permitting ILS/RNAV/GLS approaches to runways or missed approach courses that intersect where required minimum spacing between the aircraft on each final approach course is required.

**SIMULTANEOUS (CONVERGING) INDEPENDENT APPROACHES**– An approach operation permitting ILS/RNAV/GLS approaches to non-parallel runways where approach procedure design maintains the required aircraft spacing throughout the approach and missed approach and hence the operations may be conducted independently.

**SIMULTANEOUS ILS APPROACHES**– An approach system permitting simultaneous ILS approaches to airports having parallel runways separated by at least 4,300 feet between centerlines. Integral parts of a total system are ILS, radar, communications, ATC procedures, and appropriate airborne equipment.

(See PARALLEL RUNWAYS.)

(Refer to AIM.)

**SIMULTANEOUS OFFSET INSTRUMENT APPROACH (SOIA)**– An instrument landing system comprised of an ILS PRM, RNAV PRM or GLS PRM approach to one runway and an offset LDA PRM with glideslope or an RNAV PRM or GLS PRM approach utilizing vertical guidance to another where parallel runway spaced less than 3,000 feet and at least 750 feet apart. The approach courses converge by 2.5 to 3 degrees. Simultaneous close parallel PRM approach procedures apply up to the point where the approach course separation becomes 3,000 feet, at the offset MAP. From the offset MAP to the runway threshold, visual separation by the aircraft conducting the offset approach is utilized.

(Refer to AIM)

**SIMULTANEOUS (PARALLEL) DEPENDENT APPROACHES**– An approach operation permitting ILS/RNAV/GLS approaches to adjacent parallel runways where prescribed diagonal spacing must be maintained. Aircraft are not permitted to pass each

other during simultaneous dependent operations. Integral parts of a total system ATC procedures, and appropriate airborne and ground based equipment.

**SINGLE DIRECTION ROUTES**– Preferred IFR Routes which are sometimes depicted on high altitude en route charts and which are normally flown in one direction only.

(See PREFERRED IFR ROUTES.)

(Refer to CHART SUPPLEMENT U.S.)

**SINGLE FREQUENCY APPROACH**– A service provided under a letter of agreement to military single-piloted turbojet aircraft which permits use of a single UHF frequency during approach for landing. Pilots will not normally be required to change frequency from the beginning of the approach to touchdown except that pilots conducting an en route descent are required to change frequency when control is transferred from the air route traffic control center to the terminal facility. The abbreviation “SFA” in the DOD FLIP IFR Supplement under “Communications” indicates this service is available at an aerodrome.

**SINGLE-PILOTED AIRCRAFT**– A military turbojet aircraft possessing one set of flight controls, tandem cockpits, or two sets of flight controls but operated by one pilot is considered single-piloted by ATC when determining the appropriate air traffic service to be applied.

(See SINGLE FREQUENCY APPROACH.)

**SKYSPOTTER**– A pilot who has received specialized training in observing and reporting inflight weather phenomena.

**SLASH**– A radar beacon reply displayed as an elongated target.

**SLDI**–

(See SECTOR LIST DROP INTERVAL.)

**SLOT TIME**–

(See METER FIX TIME/SLOT TIME.)

**SLOW TAXI**– To taxi a float plane at low power or low RPM.

**SN**–

(See SYSTEM STRATEGIC NAVIGATION.)

**SPEAK SLOWER**– Used in verbal communications as a request to reduce speech rate.

**SPECIAL ACTIVITY AIRSPACE (SAA)**– Any airspace with defined dimensions within the National Airspace System wherein limitations may be imposed upon aircraft operations. This airspace may be restricted areas, prohibited areas, military operations areas, air ATC assigned airspace, and any other designated airspace areas. The dimensions of this airspace are programmed into EDST and can be designated as either active or inactive by screen entry. Aircraft trajectories are constantly tested against the dimensions of active areas and alerts issued to the applicable sectors when violations are predicted.

(See EN ROUTE DECISION SUPPORT TOOL.)

**SPECIAL AIR TRAFFIC RULES (SATR)**– Rules that govern procedures for conducting flights in certain areas listed in 14 CFR Part 93. The term “SATR” is used in the United States to describe the rules for operations in specific areas designated in the Code of Federal Regulations.

(Refer to 14 CFR Part 93.)

**SPECIAL EMERGENCY**– A condition of air piracy or other hostile act by a person(s) aboard an aircraft which threatens the safety of the aircraft or its passengers.

**SPECIAL FLIGHT RULES AREA (SFRA)**– An area in the NAS, described in 14 CFR Part 93, wherein the flight of aircraft is subject to special traffic rules, unless otherwise authorized by air traffic control. Not all areas listed in 14 CFR Part 93 are designated SFRA, but special air traffic rules apply to all areas described in 14 CFR Part 93.

**SPECIAL INSTRUMENT APPROACH PROCEDURE**–

(See INSTRUMENT APPROACH PROCEDURE.)

**SPECIAL USE AIRSPACE**– Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Types of special use airspace are:

**a. Alert Area**– Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations, and pilots of participating aircraft as well as pilots

transiting the area are equally responsible for collision avoidance.

**b. Controlled Firing Area**– Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.

**c. Military Operations Area (MOA)**– Permanent and temporary MOAs are airspace established outside of Class A airspace area to separate or segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. Permanent MOAs are depicted on Sectional Aeronautical, VFR Terminal Area, and applicable En Route Low Altitude Charts.

Note: Temporary MOAs are not charted.

(Refer to AIM.)

**d. Prohibited Area**– Airspace designated under 14 CFR Part 73 within which no person may operate an aircraft without the permission of the using agency.

(Refer to AIM.)

(Refer to En Route Charts.)

**e. Restricted Area**– Permanent and temporary restricted areas are airspace designated under 14 CFR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency. Permanent restricted areas are depicted on Sectional Aeronautical, VFR Terminal Area, and applicable En Route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown.

Note: Temporary restricted areas are not charted.

(Refer to 14 CFR Part 73.)

(Refer to AIM.)

**f. Warning Area**– A warning area is airspace of defined dimensions extending from 3 nautical miles outward from the coast of the United States, that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning area is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

**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 aircraft are permitted flight under visual flight rules.

(See SPECIAL VFR OPERATIONS.)

(Refer to 14 CFR Part 91.)

**SPECIAL VFR FLIGHT [ICAO]**– A VFR flight cleared by air traffic control to operate within Class B, C, D, and E surface areas in meteorological conditions below VMC.

**SPECIAL VFR OPERATIONS**– Aircraft operating in accordance with clearances within Class B, C, D, and E surface areas in weather conditions less than the basic VFR weather minima. Such operations must be requested by the pilot and approved by ATC.

(See SPECIAL VFR CONDITIONS.)

(See ICAO term SPECIAL VFR FLIGHT.)

**SPEED**–

(See AIRSPEED.)

(See GROUND SPEED.)

