

**CHANGE**

**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

**JO 7110.65AA  
CHG 1**

**Air Traffic Organization Policy**

**Effective Date:**  
October 5, 2023

**SUBJ:** Air Traffic Control

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- 1. Purpose of This Change.** This change transmits revised pages to Federal Aviation Administration Order JO 7110.65AA, Air Traffic Control, and the Briefing Guide.
- 2. Audience.** This change applies to all Air Traffic Organization (ATO) personnel and anyone using ATO directives.
- 3. Where Can I Find This Change?** This change is available on the FAA website at [http://faa.gov/air\\_traffic/publications](http://faa.gov/air_traffic/publications) and [https://employees.faa.gov/tools\\_resources/orders\\_notices/](https://employees.faa.gov/tools_resources/orders_notices/).
- 4. Explanation of Policy Change.** See the Explanation of Changes attachment that has editorial corrections and changes submitted through normal procedures. The Briefing Guide lists only new or modified material, along with background.
- 5. Distribution.** This change is distributed to select offices in Washington headquarters, service area offices, the William J. Hughes Technical Center, the Mike Monroney Aeronautical Center, air traffic field facilities, and international aviation offices. This change is distributed electronically to all who subscribe to receive email notification through the FAA's website. All organizations are responsible for viewing, downloading, and subscribing to receive email notifications when changes occur to this order. Subscriptions to air traffic directives can be made through the Air Traffic Plans and Publications website at [https://www.faa.gov/air\\_traffic/publications/](https://www.faa.gov/air_traffic/publications/) or directly via the following link: [https://public.govdelivery.com/accounts/USAFAA/subscriber/new?topic\\_id=USAFAA\\_39](https://public.govdelivery.com/accounts/USAFAA/subscriber/new?topic_id=USAFAA_39).
- 6. Disposition of Transmittal.** Retain this transmittal until superseded by a new basic order.
- 7. Page Control Chart.** See the page control chart attachment.

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## **Explanation of Changes**

### **Change 1**

**Direct questions through appropriate facility/service center office staff  
to the Office of Primary Interest (OPI)**

**a. 2-1-4. OPERATIONAL PRIORITY**

This change updates procedures and information regarding National Airborne Operations Center (NAOC) and Special Air Missions (SCOOT) missions, including mission notification procedures; clarifying use of the terms NAOC and SCOOT in air/ground communications; and approving special handling requests.

**b. 5-2-15. VALIDATION OF MODE C READOUT**

This change modifies the reference of “coast/suspend tabular list” to a more generic “Coast/Suspend Status” to accommodate differences in operating systems used in the NAS. Additionally, formatting changes were made to subparagraphs to improve clarity.

**c. 5-5-4. MINIMA**

**5-5-9. SEPARATION FROM OBSTRUCTIONS**

This change replaces current references to terminal airport surveillance radar systems ASR-9 and ASR-11, and their associated secondary radar systems with new terminology associated with the Mode S Beacon Replacement System (MSBRS).

**d. 5-9-7. SIMULTANEOUS INDEPENDENT APPROACHES- DUAL & TRIPLE**

This change revises the currently published high update rate surveillance (HUR) runway centerline spacing (RCLS) distances to those articulated within the report with improved surveillance update rate conditions. Additionally, runway centerline distances articulated for monitoring approaches is revised to account for recently changed offset approach distances.

**e. 7-4-6. RNAV VISUAL FLIGHT PROCEDURES (RVFP)**

This change provides specific guidance in the conduct of RNAV Visual Flight Procedures which have historically been covered in Flight Standards orders while the air traffic order has been silent.

**f. Editorial Changes**

Editorial changes include reference updates in paragraphs 2-2-10 and 2-6-2; updating reference in 10-2-19; updating references in 19 paragraphs throughout to align with JO 7610.4 and JO 7610.14 content division; removal of the abbreviation FMSP for Flight Management System Procedure; replacing the term TARGET MARKERS with DATA BLOCKS in paragraphs 5-3-8 and 5-3-9; and updating the distribution, subscription, and purchase information in Chapter 1, Section 1 and in the Change cover pages.

**g. Entire publication**

Additional editorial/format changes were made where necessary. Revision bars were not used because of the insignificant nature of these changes.



## PAGE CONTROL CHART

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# Chapter 1. General

## Section 1. Introduction

### 1-1-1. PURPOSE OF THIS ORDER

This order prescribes air traffic control procedures and phraseology for use by persons providing air traffic control services. Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it.

### 1-1-2. AUDIENCE

This order applies to all ATO personnel and anyone using ATO directives.

### 1-1-3. WHERE TO FIND THIS ORDER

This order is available on the FAA's Air Traffic Plans and Publications website at [http://faa.gov/air\\_traffic/publications](http://faa.gov/air_traffic/publications) and Orders & Notices website at [https://www.faa.gov/regulations\\_policies/orders\\_notices/](https://www.faa.gov/regulations_policies/orders_notices/).

### 1-1-4. WHAT THIS ORDER CANCELS

FAA Order JO 7110.65Z, Air Traffic Control, dated June 17, 2021, and all changes to it are canceled.

### 1-1-5. EXPLANATION OF CHANGES

The significant changes to this order are identified in the Explanation of Changes page(s). It is advisable to retain the page(s) throughout the duration of the basic order.

### 1-1-6. EFFECTIVE DATES AND SUBMISSIONS FOR CHANGES

- a. This order and its changes are scheduled to be published to coincide with AIRAC dates. (See TBL 1-1-1.)
- b. The "Cutoff Date for Completion" in the table below refers to the deadline for a proposed change to be fully coordinated and signed. Change initiators must submit their proposed changes well in advance of this cutoff date to meet the publication effective date. The process to review and coordinate changes often takes several months after the change is initially submitted.

*TBL 1-1-1*  
**Publication Schedule**

Basic or Change	Cutoff Date for Completion	Effective Date of Publication
JO 7110.65AA	11/3/22	4/20/23
Change 1	4/20/23	10/5/23
Change 2	10/5/23	3/21/24
Change 3	3/21/24	9/5/24
JO 7110.65BB	9/5/24	2/20/25
Change 1	2/20/25	8/7/25
Change 2	8/7/25	1/22/26
Change 3	1/22/26	7/9/26

### 1-1-7. DELIVERY DATES

- a. This order will be available on the FAA's website 30 days prior to its effective date.
- b. If an FAA facility **has not** received the order/changes at least 30 days before the above effective dates, the facility must notify its service area office distribution officer.
- c. If a military facility **has not** received the order/changes at least 30 days before the above effective dates, the facility must notify its appropriate military headquarters. (See TBL 1-1-2.)

*TBL 1-1-2*  
**Military Distribution Contacts**

<b>Military Headquarters</b>	<b>DSN</b>	<b>Commercial</b>
U.S. Army USAASA	656-4868	(703) 806-4868
U.S. Air Force HQ AFFSA	884-5509	(405) 734-5509
U.S. Navy CNO (N980A)	224-2638	(703) 614-2638

### 1-1-8. RECOMMENDATIONS FOR PROCEDURAL CHANGES

The office of primary responsibility (OPR) for this order is:

FAA Headquarters, Mission Support Services  
Policy (AJV-P)  
600 Independence Avenue, SW  
Washington, DC 20597

- a. Personnel should submit recommended changes in procedures to facility management.
- b. Recommendations from other sources should be submitted through appropriate FAA, military, or industry/user channels.
- c. Proposed changes must be submitted electronically to 9-AJV-P-HQ-Correspondence@faa.gov. The submission should include a description of the recommended change, and the proposed language to be used in the order.

**NOTE-**

*For details on the submission process as well as additional AJV-P processing responsibilities, please see FAA Order JO 7000.5, Procedures for Submitting Changes to Air Traffic Control Publications.*

- d. Procedural changes will not be made to this order until the operational system software has been adapted to accomplish the revised procedures.

### 1-1-9. REQUESTS FOR INTERPRETATIONS OR CLARIFICATIONS TO THIS ORDER

- a. Interpretation requests from field air traffic personnel must be submitted as follows:
  1. The request must be submitted, in writing, by an Air Traffic Facility/General manager to their Service Area Director.
  2. The Service Area Director must review the request and determine if more than one interpretation on the intent of the language can be inferred.
  3. If it is determined that an interpretation is required, the Service Area Director must submit the request, in writing, to the Policy Directorate, for a response.

**b.** If a request does not require an interpretation but further clarification is needed it must be forwarded to the Service Center Operations Support Group for a response.

**1.** The Service Center Operations Support Group may consult with the Policy Directorate when preparing their response.

**2.** The Service Center Operations Support Group must provide a written response to the requestor and forward the response to the Policy Directorate.

**c.** Interpretation requests from all other sources must be submitted to the Policy Directorate at 9-AJV-P-HQ-Correspondence@faa.gov.

**NOTE–**

*Interpretations can be accessed through the Air Traffic Control Interpretation link at the following website: [https://my.faa.gov/org/linebusiness/ato/mission\\_support/psgroup/atc\\_interpretations.html](https://my.faa.gov/org/linebusiness/ato/mission_support/psgroup/atc_interpretations.html).*

## **1–1–10. PROCEDURAL LETTERS OF AGREEMENT (LOA)**

Procedures/minima which are applied jointly or otherwise require the cooperation or concurrence of more than one facility/organization must be documented in a letter of agreement. LOAs only supplement this order. Any minima they specify must not be less than that specified herein unless appropriate military authority has authorized application of reduced separation between military aircraft.

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–1–1, ATC Service.*

*FAA Order JO 7210.3, Para 4–3–1, Letters of Agreement.*

## **1–1–11. CONSTRAINTS GOVERNING SUPPLEMENTS AND PROCEDURAL DEVIATIONS**

**a.** Exceptional or unusual requirements may dictate procedural deviations or supplementary procedures to this order. Prior to implementing supplemental or any procedural deviation that alters the level, quality, or degree of service, obtain prior approval from the Vice President, Mission Support Services.

**b.** If military operations or facilities are involved, prior approval by the following appropriate headquarters is required for subsequent interface with FAA. (See TBL 1–1–3.)

**TBL 1–1–3**

### **Military Operations Interface Offices**

<b>Branch</b>	<b>Address</b>
U.S. Navy	Department of the Navy Chief of Naval Operations N980A, NAATSEA 2000 Navy Pentagon (5D453) Washington, D.C. 20350–2000
U.S. Air Force	HQ AFFSA 5316 S. Douglas Blvd Bldg 8400, Room 232 Oklahoma City, OK 73150
U.S. Army	Director USAASA (MOAS–AS) 9325 Gunston Road, Suite N319 Ft. Belvoir, VA 22060–5582

**NOTE–**

*Terminal: Headquarters Air Force Flight Standards Agency is the approval authority for any USAF procedures or minima that differ from those specified herein and that involve military aircraft only.*

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–1–12, Military Procedures.*

*FAA Order JO 7110.65, Para 3–1–3, Use of Active Runways.*

**1-1-12. SAFETY MANAGEMENT SYSTEM (SMS)**

Every employee is responsible to ensure the safety of equipment and procedures used in the provision of services within the National Airspace System (NAS). Risk assessment techniques and mitigations, as appropriate, are intended for implementation of any planned safety significant changes within the NAS, as directed by FAA Order 1100.161, Air Traffic Safety Oversight. Direction regarding the SMS and its application can be found in the FAA Safety Management System Manual and FAA Order 1100.161. The SMS will be implemented through a period of transitional activities. (Additional information pertaining to these requirements and processes can be obtained by contacting the service area offices.)

**1-1-13. REFERENCES TO FAA NON-AIR TRAFFIC ORGANIZATIONS**

When references are made to regional office organizations that are not part of the Air Traffic Organization (i.e., Communications Center, Flight Standards, Airport offices, etc.), the facility should contact the FAA region where the facility is physically located – not the region where the facility's service area office is located.

**1-1-14. DISTRIBUTION**

a. This order is distributed to selected offices in Washington headquarters, regional offices, service area offices, the William J. Hughes Technical Center, the Mike Monroney Aeronautical Center, and to all air traffic field facilities and international aviation field offices.

b. This order is distributed electronically to all who subscribe to receive email notifications through the FAA's website. All organizations are responsible for viewing, downloading, and subscribing to receive email notifications when changes occur to this order. Subscriptions to air traffic directives can be made through the Air Traffic Plans and Publications website at [https://www.faa.gov/air\\_traffic/publications/](https://www.faa.gov/air_traffic/publications/) or directly via the following link: [https://public.govdelivery.com/accounts/USAFAA/subscriber/new?topic\\_id=USAFAA\\_39](https://public.govdelivery.com/accounts/USAFAA/subscriber/new?topic_id=USAFAA_39).