**SPEED ADJUSTMENT**– An ATC procedure used to request pilots to adjust aircraft speed to a specific value for the purpose of providing desired spacing. Pilots are expected to maintain a speed of plus or minus 10 knots or 0.02 Mach number of the specified speed. Examples of speed adjustments are:

**a.** “Increase/reduce speed to Mach point (number).”

**b.** “Increase/reduce speed to (speed in knots)” or “Increase/reduce speed (number of knots) knots.”

**SPEED BRAKES**– Moveable aerodynamic devices on aircraft that reduce airspeed during descent and landing.

**SPEED SEGMENTS**– Portions of the arrival route between the transition point and the vertex along the optimum flight path for which speeds and altitudes are specified. There is one set of arrival speed segments adapted from each transition point to each vertex. Each set may contain up to six segments.

**SQUAWK (Mode, Code, Function)**– Activate specific modes/codes/functions on the aircraft transponder; e.g., “Squawk three/alpha, two one zero five, low.”

(See TRANSPONDER.)

**STA**–

(See SCHEDULED TIME OF ARRIVAL.)

**STAGING/QUEUING**– The placement, integration, and segregation of departure aircraft in designated



movement areas of an airport by departure fix, EDCT, and/or restriction.

**STAND BY**– Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in “stand by for clearance.” The caller should reestablish contact if a delay is lengthy. “Stand by” is not an approval or denial.

**STANDARD INSTRUMENT APPROACH PROCEDURE (SIAP)**–

(See INSTRUMENT APPROACH PROCEDURE.)

**STANDARD INSTRUMENT DEPARTURE (SID)**– A preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement to expedite traffic flow and to reduce pilot/controller workload. ATC clearance must always be received prior to flying a SID.

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(See OBSTACLE DEPARTURE PROCEDURE.)

(Refer to AIM.)

**STANDARD RATE TURN**– A turn of three degrees per second.

**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 en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

**STANDARD TERMINAL ARRIVAL CHARTS**–

(See AERONAUTICAL CHART.)

**STANDARD TERMINAL AUTOMATION REPLACEMENT SYSTEM (STARS)**–

(See DTAS.)

**STAR**–

(See STANDARD TERMINAL ARRIVAL.)

**STATE AIRCRAFT**– Aircraft used in military, customs and police service, in the exclusive service of any government or of any political subdivision thereof, including the government of any state, territory, or possession of the United States or the

District of Columbia, but not including any government-owned aircraft engaged in carrying persons or property for commercial purposes.

**STATIC RESTRICTIONS**– Those restrictions that are usually not subject to change, fixed, in place, and/or published.

**STATIONARY RESERVATIONS**– Altitude reservations which encompass activities in a fixed area. Stationary reservations may include activities, such as special tests of weapons systems or equipment, certain U.S. Navy carrier, fleet, and anti-submarine operations, rocket, missile and drone operations, and certain aerial refueling or similar operations.

**STEP TAXI**– To taxi a float plane at full power or high RPM.

**STEP TURN**– A maneuver used to put a float plane in a planing configuration prior to entering an active sea lane for takeoff. The STEP TURN maneuver should only be used upon pilot request.

**STEPDOWN FIX**– A fix permitting additional descent within a segment of an instrument approach procedure by identifying a point at which a controlling obstacle has been safely overflown.

**STEREO ROUTE**– A routinely used route of flight established by users and ARTCCs identified by a coded name; e.g., ALPHA 2. These routes minimize flight plan handling and communications.

**STOL AIRCRAFT**–

(See SHORT TAKEOFF AND LANDING AIRCRAFT.)

**STOP ALTITUDE SQUAWK**– Used by ATC to inform an aircraft to turn off the automatic altitude reporting feature of its transponder. It is issued when the verbally reported altitude varies 300 feet or more from the automatic altitude report.

(See ALTITUDE READOUT.)

(See TRANSPONDER.)

**STOP AND GO**– A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point.

(See LOW APPROACH.)

(See OPTION APPROACH.)

**STOP BURST**–

(See STOP STREAM.)

**STOP BUZZER**–

(See STOP STREAM.)

**STOP SQUAWK (Mode or Code)**– Used by ATC to tell the pilot to turn specified functions of the aircraft transponder off.

(See STOP ALTITUDE SQUAWK.)

(See TRANSPONDER.)

**STOP STREAM**– Used by ATC to request a pilot to suspend electronic attack activity.

(See JAMMING.)

**STOPOVER FLIGHT PLAN**– A flight plan format which permits in a single submission the filing of a sequence of flight plans through interim full-stop destinations to a final destination.

**STOPWAY**– An area beyond the takeoff runway no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

**STRAIGHT-IN APPROACH IFR**– An instrument approach wherein final approach is begun without first having executed a procedure turn, not necessarily completed with a straight-in landing or made to straight-in landing minimums.

(See LANDING MINIMUMS.)

(See STRAIGHT-IN APPROACH VFR.)

(See STRAIGHT-IN LANDING.)

**STRAIGHT-IN APPROACH VFR**– Entry into the traffic pattern by interception of the extended runway centerline (final approach course) without executing any other portion of the traffic pattern.

(See TRAFFIC PATTERN.)

**STRAIGHT-IN LANDING**– A landing made on a runway aligned within 30° of the final approach course following completion of an instrument approach.

(See STRAIGHT-IN APPROACH IFR.)

**STRAIGHT-IN LANDING MINIMUMS**–

(See LANDING MINIMUMS.)

**STRAIGHT-IN MINIMUMS**–

(See STRAIGHT-IN LANDING MINIMUMS.)

**STRATEGIC PLANNING**– Planning whereby solutions are sought to resolve potential conflicts.

**SUBSTITUTE ROUTE**– A route assigned to pilots when any part of an airway or route is unusable because of NAVAID status. These routes consist of:

a. Substitute routes which are shown on U.S. Government charts.

b. Routes defined by ATC as specific NAVAID radials or courses.

c. Routes defined by ATC as direct to or between NAVAIDs.

**SUNSET AND SUNRISE**– The mean solar times of sunset and sunrise as published in the Nautical Almanac, converted to local standard time for the locality concerned. Within Alaska, the end of evening civil twilight and the beginning of morning civil twilight, as defined for each locality.

**SUPPLEMENTAL WEATHER SERVICE LOCATION**– Airport facilities staffed with contract personnel who take weather observations and provide current local weather to pilots via telephone or radio. (All other services are provided by the parent FSS.)

**SUPPS**– Refers to ICAO Document 7030 Regional Supplementary Procedures. SUPPS contain procedures for each ICAO Region which are unique to that Region and are not covered in the worldwide provisions identified in the ICAO Air Navigation Plan. Procedures contained in Chapter 8 are based in part on those published in SUPPS.

**SURFACE AREA**– The airspace contained by the lateral boundary of the Class B, C, D, or E airspace designated for an airport that begins at the surface and extends upward.

**SURPIC**– A description of surface vessels in the area of a Search and Rescue incident including their predicted positions and their characteristics.

(Refer to FAA Order JO 7110.65, Para 10–6–4, INFLIGHT CONTINGENCIES.)

**SURVEILLANCE APPROACH**– An instrument approach wherein the air traffic controller issues instructions, for pilot compliance, based on aircraft position in relation to the final approach course (azimuth), and the distance (range) from the end of the runway as displayed on the controller's radar scope. The controller will provide recommended altitudes on final approach if requested by the pilot.

(Refer to AIM.)

**SWAP**–

(See SEVERE WEATHER AVOIDANCE PLAN.)

SWSL-

(See SUPPLEMENTAL WEATHER SERVICE LOCATION.)

SYSTEM STRATEGIC NAVIGATION- Military activity accomplished by navigating along a

preplanned route using internal aircraft systems to maintain a desired track. This activity normally requires a lateral route width of 10 NM and altitude range of 1,000 feet to 6,000 feet AGL with some route segments that permit terrain following.



# T

## TACAN–

(See TACTICAL AIR NAVIGATION.)

**TACAN-ONLY AIRCRAFT**– An aircraft, normally military, possessing TACAN with DME but no VOR navigational system capability. Clearances must specify TACAN or VORTAC fixes and approaches.

**TACTICAL AIR NAVIGATION (TCAN)**– An ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

(See VORTAC.)

(Refer to AIM.)

**TAILWIND**– Any wind more than 90 degrees to the longitudinal axis of the runway. The magnetic direction of the runway shall be used as the basis for determining the longitudinal axis.

## TAKEOFF AREA–

(See LANDING AREA.)

**TAKEOFF DISTANCE AVAILABLE (TODA)**– The takeoff run available plus the length of any remaining runway or clearway beyond the far end of the takeoff run available.

(See ICAO term TAKEOFF DISTANCE AVAILABLE.)

**TAKEOFF DISTANCE AVAILABLE [ICAO]**– The length of the takeoff run available plus the length of the clearway, if provided.

**TAKEOFF HOLD LIGHTS (THL)**– The THL system is composed of in-pavement lighting in a double, longitudinal row of lights aligned either side of the runway centerline. The lights are focused toward the arrival end of the runway at the “line up and wait” point, and they extend for 1,500 feet in front of the holding aircraft. Illuminated red lights indicate to an aircraft in position for takeoff or rolling that it is unsafe to takeoff because the runway is occupied or about to be occupied by an aircraft or vehicle.

**TAKEOFF ROLL** – The process whereby an aircraft is aligned with the runway centerline and the aircraft is moving with the intent to take off. For helicopters,

this pertains to the act of becoming airborne after departing a takeoff area.

**TAKEOFF RUN AVAILABLE (TORA)** – The runway length declared available and suitable for the ground run of an airplane taking off.

(See ICAO term TAKEOFF RUN AVAILABLE.)

**TAKEOFF RUN AVAILABLE [ICAO]**– The length of runway declared available and suitable for the ground run of an aeroplane take-off.

**TARGET**– The indication shown on an analog display resulting from a primary radar return or a radar beacon reply.

(See ASSOCIATED.)

(See DIGITAL TARGET.)

(See DIGITIZED RADAR TARGET.)

(See FUSED TARGET.)

(See PRIMARY RADAR TARGET.)

(See RADAR.)

(See SECONDARY RADAR TARGET.)

(See TARGET SYMBOL.)

(See ICAO term TARGET.)

(See UNASSOCIATED.)

**TARGET [ICAO]**– In radar:

**a.** Generally, any discrete object which reflects or retransmits energy back to the radar equipment.

**b.** Specifically, an object of radar search or surveillance.

**TARGET RESOLUTION**– A process to ensure that correlated radar targets do not touch. Target resolution must be applied as follows:

**a.** Between the edges of two primary targets or the edges of the ASR-9/11 primary target symbol.

**b.** Between the end of the beacon control slash and the edge of a primary target.

**c.** Between the ends of two beacon control slashes.

Note 1: Mandatory traffic advisories and safety alerts must be issued when this procedure is used.

Note 2: This procedure must not be used when utilizing mosaic radar systems or multi-sensor mode.

**TARGET SYMBOL**– A computer-generated indication shown on a radar display resulting from a primary radar return or a radar beacon reply.

**TARMAC DELAY**– The holding of an aircraft on the ground either before departure or after landing with no opportunity for its passengers to deplane.

**TARMAC DELAY AIRCRAFT**– An aircraft whose pilot-in-command has requested to taxi to the ramp, gate, or alternate deplaning area to comply with the Three-hour Tarmac Rule.

**TARMAC DELAY REQUEST**– A request by the pilot-in-command to taxi to the ramp, gate, or alternate deplaning location to comply with the Three-hour Tarmac Rule.

**TAS**–

(See **TERMINAL AUTOMATION SYSTEMS**.)

**TAWS**–

(See **TERRAIN AWARENESS WARNING SYSTEM**.)

**TAXI**– The movement of an airplane under its own power on the surface of an airport (14 CFR Section 135.100 [Note]). Also, it describes the surface movement of helicopters equipped with wheels.

(See **AIR TAXI**.)

(See **HOVER TAXI**.)

(Refer to 14 CFR Section 135.100.)

(Refer to **AIM**.)

**TAXI PATTERNS**– Patterns established to illustrate the desired flow of ground traffic for the different runways or airport areas available for use.

**TCAS**–

(See **TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM**.)

**TCH**–

(See **THRESHOLD CROSSING HEIGHT**.)

**TCLT**–

(See **TENTATIVE CALCULATED LANDING TIME**.)

**TDLS**–

(See **TERMINAL DATA LINK SYSTEM**.)

**TDZE**–

(See **TOUCHDOWN ZONE ELEVATION**.)

**TELEPHONE INFORMATION BRIEFING SERVICE**– A continuous telephone recording of meteorological and/or aeronautical information.

(Refer to **AIM**.)

**TEMPORARY FLIGHT RESTRICTION (TFR)**– A TFR is a regulatory action issued by the FAA via the U.S. NOTAM System, under the authority of United States Code, Title 49. TFRs are issued within the sovereign airspace of the United States and its territories to restrict certain aircraft from operating within a defined area on a temporary basis to protect persons or property in the air or on the ground. While not all inclusive, TFRs may be issued for disaster or hazard situations such as: toxic gas leaks or spills, fumes from flammable agents, aircraft accident/incident sites, aviation or ground resources engaged in wildfire suppression, or aircraft relief activities following a disaster. TFRs may also be issued in support of VIP movements, for reasons of national security; or when determined necessary for the management of air traffic in the vicinity of aerial demonstrations or major sporting events. NAS users or other interested parties should contact a FSS for TFR information. Additionally, TFR information can be found in automated briefings, NOTAM publications, and on the internet at <http://www.faa.gov>. The FAA also distributes TFR information to aviation user groups for further dissemination.

**TENTATIVE CALCULATED LANDING TIME (TCLT)**– A projected time calculated for adapted vertex for each arrival aircraft based upon runway configuration, airport acceptance rate, airport arrival delay period, and other metered arrival aircraft. This time is either the VTA of the aircraft or the TCLT/ACLT of the previous aircraft plus the AAI, whichever is later. This time will be updated in response to an aircraft's progress and its current relationship to other arrivals.

**TERMINAL AREA**– A general term used to describe airspace in which approach control service or airport traffic control service is provided.

**TERMINAL AREA FACILITY**– A facility providing air traffic control service for arriving and departing IFR, VFR, Special VFR, and on occasion en route aircraft.

(See **APPROACH CONTROL FACILITY**.)

(See **TOWER**.)

**TERMINAL AUTOMATION SYSTEMS (TAS)**– TAS is used to identify the numerous automated tracking systems including ARTS IIE, ARTS IIIA, ARTS IIIE, STARS, and MEARTS.