## Chapter 2. General Control

### Section 1. General

#### 2-1-1. ATC SERVICE

- a. The primary purpose of the ATC system is to prevent a collision involving aircraft operating in the system.
- b. In addition to its primary purpose, the ATC system also:
  - 1. Provides a safe, orderly, and expeditious flow of air traffic.
  - 2. Supports National Security and Homeland Defense missions.
- c. The ATC system must provide certain additional services to the extent permitted. The provision of additional services is not optional on the part of the controller, but rather required when the work situation permits. It is recognized that the provision of these services may be precluded by various factors, including, but not limited to:
  - 1. Volume of traffic.
  - 2. Frequency congestion.
  - 3. Quality of surveillance.
  - 4. Controller workload.
  - 5. Higher priority duties.
  - 6. The physical inability to scan and detect situations falling in this category.
- d. Controllers must provide air traffic control service in accordance with the procedures and minima in this order, except when one or more of the following conditions exists:
  - 1. A deviation is necessary to conform with ICAO Documents, National Rules of the Air, or special agreements where the U.S. provides air traffic control service in airspace outside the U.S. and its possessions or:

**NOTE—**

*Pilots are required to abide by CFRs or other applicable regulations regardless of the application of any procedure or minima in this order.*

- 2. Other procedures/minima are prescribed in a letter of agreement, FAA directive, or a military document, or:

**NOTE—**

*These procedures may include altitude reservations, air refueling, fighter interceptor operations, law enforcement, etc.*

**REFERENCE—**

*FAA Order JO 7110.65, Para 1-1-10, Procedural Letters of Agreement (LOA).*

- 3. A deviation is necessary to assist an aircraft when an emergency has been declared.

**REFERENCE—**

*FAA Order JO 7110.65, Para 2-1-6, Safety Alert.*

*FAA Order JO 7110.65, Chapter 10, Emergencies.*

*FAA Order JO 7110.65, Para 5-1-4, Merging Target Procedures.*

- e. Air Traffic Control services are not provided for model aircraft operating in the NAS or to any UAS operating in the NAS at or below 400ft AGL.

**NOTE—**

- 1. This does not prohibit ATC from providing services to civil and public UAS.

**2.** *The provisions of this paragraph apply to model aircraft operating at any altitude. For all other UAS, this paragraph applies only to those UAS operating entirely at or below 400ft AGL.*

**REFERENCE–**

*P/CG Term – Model Aircraft.*

## **2–1–2. DUTY PRIORITY**

**a.** Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment must be used in prioritizing all other provisions of this order based on the requirements of the situation at hand.

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–1–6, Safety Alert.*

**NOTE–**

*Because there are many variables involved, it is virtually impossible to develop a standard list of duty priorities that would apply uniformly to every conceivable situation. Each set of circumstances must be evaluated on its own merit, and when more than one action is required, controllers must exercise their best judgment based on the facts and circumstances known to them. That action which is most critical from a safety standpoint is performed first.*

**b.** Provide support to national security and homeland defense activities to include, but not be limited to, reporting of suspicious and/or unusual aircraft/pilot activities.

**REFERENCE–**

*FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations.*

**c.** Provide and/or solicit weather information in accordance with procedures and requirements outlined in this order.

**NOTE–**

*Controllers are responsible to become familiar with and stay aware of current weather information needed to perform ATC duties.*

**d.** Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

## **2–1–3. PROCEDURAL PREFERENCE**

**a.** Use automation procedures in preference to nonautomation procedures when workload, communications, and equipment capabilities permit.

**b.** Use automation procedures that provide closed loop clearances in preference to open loop clearances to promote operational advantage for time-based management (TBM) when workload permits. (e.g., a QU route pick that anticipates length of vector and includes the next fix that ties into the route of flight.)

**c.** Use radar separation in preference to nonradar separation when it will be to an operational advantage and workload, communications, and equipment permit.

**d.** Use nonradar separation in preference to radar separation when the situation dictates that an operational advantage will be gained.

**NOTE–**

*One situation may be where vertical separation would preclude excessive vectoring.*

## **2–1–4. OPERATIONAL PRIORITY**

It is recognized that traffic flow may affect the controller's ability to provide priority handling. However, without compromising safety, good judgment must be used in each situation to facilitate the most expeditious movement of priority aircraft. Provide air traffic control service to aircraft on a "first come, first served" basis as circumstances permit, except the following:

**NOTE–**

*It is solely the pilot's prerogative to cancel an IFR flight plan. However, a pilot's retention of an IFR flight plan does not afford*



priority over VFR aircraft. For example, this does not preclude the requirement for the pilot of an arriving IFR aircraft to adjust his/her flight path, as necessary, to enter a traffic pattern in sequence with arriving VFR aircraft.

- a. An aircraft in distress has the right of way over all other air traffic.

**REFERENCE–**

14 CFR Section 91.113(c).

- b. Treat air ambulance flights as follows:

1. Provide priority handling to civil air ambulance flights when the pilot, in radio transmissions, verbally identifies the flight by stating “MEDEVAC” followed by the FAA authorized call sign or the full civil registration letters/numbers. Good judgment must be used in each situation to facilitate the most expeditious movement of a MEDEVAC aircraft.

**NOTE–**

*If a flight plan includes the letter “L” for “MEDEVAC” and/or includes “MEDEVAC” in Item 11 (Remarks) of the flight plan or Item 18 (Other Information) of an international flight plan, the entries are considered informational in nature only and not an identification for operational priority.*

**REFERENCE–**

FAA Order JO 7110.65, Para 2–4–20, Aircraft Identification.

2. Provide priority handling to AIR EVAC and HOSP flights when verbally requested by the pilot.

**NOTE–**

*If a flight plan includes “HOSP” or “AIR EVAC” in either Item 11 (Remarks) or Item 18 (Other Information) of an international flight plan, the entries are considered informational in nature only and not an identification for operational priority. For aircraft identification in radio transmissions, civilian pilots will use normal call signs when filing “HOSP” and military pilots will use the “EVAC” call sign.*

3. Assist the pilots of MEDEVAC, AIR EVAC, and HOSP aircraft to avoid areas of significant weather and adverse conditions.

4. If requested by a pilot, provide additional assistance (i.e., landline notifications) to expedite ground handling of patients, vital organs, or urgently needed medical materials.

- c. Provide priority handling and expedite the movement of presidential aircraft and entourage and any rescue support aircraft as well as related control messages when traffic conditions and communications facilities permit.

**NOTE–**

*As used herein the terms presidential aircraft and entourage include aircraft and entourage of the President, Vice President, or other public figures when designated by the White House.*

**REFERENCE–**

FAA Order JO 7110.65, Para 2–4–20, Aircraft Identification.

FAA Order JO 7110.65, Para 4–3–2, Departure Clearances.

FAA Order JO 7210.3, Para 5–1–1, Advance Coordination.

- d. Provide priority handling and maximum assistance to SAR aircraft performing a SAR mission.