**TERMINAL DATA LINK SYSTEM (TDLS)**– A system that provides Digital Automatic Terminal

Information Service (D-ATIS) both on a specified radio frequency and also, for subscribers, in a text message via data link to the cockpit or to a gate printer. TDLS also provides Pre-departure Clearances (PDC), at selected airports, to subscribers, through a service provider, in text to the cockpit or to a gate printer. In addition, TDLS will emulate the Flight Data Input/Output (FDIO) information within the control tower.

**TERMINAL RADAR SERVICE AREA**– Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. The AIM contains an explanation of TRSA. TRSAs are depicted on VFR aeronautical charts. Pilot participation is urged but is not mandatory.

**TERMINAL VFR RADAR SERVICE**– A national program instituted to extend the terminal radar services provided instrument flight rules (IFR) aircraft to visual flight rules (VFR) aircraft. The program is divided into four types service referred to as basic radar service, terminal radar service area (TRSA) service, Class B service and Class C service. The type of service provided at a particular location is contained in the Chart Supplement U.S.

**a. Basic Radar Service**– These services are provided for VFR aircraft by all commissioned terminal radar facilities. Basic radar service includes safety alerts, traffic advisories, limited radar vectoring when requested by the pilot, and sequencing at locations where procedures have been established for this purpose and/or when covered by a letter of agreement. The purpose of this service is to adjust the flow of arriving IFR and VFR aircraft into the traffic pattern in a safe and orderly manner and to provide traffic advisories to departing VFR aircraft.

**b. TRSA Service**– This service provides, in addition to basic radar service, sequencing of all IFR and participating VFR aircraft to the primary airport and separation between all participating VFR aircraft. The purpose of this service is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the area defined as a TRSA.

**c. Class C Service**– This service provides, in addition to basic radar service, approved separation between IFR and VFR aircraft, and sequencing of VFR aircraft, and sequencing of VFR arrivals to the primary airport.

**d. Class B Service**– This service provides, in addition to basic radar service, approved separation of aircraft based on IFR, VFR, and/or weight, and sequencing of VFR arrivals to the primary airport(s).

(See CONTROLLED AIRSPACE.)

(See TERMINAL RADAR SERVICE AREA.)

(Refer to AIM.)

(Refer to CHART SUPPLEMENT U.S.)

**TERMINAL-VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE STATION (TVOR)**– A very high frequency terminal omnirange station located on or near an airport and used as an approach aid.

(See NAVIGATIONAL AID.)

(See VOR.)

**TERRAIN AWARENESS WARNING SYSTEM (TAWS)**– An on-board, terrain proximity alerting system providing the aircrew ‘Low Altitude warnings’ to allow immediate pilot action.

**TERRAIN FOLLOWING**– The flight of a military aircraft maintaining a constant AGL altitude above the terrain or the highest obstruction. The altitude of the aircraft will constantly change with the varying terrain and/or obstruction.

**TETRAHEDRON**– A device normally located on uncontrolled airports and used as a landing direction indicator. The small end of a tetrahedron points in the direction of landing. At controlled airports, the tetrahedron, if installed, should be disregarded because tower instructions supersede the indicator.

(See SEGMENTED CIRCLE.)

(Refer to AIM.)

**TF**–

(See TERRAIN FOLLOWING.)

***THAT IS CORRECT***– The understanding you have is right.

**THREE-HOUR TARMAC RULE**– Rule that relates to Department of Transportation (DOT) requirements placed on airlines when tarmac delays are anticipated to reach 3 hours.

**360 OVERHEAD**–

(See OVERHEAD MANEUVER.)

**THRESHOLD**– The beginning of that portion of the runway usable for landing.

(See AIRPORT LIGHTING.)

(See DISPLACED THRESHOLD.)

**THRESHOLD CROSSING HEIGHT**– The theoretical height above the runway threshold at

which the aircraft's glideslope antenna would be if the aircraft maintains the trajectory established by the mean ILS glideslope or the altitude at which the calculated glidepath of an RNAV or GPS approaches.

(See GLIDESLOPE.)

(See THRESHOLD.)

#### THRESHOLD LIGHTS–

(See AIRPORT LIGHTING.)

#### TIBS–

(See TELEPHONE INFORMATION BRIEFING SERVICE.)

**TIE-IN FACILITY–** The FSS primarily responsible for providing FSS services, including telecommunications services for landing facilities or navigational aids located within the boundaries of a flight plan area (FPA). Three-letter identifiers are assigned to each FSS/FPA and are annotated as tie-in facilities in the Chart Supplement U.S., the Alaska Supplement, the Pacific Supplement, and FAA Order JO 7350.9, Location Identifiers. Large consolidated FSS facilities may have many tie-in facilities or FSS sectors within one facility.

(See FLIGHT PLAN AREA.)

(See FLIGHT SERVICE STATION.)

#### TIME BASED FLOW MANAGEMENT (TBFM)–

The hardware, software, methods, processes, and initiatives to manage air traffic flows based on time to balance air traffic demand with system capacity, and support the management of PBN. This includes, but not limited to, Adjacent Center Metering (ACM), En Route Departure Capability (EDC), Ground-based Interval Management-Spacing (GIM-S), Integrated Departure/Arrival Capability (IDAC), Single Center Metering (SCM), Time-Based Metering (TBM), Time-Based Scheduling (TBS), and Extended/Coupled Metering.

**TIME GROUP–** Four digits representing the hour and minutes from the Coordinated Universal Time (UTC) clock. FAA uses UTC for all operations. The term “ZULU” may be used to denote UTC. The word “local” or the time zone equivalent shall be used to denote local when local time is given during radio and telephone communications. When written, a time zone designator is used to indicate local time; e.g., “0205M” (Mountain). The local time may be based on the 24-hour clock system. The day begins at 0000 and ends at 2359.

#### TIS–B–

(See TRAFFIC INFORMATION SERVICE–BROADCAST.)

#### TMPA–

(See TRAFFIC MANAGEMENT PROGRAM ALERT.)

#### TMU–

(See TRAFFIC MANAGEMENT UNIT.)

#### TODA–

(See TAKEOFF DISTANCE AVAILABLE.)

(See ICAO term TAKEOFF DISTANCE AVAILABLE.)

#### TOI–

(See TRACK OF INTEREST.)

**TOP ALTITUDE–** In reference to SID published altitude restrictions, the charted “maintain” altitude contained in the procedure description or assigned by ATC.

#### TORA–

(See TAKEOFF RUN AVAILABLE.)

(See ICAO term TAKEOFF RUN AVAILABLE.)

**TORCHING–** The burning of fuel at the end of an exhaust pipe or stack of a reciprocating aircraft engine, the result of an excessive richness in the fuel air mixture.

#### TOS–

(See TRAJECTORY OPTIONS SET)

**TOTAL ESTIMATED ELAPSED TIME [ICAO]–** For IFR flights, the estimated time required from takeoff to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from takeoff to arrive over the destination aerodrome.

(See ICAO term ESTIMATED ELAPSED TIME.)

**TOUCH-AND-GO–** An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

#### TOUCH-AND-GO LANDING–

(See TOUCH-AND-GO.)

#### TOUCHDOWN–

**a.** The point at which an aircraft first makes contact with the landing surface.



**b.** Concerning a precision radar approach (PAR), it is the point where the glide path intercepts the landing surface.

(See ICAO term TOUCHDOWN.)

**TOUCHDOWN [ICAO]**– The point where the nominal glide path intercepts the runway.

Note: Touchdown as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.

**TOUCHDOWN RVR**–

(See VISIBILITY.)

**TOUCHDOWN ZONE**– The first 3,000 feet of the runway beginning at the threshold. The area is used for determination of Touchdown Zone Elevation in the development of straight-in landing minimums for instrument approaches.

(See ICAO term TOUCHDOWN ZONE.)

**TOUCHDOWN ZONE [ICAO]**– The portion of a runway, beyond the threshold, where it is intended landing aircraft first contact the runway.

**TOUCHDOWN ZONE ELEVATION**– The highest elevation in the first 3,000 feet of the landing surface. TDZE is indicated on the instrument approach procedure chart when straight-in landing minimums are authorized.

(See TOUCHDOWN ZONE.)

**TOUCHDOWN ZONE LIGHTING**–

(See AIRPORT LIGHTING.)

**TOWER**– A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).

(See AIRPORT TRAFFIC CONTROL SERVICE.)

(See APPROACH CONTROL FACILITY.)

(See APPROACH CONTROL SERVICE.)

(See MOVEMENT AREA.)

(See TOWER EN ROUTE CONTROL SERVICE.)

(See ICAO term AERODROME CONTROL TOWER.)

(Refer to AIM.)

**TOWER EN ROUTE CONTROL SERVICE**– The control of IFR en route traffic within delegated airspace between two or more adjacent approach control facilities. This service is designed to expedite traffic and reduce control and pilot communication requirements.

**TOWER TO TOWER**–

(See TOWER EN ROUTE CONTROL SERVICE.)

**TRACEABLE PRESSURE STANDARD**– The facility station pressure instrument, with certification/calibration traceable to the National Institute of Standards and Technology. Traceable pressure standards may be mercurial barometers, commissioned ASOS/AWSS or dual transducer AWOS, or portable pressure standards or DASI.

**TRACK**– The actual flight path of an aircraft over the surface of the earth.

(See COURSE.)

(See FLIGHT PATH.)

(See ROUTE.)

(See ICAO term TRACK.)

**TRACK [ICAO]**– The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (True, Magnetic, or Grid).

**TRACK OF INTEREST (TOI)**– Displayed data representing an airborne object that threatens or has the potential to threaten North America or National Security. Indicators may include, but are not limited to: noncompliance with air traffic control instructions or aviation regulations; extended loss of communications; unusual transmissions or unusual flight behavior; unauthorized intrusion into controlled airspace or an ADIZ; noncompliance with issued flight restrictions/security procedures; or unlawful interference with airborne flight crews, up to and including hijack. In certain circumstances, an object may become a TOI based on specific and credible intelligence pertaining to that particular aircraft/object, its passengers, or its cargo.

**TRACK OF INTEREST RESOLUTION**– A TOI will normally be considered resolved when: the aircraft/object is no longer airborne; the aircraft complies with air traffic control instructions, aviation regulations, and/or issued flight restrictions/security procedures; radio contact is re-established and authorized control of the aircraft is verified; the aircraft is intercepted and intent is verified to be

nonthreatening/nonhostile; TOI was identified based on specific and credible intelligence that was later determined to be invalid or unreliable; or displayed data is identified and characterized as invalid.

**TRAFFIC-**

**a.** A term used by a controller to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued:

1. In response to a handoff or point out,
2. In anticipation of a handoff or point out, or
3. In conjunction with a request for control of an aircraft.

**b.** A term used by ATC to refer to one or more aircraft.

**TRAFFIC ADVISORIES-** Advisories issued to alert pilots to other known or observed air traffic which may be in such proximity to the position or intended route of flight of their aircraft to warrant their attention. Such advisories may be based on:

- a.** Visual observation.
- b.** Observation of radar identified and nonidentified aircraft targets on an ATC radar display, or
- c.** Verbal reports from pilots or other facilities.

Note 1: The word "traffic" followed by additional information, if known, is used to provide such advisories; e.g., "Traffic, 2 o'clock, one zero miles, southbound, eight thousand."

Note 2: Traffic advisory service will be provided to the extent possible depending on higher priority duties of the controller or other limitations; e.g., radar limitations, volume of traffic, frequency congestion, or controller workload. Radar/nonradar traffic advisories do not relieve the pilot of his/her responsibility to see and avoid other aircraft. Pilots are cautioned that there are many times when the controller is not able to give traffic advisories concerning all traffic in the aircraft's proximity; in other words, when a pilot requests or is receiving traffic advisories, he/she should not assume that all traffic will be issued.

(Refer to AIM.)

**TRAFFIC ALERT** (*aircraft call sign*), **TURN** (*left/right*) **IMMEDIATELY**, (*climb/descend*) **AND MAINTAIN** (*altitude*).

(See SAFETY ALERT.)

**TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS)-** An airborne collision

avoidance system based on radar beacon signals which 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.

**TRAFFIC INFORMATION-**

(See TRAFFIC ADVISORIES.)

**TRAFFIC INFORMATION SERVICE-BROADCAST (TIS-B)-** The broadcast of ATC derived traffic information to ADS-B equipped (1090ES or UAT) aircraft. The source of this traffic information is derived from ground-based air traffic surveillance sensors, typically from radar targets. TIS-B service will be available throughout the NAS where there are both adequate surveillance coverage (radar) and adequate broadcast coverage from ADS-B ground stations. Loss of TIS-B will occur when an aircraft enters an area not covered by the GBT network. If this occurs in an area with adequate surveillance coverage (radar), nearby aircraft that remain within the adequate broadcast coverage (ADS-B) area will view the first aircraft. TIS-B may continue when an aircraft enters an area with inadequate surveillance coverage (radar); nearby aircraft that remain within the adequate broadcast coverage (ADS-B) area will not view the first aircraft.

**TRAFFIC IN SIGHT-** Used by pilots to inform a controller that previously issued traffic is in sight.

(See NEGATIVE CONTACT.)

(See TRAFFIC ADVISORIES.)

**TRAFFIC MANAGEMENT PROGRAM ALERT-** A term used in a Notice to Airmen (NOTAM) issued in conjunction with a special traffic management program to alert pilots to the existence of the program and to refer them to either the Notices to Airmen publication or a special traffic management program advisory message for program details. The contraction TMPA is used in NOTAM text.

**TRAFFIC MANAGEMENT UNIT-** The entity in ARTCCs and designated terminals directly involved in the active management of facility traffic. Usually under the direct supervision of an assistant manager for traffic management.

**TRAFFIC NO FACTOR-** Indicates that the traffic described in a previously issued traffic advisory is no factor.

**TRAFFIC NO LONGER OBSERVED-** Indicates that the traffic described in a previously issued traffic

advisory is no longer depicted on radar, but may still be a factor.

**TRAFFIC PATTERN**– The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

**a. Upwind Leg**– A flight path parallel to the landing runway in the direction of landing.

**b. Crosswind Leg**– A flight path at right angles to the landing runway off its upwind end.

**c. Downwind Leg**– A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

**d. Base Leg**– A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

**e. Final Approach**– A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

(See STRAIGHT-IN APPROACH VFR.)