**REFERENCE–**

FAA Order JO 7110.65, Para 10–1–3, Providing Assistance.

- e. Provide priority handling and maximum assistance to expedite the movement of interceptor aircraft on active air defense missions until the unknown aircraft is identified.

- f. Provide priority handling to NIGHT WATCH “NAOC” (pronounced NAY–OCK) aircraft when notified via landline or when “NAOC” is used in air/ground communications. When the term “NAOC” is used, approve any request(s) as soon as practicable.

**NOTE–**

*The term “NAOC” will not be a part of the Flight ID in the flight plan or used in conjunction with the call sign but may otherwise be used when the aircraft is airborne.*

**REFERENCE–**

FAA Order JO 7610.4, Para 9–1–1, Applications.

- g. Provide priority handling to any civil or military aircraft using the code name “FLYNET.”

**REFERENCE–**

FAA Order JO 7110.65, Para 9–2–5, FLYNET.

FAA Order JO 7610.4, Para 9–4–1, “FLYNET” Flights, Nuclear Emergency Teams.

**h.** Provide priority handling to aircraft using the code name “Garden Plot” only when CARF notifies you that such priority is authorized. Refer any questions regarding flight procedures to CARF for resolution.

**NOTE–**

*Garden Plot flights require priority movement and are coordinated by the military with CARF. State authority will contact the Regional Administrator to arrange for priority of National Guard troop movements within a particular state.*

**i.** Provide priority handling to USAF or other government aircraft engaged in aerial sampling/surveying missions using the call sign “SAMP.”

**REFERENCE–**

FAA Order JO 7110.65, Para 9–2–17, SAMP Flights.

FAA Order JO 7210.3, Para 5–3–2, Aerial Sampling/Surveying For Airborne Contamination.

**j.** Provide priority handling to Special Air Mission “SCOOT” aircraft when notified via landline or when “SCOOT” is used in air/ground communications. When the term “SCOOT” is used, approve any request(s) as soon as practicable.

**NOTE–**

*The term “SCOOT” will not be a part of the Flight ID in the flight plan but may be used during radio communications in conjunction with the call sign.*

**REFERENCE–**

FAA Order JO 7610.4, Para 9–6–1, Applications.

**k.** When requested, provide priority handling to TEAL and NOAA mission aircraft.

**REFERENCE–**

FAA Order JO 7110.65, Para 9–2–19, Weather Reconnaissance Flights.

**l.** Provide priority handling, as required to expedite Flight Check aircraft.

**NOTE–**

*It is recognized that unexpected wind conditions, weather, or heavy traffic flows may affect controller’s ability to provide priority or special handling at the specific time requested.*

**REFERENCE–**

FAA Order JO 7110.65, Para 9–1–3, Flight Check Aircraft.

**m.** IFR aircraft must have priority over SVFR aircraft.

**REFERENCE–**

FAA Order JO 7110.65, Chapter 7, Section 5, Special VFR (SVFR).

**n.** Aircraft operating under the North American Route Program (NRP) are not subject to route limiting restrictions (e.g., published preferred IFR routes, letter of agreement requirements, standard operating procedures).

**REFERENCE–**

FAA Order JO 7110.65, Para 2–3–2, En Route Data Entries.

FAA Order JO 7110.65, Para 2–2–15, North American Route Program (NRP) Information.

FAA Order JO 7110.65, Para 4–2–5, Route or Altitude Amendments.

FAA Order JO 7210.3, Chapter 18, Section 17, North American Route Program.

**o.** If able, provide priority handling to diverted flights. Priority handling may be requested via use of “DVRSN” in the remarks section of the flight plan or by the flight being placed on the Diversion Recovery Tool (DRT).

**REFERENCE–**

FAA Order JO 7210.3, Para 18–4–5, Diversion Recovery.

**p.** If able, provide priority handling to FALLEN HERO flights when “FALLEN HERO” is indicated in the remarks section of the flight plan or requested in air/ground communications.

**2–1–5. EXPEDITIOUS COMPLIANCE**

**a.** Use the word “immediately” only when expeditious compliance is required to avoid an imminent situation.

3. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

4. If normal operation is reported after the standby equipment is activated, continue use, record the incident on FAA Form 7230-4 or appropriate military form, and notify technical operations personnel (the Systems Engineer of the ARTCC when an en route aid is involved).

5. If continued malfunction is reported after the standby equipment is activated or the standby equipment cannot be activated, inform technical operations personnel and request advice on whether or not the aid should be shut down. In the absence of a second aircraft report, advise the technical operations personnel of the time of the initial aircraft report and the estimated time a second aircraft report could be obtained.

b. When an aircraft reports a GPS or WAAS anomaly, request the following information and/or take the following actions:

1. Record the following minimum information:

(a) Aircraft make, model, and call sign.

(b) Location or position, and altitude at the time where GPS or WAAS anomaly was observed.

(c) Date/time of occurrence.

2. Request a report from a second aircraft.

3. Record the incident on FAA Form 7230-4 or appropriate military form.

4. Inform other aircraft of the anomaly as specified in subparagraph 4-8-1k, l, or m, as applicable.

**PHRASEOLOGY-**

*ATTENTION ALL AIRCRAFT, GPS REPORTED UNRELIABLE (OR WAAS UNAVAILABLE) IN VICINITY/AREA (position).*

**EXAMPLE-**

*"Attention all aircraft, GPS reported unreliable (or WAAS unavailable) in the area 30 miles south of Waco VOR."*

c. When a pilot reports a WAAS anomaly, determine from the pilot what indications he or she observes and record the information in accordance with subparagraph b above.

## **2-1-11. USE OF MARSA**

a. MARSA may only be applied to military operations specified in a letter of agreement or other appropriate FAA or military document.

**NOTE-**

*Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.*

b. ATC facilities do not invoke or deny MARSA. Their sole responsibility concerning the use of MARSA is to provide separation between military aircraft engaged in MARSA operations and other nonparticipating IFR aircraft.

c. DoD must ensure that military pilots requesting special use airspace/ATCAAs have coordinated with the scheduling agency, have obtained approval for entry, and are familiar with the appropriate MARSA procedures. ATC is not responsible for determining which military aircraft are authorized to enter special use airspace/ATCAAs.

**REFERENCE-**

*FAA Order JO 7110.65, Para 9-2-13, Military Aerial Refueling.*

## 2-1-12. MILITARY PROCEDURES

Military procedures in the form of additions, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They must be applied by:

- a. ATC facilities operated by that military service.