(See TAXI PATTERNS.)

(See ICAO term AERODROME TRAFFIC CIRCUIT.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**TRAFFIC SITUATION DISPLAY (TSD)**– TSD is a computer system that receives radar track data from all 20 CONUS ARTCCs, organizes this data into a mosaic display, and presents it on a computer screen. The display allows the traffic management coordinator multiple methods of selection and highlighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace, airports, and geopolitical boundaries. By using the TSD, a coordinator can monitor any number of traffic situations or the entire systemwide traffic flows.

**TRAJECTORY**– A EDST representation of the path an aircraft is predicted to fly based upon a Current Plan or Trial Plan.

(See EN ROUTE DECISION SUPPORT TOOL.)

**TRAJECTORY MODELING**– The automated process of calculating a trajectory.

**TRAJECTORY OPTIONS SET (TOS)**– A TOS is an electronic message, submitted by the operator, that is used by the Collaborative Trajectory Options Program (CTOP) to manage the airspace captured in the traffic management program. The TOS will allow the operator to express the route and delay trade-off options that they are willing to accept.

**TRANSCRIBED WEATHER BROADCAST (TWEB)**– A continuous recording of meteorological and aeronautical information that is broadcast on L/MF and VOR facilities for pilots. (Provided only in Alaska.)

(Refer to AIM.)

**TRANSFER OF CONTROL**– That action whereby the responsibility for the separation of an aircraft is transferred from one controller to another.

(See ICAO term TRANSFER OF CONTROL.)

**TRANSFER OF CONTROL [ICAO]**– Transfer of responsibility for providing air traffic control service.

**TRANSFERRING CONTROLLER**– A controller/facility transferring control of an aircraft to another controller/facility.

(See ICAO term TRANSFERRING UNIT/CONTROLLER.)

**TRANSFERRING FACILITY**–

(See TRANSFERRING CONTROLLER.)

**TRANSFERRING UNIT/CONTROLLER [ICAO]**– Air traffic control unit/air traffic controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.

Note: See definition of accepting unit/controller.

**TRANSITION**–

**a.** The general term that describes the change from one phase of flight or flight condition to another; e.g., transition from en route flight to the approach or transition from instrument flight to visual flight.

**b.** A published procedure (DP Transition) used to connect the basic DP to one of several en route

airways/jet routes, or a published procedure (STAR Transition) used to connect one of several en route airways/jet routes to the basic STAR.

(Refer to DP/STAR Charts.)

**TRANSITION POINT**– A point at an adapted number of miles from the vertex at which an arrival aircraft would normally commence descent from its en route altitude. This is the first fix adapted on the arrival speed segments.

**TRANSITION WAYPOINT**– The waypoint that defines the beginning of a runway or en route transition on an RNAV SID or STAR.

**TRANSITIONAL AIRSPACE**– That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

**TRANSMISSOMETER**– An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV).

(See VISIBILITY.)

**TRANSMITTING IN THE BLIND**– A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

**TRANSPONDER**– The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) which 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.

(See INTERROGATOR.)

(See ICAO term TRANSPONDER.)

(Refer to AIM.)

**TRANSPONDER [ICAO]**– A receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.

**TRANSPONDER CODES**–

(See CODES.)

**TRANSPONDER OBSERVED** – Phraseology used to inform a VFR pilot the aircraft's assigned beacon code and position have been observed. Specifically, this term conveys to a VFR pilot the transponder reply has been observed and its position correlated for transit through the designated area.

**TRIAL PLAN**– A proposed amendment which utilizes automation to analyze and display potential conflicts along the predicted trajectory of the selected aircraft.

**TRSA**–

(See TERMINAL RADAR SERVICE AREA.)

**TSD**–

(See TRAFFIC SITUATION DISPLAY.)

**TURBOJET AIRCRAFT**– An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

**TURBOPROP AIRCRAFT**– An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

**TURBULENCE**– An atmospheric phenomenon that causes changes in aircraft altitude, attitude, and or airspeed with aircraft reaction depending on intensity. Pilots report turbulence intensity according to aircraft's reaction as follows:

**a. Light** – Causes slight, erratic changes in altitude and or attitude (pitch, roll, or yaw).

**b. Moderate**– Similar to Light but of greater intensity. Changes in altitude and or attitude occur but the aircraft remains in positive control at all times. It usually causes variations in indicated airspeed.

**c. Severe**– Causes large, abrupt changes in altitude and or attitude. It usually causes large variations in indicated airspeed. Aircraft may be momentarily out of control.

**d. Extreme**– The aircraft is violently tossed about and is practically impossible to control. It may cause structural damage.

(See CHOP.)

(Refer to AIM.)

**TURN ANTICIPATION**– (maneuver anticipation).

**TVOR**–

(See TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION.)

**TWEB**–

(See TRANSCRIBED WEATHER BROADCAST.)

TWO-WAY RADIO COMMUNICATIONS FAILURE-  
URE-  
(See LOST COMMUNICATIONS.)



# U

UHF–

(See ULTRAHIGH FREQUENCY.)

**ULTRAHIGH FREQUENCY (UHF)**– The frequency band between 300 and 3,000 MHz. The bank of radio frequencies used for military air/ground voice communications. In some instances this may go as low as 225 MHz and still be referred to as UHF.

**ULTRALIGHT VEHICLE**– A single-occupant aeronautical vehicle operated for sport or recreational purposes which does not require FAA registration, an airworthiness certificate, or pilot certification. Operation of an ultralight vehicle in certain airspace requires authorization from ATC.

(Refer to 14 CFR Part 103.)

**UNABLE**– Indicates inability to comply with a specific instruction, request, or clearance.

**UNASSOCIATED**– A radar target that does not display a data block with flight identification and altitude information.

(See ASSOCIATED.)

**UNDER THE HOOD**– Indicates that the pilot is using a hood to restrict visibility outside the cockpit while simulating instrument flight. An appropriately rated pilot is required in the other control seat while this operation is being conducted.

(Refer to 14 CFR Part 91.)

**UNFROZEN**– The Scheduled Time of Arrival (STA) tags, which are still being rescheduled by the time based flow management (TBFM) calculations. The aircraft will remain unfrozen until the time the corresponding estimated time of arrival (ETA) tag passes the preset freeze horizon for that aircraft's stream class. At this point the automatic rescheduling will stop, and the STA becomes "frozen."

**UNICOM**– A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

(See CHART SUPPLEMENT U.S.)

(Refer to AIM.)

**UNMANNED AIRCRAFT (UA)**– A device used or intended to be used for flight that has no onboard pilot. This device can be any type of airplane, helicopter, airship, or powered-lift aircraft. Unmanned free balloons, moored balloons, tethered aircraft, gliders, and unmanned rockets are not considered to be a UA.

**UNMANNED AIRCRAFT SYSTEM (UAS)**– An unmanned aircraft and its associated elements related to safe operations, which may include control stations (ground, ship, or air based), control links, support equipment, payloads, flight termination systems, and launch/recovery equipment. It consists of three elements: unmanned aircraft, control station, and data link.

**UNPUBLISHED ROUTE**– A route for which no minimum altitude is published or charted for pilot use. It may include a direct route between NAVAIDS, a radial, a radar vector, or a final approach course beyond the segments of an instrument approach procedure.

(See PUBLISHED ROUTE.)

(See ROUTE.)

**UNRELIABLE (GPS/WAAS)**– An advisory to pilots indicating the expected level of service of the GPS and/or WAAS may not be available. Pilots must then determine the adequacy of the signal for desired use.

**UPWIND LEG**–

(See TRAFFIC PATTERN.)

**URGENCY**– A condition of being concerned about safety and of requiring timely but not immediate assistance; a potential distress condition.

(See ICAO term URGENCY.)

**URGENCY [ICAO]**– A condition concerning the safety of an aircraft or other vehicle, or of person on board or in sight, but which does not require immediate assistance.

**USAFIB**–

(See ARMY AVIATION FLIGHT INFORMATION BULLETIN.)





# V

## VASI–

(See VISUAL APPROACH SLOPE INDICATOR.)

## VCOA–

(See VISUAL CLIMB OVER AIRPORT.)

## VDP–

(See VISUAL DESCENT POINT.)

**VECTOR**– A heading issued to an aircraft to provide navigational guidance by radar.

(See ICAO term RADAR VECTORING.)

**VERIFY**– Request confirmation of information; e.g., “verify assigned altitude.”

**VERIFY SPECIFIC DIRECTION OF TAKEOFF (OR TURNS AFTER TAKEOFF)**– Used by ATC to ascertain an aircraft’s direction of takeoff and/or direction of turn after takeoff. It is normally used for IFR departures from an airport not having a control tower. When direct communication with the pilot is not possible, the request and information may be relayed through an FSS, dispatcher, or by other means.

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

**VERTEX**– The last fix adapted on the arrival speed segments. Normally, it will be the outer marker of the runway in use. However, it may be the actual threshold or other suitable common point on the approach path for the particular runway configuration.

**VERTEX TIME OF ARRIVAL**– A calculated time of aircraft arrival over the adapted vertex for the runway configuration in use. The time is calculated via the optimum flight path using adapted speed segments.

**VERTICAL NAVIGATION (VNAV)**– A function of area navigation (RNAV) equipment which calculates, displays, and provides vertical guidance to a profile or path.

**VERTICAL SEPARATION**– Separation between aircraft expressed in units of vertical distance.

(See SEPARATION.)

**VERTICAL TAKEOFF AND LANDING AIRCRAFT (VTOL)**– Aircraft capable of vertical climbs

and/or descents and of using very short runways or small areas for takeoff and landings. These aircraft include, but are not limited to, helicopters.

(See SHORT TAKEOFF AND LANDING AIRCRAFT.)

**VERY HIGH FREQUENCY (VHF)**– The frequency band between 30 and 300 MHz. Portions of this band, 108 to 118 MHz, are used for certain NAVAIDs; 118 to 136 MHz are used for civil air/ground voice communications. Other frequencies in this band are used for purposes not related to air traffic control.

**VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION**–

(See VOR.)

**VERY LOW FREQUENCY (VLF)**– The frequency band between 3 and 30 kHz.

## VFR–

(See VISUAL FLIGHT RULES.)

**VFR AIRCRAFT**– An aircraft conducting flight in accordance with visual flight rules.

(See VISUAL FLIGHT RULES.)

**VFR CONDITIONS**– Weather conditions equal to or better than the minimum for flight under visual flight rules. The term may be used as an ATC clearance/instruction only when:

**a.** An IFR aircraft requests a climb/descent in VFR conditions.

**b.** The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude.

**c.** A pilot has requested a practice instrument approach and is not on an IFR flight plan.

Note: All pilots receiving this authorization must comply with the VFR visibility and distance from cloud criteria in 14 CFR Part 91. Use of the term does not relieve controllers of their responsibility to separate aircraft in Class B and Class C airspace or TRSAs as required by FAA Order JO 7110.65. When used as an ATC clearance/instruction, the term may be abbreviated “VFR;” e.g., “MAINTAIN VFR,” “CLIMB/DESCEND VFR,” etc.

## VFR FLIGHT–

(See VFR AIRCRAFT.)

**VFR MILITARY TRAINING ROUTES (VR)**– Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training under VFR below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

**VFR NOT RECOMMENDED**– An advisory provided by a flight service station to a pilot during a preflight or inflight weather briefing that flight under visual flight rules is not recommended. To be given when the current and/or forecast weather conditions are at or below VFR minimums. It does not abrogate the pilot's authority to make his/her own decision.

**VFR-ON-TOP**– ATC authorization for an IFR aircraft to operate in VFR conditions at any appropriate VFR altitude (as specified in 14 CFR and as restricted by ATC). A pilot receiving this authorization must comply with the VFR visibility, distance from cloud criteria, and the minimum IFR altitudes specified in 14 CFR Part 91. The use of this term does not relieve controllers of their responsibility to separate aircraft in Class B and Class C airspace or TRSAs as required by FAA Order JO 7110.65.

**VFR TERMINAL AREA CHARTS**–  
(See AERONAUTICAL CHART.)

**VFR WAYPOINT**–  
(See WAYPOINT.)

**VHF**–  
(See VERY HIGH FREQUENCY.)

**VHF OMNIDIRECTIONAL RANGE/TACTICAL AIR NAVIGATION**–  
(See VORTAC.)

**VIDEO MAP**– An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, hospital emergency landing areas, NAVAIDs and fixes, reporting points, airway/route centerlines, boundaries, handoff points, special use tracks, obstructions, prominent geographic features, map alignment indicators, range accuracy marks, and/or minimum vectoring altitudes.

**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.

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**a. 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.

**b. Ground Visibility**– Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.

**c. Prevailing Visibility**– The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.

**d. 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.

**e. 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.

**1. Touchdown RVR**– The RVR visibility readout values obtained from RVR equipment serving the runway touchdown zone.

**2. Mid-RVR**– The RVR readout values obtained from RVR equipment located midfield of the runway.

**3. Rollout RVR**– The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

(See ICAO term FLIGHT VISIBILITY.)

(See ICAO term GROUND VISIBILITY.)

(See ICAO term RUNWAY VISUAL RANGE.)

(See ICAO term VISIBILITY.)

**VISIBILITY [ICAO]**– 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.

**a. Flight Visibility**– The visibility forward from the cockpit of an aircraft in flight.

**b. Ground Visibility**– The visibility at an aerodrome as reported by an accredited observer.

**c. Runway Visual Range [RVR]**– The range over which the pilot of an aircraft on the centerline of a runway can see the runway surface markings or the lights delineating the runway or identifying its centerline.

**VISUAL APPROACH**– An approach conducted on an instrument flight rules (IFR) flight plan which 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 feet, and visibility of 3 miles or greater.

(See ICAO term VISUAL APPROACH.)

**VISUAL APPROACH [ICAO]**– An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

**VISUAL APPROACH SLOPE INDICATOR (VASI)**–

(See AIRPORT LIGHTING.)