### **EXAMPLE–**

1. *An Air Force facility providing service for an Air Force base would apply USAF procedures to all traffic regardless of class.*
2. *A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.*

- b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

### **EXAMPLE–**

1. *An FAA facility supports a USAF base exclusively; USAF procedures are applied to all traffic at that base.*
2. *An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport; basic FAA procedures are applied at both locations by the FAA facility.*
3. *A USAF facility supports a USAF base and provides approach control service to a satellite civilian airport; USAF procedures are applied at both locations by the USAF facility.*

### **REFERENCE–**

FAA Order JO 7110.65, Para 1-2-5, Annotations.

- c. Other ATC facilities when specified in a letter of agreement.

### **EXAMPLE–**

*A USAF unit is using a civil airport supported by an FAA facility– USAF procedures will be applied as specified in a letter of agreement between the unit and the FAA facility to the aircraft of the USAF unit. Basic FAA procedures will be applied to all other aircraft.*

## 2-1-13. FORMATION FLIGHTS

Control formation flights as a single aircraft. Separation responsibility between aircraft within the formation rests with 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 during join-up and breakaway.

### **REFERENCE–**

P/CG Term – Formation Flight.

FAA Order JO 7610.14, Chapter 7, Section 3, Military Formation Flight.

ICAO Annex 2, 3.1.8 Formation Flights.

- a. Support formation flight join-up for two aircraft when all of the following occur:

1. Requested by any participating pilot.
2. All participating pilots concur.
3. Either of the participating pilots reports the other/s in sight.

### **EXAMPLE–**

*“ROOK01 has EAGLE03 in sight, request formation join-up with EAGLE03 at flight level two zero zero. EAGLE03 will be the lead.”*

*“EAGLE03 verify requesting flight join-up with ROOK01.”*

*If affirmative:*

*“ROOK01 climb and maintain flight level two zero zero. Report (advise) when formation join-up is complete.”*

**b.** If multiple single aircraft request to join-up, multiple formations are joining as one, or aircraft are joining an established formation, obtain confirmation of required items listed in subparagraph 2-1-13a, from the lead aircraft.

**REFERENCE-**

*P/CG Term – Formation Flight*

**c.** After join-up, aircraft beacon code assignment will be determined by formation type.

**1.** For a standard formation only the aircraft acting as the lead will squawk an ATC assigned beacon code. Ensure all other aircraft squawk standby.

**2.** For a nonstandard formation, each aircraft should squawk an ATC assigned beacon code. Controller discretion allows aircraft in a nonstandard formation to squawk standby if operationally advantageous.

**REFERENCE-**

*FAA Order JO 7610.14, Para 7-3-6, Nonstandard Formation Tactics, Subpara b3.*

**EXAMPLE-**

*“N123JP squawk standby.”*

*Or*

*“N123SP have N123JP squawk standby.”*

**d.** When formation break-up is requested, issue control instructions and/or clearances which will result in approved separation through the lead or directly to the requesting aircraft in the formation.

**EXAMPLE-**

*“N5871S requesting flight break-up with N731K. N731K is changing destination to PHL.”*

*“N731K squawk 5432, turn right, fly heading zero-seven-zero.”*

*“Center, BAMA21. BAMA23 is requesting to RTB.”*

*“BAMA21 have BAMA23 squawk 5544, descend and maintain flight level one-niner-zero and change to my frequency.”*

*“Center, BAMA21. BAMA23 is requesting to RTB.”*

*“BAMA23 squawk 5544. BAMA23 Radar contact (position if required). Cleared to SSC via direct. Descend and maintain flight level one-niner-zero.”*

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-5-8, Additional Separation for Formation Flights.*

*P/CG Term – Formation Flight.*

**e.** Military and civil formation flights in RVSM airspace.

**1.** Utilize RVSM separation standards for a formation flight, which consists of all RVSM approved aircraft.

**2.** Utilize non-RVSM separation standards for a formation flight at or above FL 290, which does not consist of all RVSM approved aircraft.

**3.** If aircraft are requesting to form a formation flight to FL 290 or above, the controller who issues the clearance creating the formation flight is responsible for ensuring that the proper equipment suffix is entered for the lead aircraft.

**4.** If the flight departs as a formation, and is requesting FL 290 or above, the first center sector must ensure that the proper equipment suffix is entered.

**5.** If the formation flight is below FL 290 and later requests FL 290 or above, the controller receiving the RVSM altitude request must ensure the proper equipment suffix is entered.

**6.** Upon break-up of the formation flight, the controller initiating the break-up must ensure that all aircraft or flights are assigned their proper equipment suffix.

## **2-1-14. COORDINATE USE OF AIRSPACE**

**a.** Ensure that the necessary coordination has been accomplished before you allow an aircraft under your control to enter another controller’s area of jurisdiction.

**b.** Before you issue a control instruction directly to a pilot that will change the aircraft's heading, route, speed, or altitude, you must ensure that coordination has been completed with all controllers whose area of jurisdiction is affected by those instructions unless otherwise specified by a letter of agreement or facility directive. If your control instruction will be relayed to the pilot through a source other than another radar controller (FSS, New York Radio, San Francisco Radio, another pilot, etc.), you are still responsible to ensure that all required coordination is completed.

**NOTE–**

**1.** *It is good operating practice for controllers to confirm that required coordination has been/will be effected, especially in unusual circumstances, such as recently modified sector configurations, airspace changes, route changes, etc.*

**2.** *Ensuring that all required coordination has been completed does not necessarily imply that the controller issuing the control instruction directly to the pilot has to perform the coordination action.*

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–15, Control Transfer.

FAA Order JO 7110.65, Para 5–5–10, Adjacent Airspace.

FAA Order JO 7110.65, Para 5–4–5, Transferring Controller Handoff.

FAA Order JO 7110.65, Para 5–4–6, Receiving Controller Handoff.

## **2–1–15. CONTROL TRANSFER**

**a.** Transfer control of an aircraft in accordance with the following conditions:

**1.** At a prescribed or coordinated location, time, fix, or altitude; or,

**2.** At the time a radar handoff and frequency change to the receiving controller have been completed and when authorized by a facility directive or letter of agreement which specifies the type and extent of control that is transferred.

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–14, Coordinate Use of Airspace.

FAA Order JO 7110.65, Para 5–4–5, Transferring Controller Handoff.

FAA Order JO 7110.65, Para 5–4–6, Receiving Controller Handoff.

**b.** Transfer control of an aircraft only after eliminating any potential conflict with other aircraft for which you have separation responsibility.

**c.** Assume control of an aircraft only after it is in your area of jurisdiction unless specifically coordinated or as specified by letter of agreement or a facility directive.