**VISUAL CLIMB OVER AIRPORT (VCOA)**– A departure option for an IFR aircraft, operating in visual meteorological conditions equal to or greater than the specified visibility and ceiling, to visually conduct climbing turns over the airport to the published “climb-to” altitude from which to proceed with the instrument portion of the departure. VCOA procedures are developed to avoid obstacles greater than 3 statute miles from the departure end of the

runway as an alternative to complying with climb gradients greater than 200 feet per nautical mile. Pilots are responsible to advise ATC as early as possible of the intent to fly the VCOA option prior to departure. These textual procedures are published in the ‘Take-Off Minimums and (Obstacle) Departure Procedures’ section of the Terminal Procedures Publications and/or appear as an option on a Graphic ODP.

(See AIM.)

**VISUAL DESCENT POINT**– 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.

**VISUAL FLIGHT RULES**– Rules that govern the procedures for conducting flight under visual conditions. The term “VFR” is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

(See INSTRUMENT FLIGHT RULES.)

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

(See VISUAL METEOROLOGICAL CONDITIONS.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**VISUAL HOLDING**– The holding of aircraft at selected, prominent geographical fixes which can be easily recognized from the air.

(See HOLDING FIX.)

**VISUAL METEOROLOGICAL CONDITIONS**– Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

(See INSTRUMENT FLIGHT RULES.)

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

(See VISUAL FLIGHT RULES.)

**VISUAL SEGMENT**–

(See PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT.)

**VISUAL SEPARATION**– A means employed by ATC to separate aircraft in terminal areas and en route airspace in the NAS. There are two ways to effect this separation:

**a.** The tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other.

**b.** A pilot sees the other aircraft involved and upon instructions from the controller provides his/her own separation by maneuvering his/her aircraft as necessary to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor.

(See SEE AND AVOID.)

(Refer to 14 CFR Part 91.)

**VLF**–

(See VERY LOW FREQUENCY.)

**VMC**–

(See VISUAL METEOROLOGICAL CONDITIONS.)

**VOICE SWITCHING AND CONTROL SYSTEM (VSCS)**– A computer controlled switching system that provides air traffic controllers with all voice circuits (air to ground and ground to ground) necessary for air traffic control.

(Refer to AIM.)

**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 may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.

(See NAVIGATIONAL AID.)

(Refer to AIM.)

**VOR TEST SIGNAL**–

(See VOT.)

**VORTAC**– A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

(See DISTANCE MEASURING EQUIPMENT.)

(See NAVIGATIONAL AID.)

(See TACAN.)

(See VOR.)

(Refer to AIM.)

**VORTICES**– Circular patterns of air created by the movement of an airfoil through the air when generating lift. As an airfoil moves through the atmosphere in sustained flight, an area of low pressure is created above it. The air flowing from the high pressure area to the low pressure area around and about the tips of the airfoil tends to roll up into two rapidly rotating vortices, cylindrical in shape. These vortices are the most predominant parts of aircraft wake turbulence and their rotational force is dependent upon the wing loading, gross weight, and speed of the generating aircraft. The vortices from medium to super aircraft can be of extremely high velocity and hazardous to smaller aircraft.

(See AIRCRAFT CLASSES.)

(See WAKE TURBULENCE.)

(Refer to AIM.)

**VOT**– A ground facility which emits a test signal to check VOR receiver accuracy. Some VOTs are available to the user while airborne, and others are limited to ground use only.

(See CHART SUPPLEMENT U.S.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

**VR**–

(See VFR MILITARY TRAINING ROUTES.)

**VSCS**–

(See VOICE SWITCHING AND CONTROL SYSTEM.)

**VTA**–

(See VERTEX TIME OF ARRIVAL.)

**VTOL AIRCRAFT**–

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT.)

# W

## WA-

(See AIRMET.)

(See WEATHER ADVISORY.)

## WAAS-

(See WIDE-AREA AUGMENTATION SYSTEM.)

**WAKE TURBULENCE-** Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.

(See AIRCRAFT CLASSES.)

(See JET BLAST.)

(See VORTICES.)

(Refer to AIM.)

## WARNING AREA-

(See SPECIAL USE AIRSPACE.)

**WAYPOINT-** A predetermined geographical position used for route/instrument approach definition, progress reports, published VFR routes, visual reporting points or points for transitioning and/or circumnavigating controlled and/or special use airspace, that is defined relative to a VORTAC station or in terms of latitude/longitude coordinates.

**WEATHER ADVISORY-** In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the Aviation Surface Forecast, Aviation Cloud Forecast, or area forecast, as they affect the operation of air traffic and as prepared by the NWS.

(See AIRMET.)

(See SIGMET.)

**WEATHER RECONNAISSANCE AREA (WRA)-** A WRA is airspace with defined dimensions and published by Notice to Airmen, which is established to support weather reconnaissance/research flights. Air traffic control services are not provided within WRAs. Only participating weather reconnaissance/research aircraft from the 53<sup>rd</sup> Weather Reconnaissance Squadron and National Oceanic and Atmospheric Administration Aircraft Operations Center are permitted to operate within a WRA. A WRA may only be established in airspace within U.S. Flight Information Regions outside of U.S. territorial airspace.

## WHEN ABLE-

**a.** In conjunction with ATC instructions, gives the pilot the latitude to delay compliance until a condition or event has been reconciled. Unlike “pilot discretion,” when instructions are prefaced “when able,” the pilot is expected to seek the first opportunity to comply.

**b.** In conjunction with a weather deviation clearance, requires the pilot to determine when he/she is clear of weather, then execute ATC instructions.

**c.** Once a maneuver has been initiated, the pilot is expected to continue until the specifications of the instructions have been met. “When able,” should not be used when expeditious compliance is required.

**WIDE-AREA AUGMENTATION SYSTEM (WAAS)-** The WAAS is a satellite navigation system consisting of the equipment and software which augments the GPS Standard Positioning Service (SPS). The WAAS provides enhanced integrity, accuracy, availability, and continuity over and above GPS SPS. The differential correction function provides improved accuracy required for precision approach.

**WIDE AREA MULTILATERATION (WAM)-** A distributed surveillance technology which may utilize any combination of signals from Air Traffic Control Radar Beacon System (ATCRBS) (Modes A and C) and Mode S transponders, and ADS-B transmissions. Multiple geographically dispersed ground sensors measure the time-of-arrival of the transponder messages. Aircraft position is determined by joint processing of the time-difference-of-arrival (TDOA) measurements computed between a reference and the ground stations’ measured time-of-arrival.

**WILCO-** I have received your message, understand it, and will comply with it.

**WIND GRID DISPLAY-** A display that presents the latest forecasted wind data overlaid on a map of the ARTCC area. Wind data is automatically entered and updated periodically by transmissions from the National Weather Service. Winds at specific altitudes, along with temperatures and air pressure can be viewed.

**WIND SHEAR**– A change in wind speed and/or wind direction in a short distance resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both.

**WIND SHEAR ESCAPE**– An unplanned abortive maneuver initiated by the pilot in command (PIC) as a result of onboard cockpit systems. Wind shear escapes are characterized by maximum thrust climbs in the low altitude terminal environment until wind shear conditions are no longer detected.

**WING TIP VORTICES**–  
(See VORTICES.)

**WORDS TWICE**–

**a.** As a request: “Communication is difficult. Please say every phrase twice.”

**b.** As information: “Since communications are difficult, every phrase in this message will be spoken twice.”

**WS**–

(See SIGMET.)

(See WEATHER ADVISORY.)

**WST**–

(See CONVECTIVE SIGMET.)

(See WEATHER ADVISORY.)

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