## **2–1–16. SURFACE AREAS**

**a.** Coordinate with the appropriate nonapproach control tower on an individual aircraft basis before issuing a clearance which would require flight within a surface area for which the tower has responsibility unless otherwise specified in a letter of agreement.

**REFERENCE–**

FAA Order JO 7210.3, Para 4–3–1, Letters of Agreement.

14 CFR Section 91.127, Operating on or in the Vicinity of an Airport in Class E Airspace.

P/CG Term – Surface Area.

**b.** Coordinate with the appropriate control tower for transit authorization when you are providing radar traffic advisory service to an aircraft that will enter another facility's airspace.

**NOTE–**

*The pilot is not expected to obtain his/her own authorization through each area when in contact with a radar facility.*

**c.** Transfer communications to the appropriate facility, if required, prior to operation within a surface area for which the tower has responsibility.

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–17, Radio Communications.

FAA Order JO 7110.65, Para 3–1–11, Surface Area Restrictions.

FAA Order JO 7110.65, Para 7–6–1, Application.

14 CFR Section 91.129, Operations in Class D Airspace.

1. To aircraft conducting ASR, PAR, or radar monitored approaches, before the aircraft starts descent on final approach.

2. To aircraft conducting instrument approaches and remaining on the radar facility's frequency, before the aircraft passes the outer marker/final approach fix.

**PHRASEOLOGY–**

*WHEELS SHOULD BE DOWN.*

## **2-1-26. SUPERVISORY NOTIFICATION**

Ensure supervisor/controller-in-charge (CIC) is aware of conditions which impact sector/position operations including, but not limited to, the following:

- a. Weather.
- b. Equipment status.
- c. Potential sector overload.
- d. Emergency situations.
- e. Special flights/operations.
- f. Aircraft/pilot activity, including unmanned aircraft system (UAS) operation that is considered suspicious, as prescribed in FAA Order JO 7610.4, paragraph 7-3-1, and for information more specific to UAS, FAA Order JO 7210.3, paragraph 2-1-34.

**REFERENCE–**

*P/CG Term – Suspicious UAS.*

## **2-1-27. POSSIBLE PILOT DEVIATION NOTIFICATION**

When it appears that the actions of a pilot constitute a pilot deviation, notify the pilot, workload permitting.

**PHRASEOLOGY–**

*(Identification) POSSIBLE PILOT DEVIATION ADVISE YOU CONTACT (facility) AT (telephone number).*

**NOTE–**

*The phraseology example identified in this paragraph is commonly referred to as the “Brasher Notification” or “Brasher Warning,” which gives flight crews the opportunity to make note of the occurrence for future reference. The use of these terms during direct pilot communications is not appropriate.*

**REFERENCE–**

*FAA Order JO 8020.16, Air Traffic Organization Aircraft Accident and Aircraft Incident Notification, Investigation, and Reporting, Chapter 11, Para 3, Air Traffic Facility Responsibilities.*

## **2-1-28. TCAS RESOLUTION ADVISORIES**

a. When an aircraft under your control jurisdiction informs you that it is responding to a TCAS Resolution Advisory (RA), do not issue control instructions that are contrary to the RA procedure that a crew member has advised you that they are executing. Provide safety alerts regarding terrain or obstructions and traffic advisories for the aircraft responding to the RA and all other aircraft under your control jurisdiction, as appropriate.

b. Unless advised by other aircraft that they are also responding to a TCAS RA, do not assume that other aircraft in the proximity of the responding aircraft are involved in the RA maneuver or are aware of the responding aircraft's intended maneuvers. Continue to provide control instructions, safety alerts, and traffic advisories as appropriate to such aircraft.

**NOTE–**

*When notified by the pilot of an RA, the controller is not prohibited from issuing traffic advisories and safety alerts.*

**REFERENCE–**

*FAA Order JO 7110.65, Para 2-1-6, Safety Alert.*

*FAA Order JO 7110.65, Para 2-1-21, Traffic Advisories.*

c. Once the responding aircraft has begun a maneuver in response to an RA, the controller is not responsible for providing approved separation between the aircraft that is responding to an RA and any other aircraft, airspace, terrain or obstructions. Responsibility for approved separation resumes when one of the following conditions is met:

1. The responding aircraft has returned to its assigned altitude, or
2. A crew member informs you that the TCAS maneuver is completed and you observe that approved separation has been reestablished, or
3. The responding aircraft has executed an alternate clearance and you observe that approved separation has been reestablished.

**NOTE–**

1. *AC 120–55, Air Carrier Operational Approval and Use of TCAS II, suggests pilots use the following phraseology to notify controllers during TCAS events. When a TCAS RA may affect an ATC clearance, inform ATC when beginning the maneuver, or as soon as workload permits.*

**EXAMPLE–**

1. “New York Center, United 321, TCAS RA.”

**NOTE–**

2. *When the RA has been resolved, the flight crew should advise ATC they are returning to their previously assigned clearance or subsequent amended clearance.*

**EXAMPLE–**

2. “New York Center, United 321, clear of conflict, returning to assigned altitude.”

## 2–1–29. RVSM OPERATIONS

RVSM operations are conducted in RVSM airspace that is defined as any airspace between FL 290 and FL 410 inclusive, where eligible aircraft are separated vertically by 1,000 feet. Controller responsibilities must include but not be limited to the following:

**a. Non–RVSM aircraft operating in RVSM airspace.**

1. Ensure non–RVSM aircraft are not permitted in RVSM airspace unless they meet the criteria of excepted aircraft and are previously approved by the operations supervisor/CIC. The following aircraft are excepted: DoD, DoD-certified aircraft operated by NASA (T38, F15, F18, WB57, S3, and U2 aircraft only), MEDEVAC, manufacturer aircraft being flown for development/certification, and Foreign State aircraft. These exceptions are accommodated on a workload or traffic-permitting basis.

**NOTE–**

*The operations supervisor/CIC is responsible for system acceptance of a non–RVSM aircraft beyond the initial sector–to–sector coordination following the pilot request to access the airspace. Operations supervisor/CIC responsibilities are defined in FAA Order JO 7210.3, Chapter 6, Section 9, Reduced Vertical Separation Minimum (RVSM).*

2. Ensure sector–to–sector coordination for all non–RVSM aircraft operations within RVSM airspace.

3. Inform the operations supervisor/CIC when a non–RVSM exception flight is denied clearance into RVSM airspace or is removed from RVSM airspace.

**b. Non–RVSM aircraft transitioning RVSM airspace.**

Ensure that operations supervisors/CICs are made aware when non–RVSM aircraft are transitioning through RVSM airspace.

c. Apply appropriate separation standards and remove any aircraft from RVSM airspace that advises it is unable RVSM due to equipment while en route.

d. Use “negative RVSM” in all verbal ground–to–ground communications involving non–RVSM aircraft while cleared to operate within RVSM airspace.



## Section 2. Flight Plans and Control Information

### 2-2-1. RECORDING INFORMATION

a. Record flight plan information required by the type of flight plan and existing circumstances. Use authorized abbreviations when possible.

**NOTE—**

*Generally, all military overseas flights are required to clear through a specified military base operations office (BASOPS). Pilots normally will not file flight plans directly with an FAA facility unless a BASOPS is not available. BASOPS will, in turn, forward the IFR flight notification message to the appropriate center.*

b. **EN ROUTE.** When flight plans are filed directly with the center, record all items given by the pilot either on a flight progress strip/flight data entry or on a voice recorder. If the latter, enter in box 26 of the initial flight progress strip the sector or position number to identify where the information may be found in the event search and rescue (SAR) activities become necessary.

**REFERENCE—**

*FAA Order JO 7110.65, Para 2-3-2, En Route Data Entries.*

### 2-2-2. FORWARDING INFORMATION

a. Except during EAS FDP operation, forward the flight plan information to the appropriate ATC facility, FSS, or BASOPS and record the time of filing and delivery on the form.

b. **EN ROUTE.** During EAS FDP operation, the above manual actions are required in cases where the data is not forwarded automatically by the computer.

**NOTE—**

*During EAS FDP operation, data is exchanged between interfaced automated facilities and both the data and time of transmission are recorded automatically.*

c. **EN ROUTE.** Forward proposed tower en route flight plans and any related amendments to the appropriate departure terminal facility.

### 2-2-3. FORWARDING VFR DATA

**TERMINAL**

Forward aircraft departure times to FSSs or military operations offices when they have requested them. Forward other VFR flight plan data only if requested by the pilot.

### 2-2-4. MILITARY DVFR DEPARTURES

**TERMINAL**

Forward departure times on all DVFR departures from joint-use airports to the military operations office.

**NOTE—**

1. *Details for handling air carrier and nonscheduled civil DVFR flight data are contained in FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations.*

2. *Civil pilots departing DVFR from a joint-use airport will include the phrase “DVFR to (destination)” in their initial call-up to an FAA-operated tower.*

### 2-2-5. IFR TO VFR FLIGHT PLAN CHANGE

Request a pilot to contact the appropriate FSS if the pilot informs you of a desire to change from an IFR to a VFR flight plan.

**2-2-6. IFR FLIGHT PROGRESS DATA**

Forward control information from controller to controller within a facility, then to the receiving facility as the aircraft progresses along its route. Where appropriate, use computer equipment in lieu of manual coordination procedures. Do not use the remarks section of flight progress strips in lieu of voice coordination to pass control information. Ensure that flight plan and control information is correct and up-to-date. When covered by a letter of agreement/facility directive, the time requirements of subparagraph a may be reduced, and the time requirements of subparagraph b1 and paragraph 2-2-11, Forwarding Amended and UTM Data, subparagraph a may be increased up to 15 minutes when facilitated by automated systems or mandatory radar handoffs; or if operationally necessary because of manual data processing or nonradar operations, the time requirements of subparagraph a may be increased.

**NOTE-**

**1.** *The procedures for preparing flight plan and control information related to altitude reservations (ALTRVs) are contained in FAA Order JO 7210.3, paragraph 8-1-2, Facility Operation and Administration, ALTRV Flight Data Processing. Development of the methods for assuring the accuracy and completeness of ALTRV flight plan and control information is the responsibility of the military liaison and security officer.*

**2.** *The term facility in this paragraph refers to centers and terminal facilities when operating in an en route capacity.*

**a.** Forward the following information at least 15 minutes before the aircraft is estimated to enter the receiving facility's area:

- 1.** Aircraft identification.
- 2.** Number of aircraft if more than one, heavy aircraft indicator "H/" if appropriate, type of aircraft, and aircraft equipment suffix.
- 3.** Assigned altitude and ETA over last reporting point/fix in transferring facility's area or assumed departure time when the departure point is the last point/fix in the transferring facility's area.
- 4.** Altitude at which aircraft will enter the receiving facility's area if other than the assigned altitude.
- 5.** True airspeed.
- 6.** Point of departure.
- 7.** Route of flight remaining.
- 8.** Destination airport and clearance limit if other than destination airport.
- 9.** ETA at destination airport (not required for military or scheduled air carrier aircraft).
- 10.** Altitude requested by the aircraft if assigned altitude differs from requested altitude (within a facility only).

**NOTE-**

*When an aircraft has crossed one facility's area and assignment at a different altitude is still desired, the pilot will reinitiate the request with the next facility.*

**REFERENCE-**

*FAA Order JO 7110.65, Para 4-5-8, Anticipated Altitude Changes.*

**11.** When flight plan data must be forwarded manually and an aircraft has been assigned a beacon code by the computer, include the code as part of the flight plan.

**NOTE-**

*When an airborne aircraft that has been assigned a beacon code by the ARTCC computer and whose flight plan will terminate in another facility's area cancels ATC service, appropriate action should be taken to remove flight plan information on that aircraft.*

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-2-II, Forwarding Amended and UTM Data.*

**12.** Longitudinal separation being used in non-radar operations between aircraft at the same altitude if it results in these aircraft having less than 10 minutes separation at the facilities' boundary, unless (otherwise) specified in a Letter of Agreement (LOA).

13. Any additional nonroutine operational information pertinent to flight safety.

**NOTE–**

*EN ROUTE. This includes alerting the receiving controller that the flight is conducting celestial navigation training.*

**REFERENCE–**

*FAA Order JO 7110.65, Para 9–2–2, Celestial Navigation Training.*

- b. Forward position report over last reporting point in the transferring facility's area if any of the following conditions exist:

1. Time differs more than 3 minutes from estimate given.
2. Requested by receiving facility.
3. Agreed to between facilities.

## **2–2–7. MANUAL INPUT OF COMPUTER-ASSIGNED BEACON CODES**

When a flight plan is manually entered into the computer and a computer-assigned beacon code has been forwarded with the flight plan data, insert the beacon code in the appropriate field as part of the input message.

## **2–2–8. ALTRV INFORMATION**

*EN ROUTE*

When an aircraft is a part of an approved ALTRV, forward only those items necessary to properly identify the flight, update flight data contained in the ALTRV APVL, or revise previously given information.

## **2–2–9. COMPUTER MESSAGE VERIFICATION**

*EN ROUTE*

Unless your facility is equipped to automatically obtain acknowledgment of receipt of transferred data, when you transfer control information by computer message, obtain, via Service F, acknowledgment that the receiving center has received the message and verification of the following:

- a. Within the time limits specified by a letter of agreement or when not covered by a letter of agreement, at least 15 minutes before the aircraft is estimated to enter the receiving facility's area, or at the time of a radar handoff, or coordination for transfer of control:

1. Aircraft identification.
2. Assigned altitude.
3. Departure or coordination fix time.

- b. Any cancellation of IFR or EAS generated VFR flight plan.

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–2–6, IFR Flight Progress Data.*

## **2–2–10. TRANSMIT PROPOSED FLIGHT PLAN**

*EN ROUTE*

- a. Transmit proposed flight plans which fall within an ARTCC's Proposed Boundary Crossing Time (PBCT) parameter to adjacent ARTCC's via the Computer B network during hours of inter-center computer operation. In addition, when the route of flight of any proposed flight plan exceeds 20 elements external to the originating ARTCC's area, NADIN must be used to forward the data to all affected centers.

- b. During nonautomated operation, the proposed flight plans must be sent via NADIN to the other centers involved when any of the following conditions are met:

1. The route of flight external to the originating center's area consists of 10 or more elements and the flight will enter 3 or more other center areas.

**NOTE–**

*An element is defined as either a fix or route as specified in FAA Order JO 7110.10, Flight Services, paragraph 6–2–3, Control Messages.*

2. The route of flight beyond the first point of exit from the originating center's area consists of 10 or more elements, which are primarily fixes described in fix-radial-distance or latitude/longitude format, regardless of the number of other center areas entered.

3. The flight plan remarks are too lengthy for interphone transmission.

## 2–2–11. FORWARDING AMENDED AND UTM DATA

a. Forward any amending data concerning previously forwarded flight plans except that revisions to ETA information in paragraph 2–2–6, IFR Flight Progress Data, need only be forwarded when the time differs by more than 3 minutes from the estimate given.

**PHRASEOLOGY–**

*(Identification), REVISED (revised information).*

**EXAMPLE–**

*“American Two, revised flight level, three three zero.”*

*“United Eight Ten, revised estimate, Front Royal two zero zero five.”*

*“Douglas Five Zero One Romeo, revised altitude, eight thousand.”*

*“U.S. Air Eleven Fifty–one, revised type, heavy Boeing Seven Sixty-seven.”*

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–2–6, IFR Flight Progress Data.*

b. Computer acceptance of an appropriate input message fulfills the requirement for sending amended data. During EAS FDP operations, the amendment data are considered acknowledged on receipt of a computer update message or a computer-generated flight progress strip containing the amended data.

**NOTE–**

1. *The successful utilization of automation equipment requires timely and accurate insertion of changes and/or new data.*

2. *If a pilot is not issued a computer-generated ADR/ADAR/AAR and if amendment data is not entered into the computer, the next controller will have incorrect route information.*

c. Forward any amended control information and record the action on the appropriate flight progress strip. Additionally, when a route or altitude in a previously issued clearance is amended within 30 minutes of an aircraft's proposed departure time, the facility that amended the clearance must coordinate the amendment with the receiving facility via verbal AND automated means to ensure timely passage of the information. If the automated means of coordination are unavailable, then verbal coordination is sufficient.

**NOTE–**

*The term “receiving” facility means the ATC facility that is expected to transmit the amended clearance to the intended aircraft/pilot.*

d. **EN ROUTE.** Effect manual coordination on any interfacility flight plan data that is not passed through automated means.

e. **EN ROUTE.** When a controller receives a UTM notification to an FDIO only facility, they must effect manual coordination for the flight plan data. In addition, the controller must verify the flight plan data to the receiving facility within three minutes of the transfer of control point estimate.

**NOTE–**

*FDIO only facilities are facilities with FDIO but without STARS.*

## 2-3-5. AIRCRAFT IDENTITY

Indicate aircraft identity by one of the following using combinations not to exceed seven alphanumeric characters:

a. Civil aircraft, including the air-carrier letter-digit registration number which can include the letter “T” for air taxi, the letter “L” for MEDEVAC, or the 3-letter company designator specified in FAA Order JO 7340.2, Contractions, followed by the trip or flight number. Use the operating air carrier’s company name in identifying equipment interchange flights.

**EXAMPLE–**

“N12345.”

“TN5552Q.”

“AA1192.”

“LN751B.”

**NOTE–**

The letter “L” is not to be used for air carrier/air taxi MEDEVAC aircraft.

**b. Military Aircraft.**

1. Prefixes indicating branch of service and/or type of mission followed by the last 5 digits of the serial number (the last 4 digits for CFC and CTG). (See TBL 2-3-6 and TBL 2-3-7.)

2. Pronounceable words of 3, 4, 5, and 6 letters followed by a 4-, 3-, 2-, or 1-digit number.

**EXAMPLE–**

“SAMP Three One Six.”

3. Assigned double-letter 2-digit flight number.

4. Navy or Marine fleet and training command aircraft, one of the following:

(a) The service prefix and 2 letters (use phonetic alphabet equivalent) followed by 2 or 3 digits.

**TBL 2-3-6  
Branch of Service Prefix**

Prefix	Branch
A	U.S. Air Force
C	U.S. Coast Guard
G	Air or Army National Guard
R	U.S. Army
VM	U.S. Marine Corps
VV	U.S. Navy
CFC	Canadian Forces
CTG	Canadian Coast Guard

**TBL 2-3-7  
Military Mission Prefix**

Prefix	Mission
E	Medical Air Evacuation
F	Flight Check
L	LOGAIR (USAF Contract)
RCH	AMC (Air Mobility Command)
S	Special Air Mission

(b) The service prefix and a digit and a letter (use phonetic alphabet equivalent) followed by 2 or 3 digits.

5. Aircraft carrying the President, Vice President, and/or their family members will use the identifiers in the following tables. See TBL 2–3–8 and TBL 2–3–9.

**TBL 2–3–8**  
**President and Family**

Service	President	Family
Air Force	AF1	EXEC1F
Marine	VM1	EXEC1F
Navy	VV1	EXEC1F
Army	RR1	EXEC1F
Coast Guard	C1	EXEC1F
Guard	G1	EXEC1F
Commercial	EXEC1	EXEC1F

**TBL 2–3–9**  
**Vice President and Family**

Service	Vice President	Family
Air Force	AF2	EXEC2F
Marine	VM2	EXEC2F
Navy	VV2	EXEC2F
Army	RR2	EXEC2F
Coast Guard	C2	EXEC2F
Guard	G2	EXEC2F
Commercial	EXEC2	EXEC2F

c. Special use. Approved special use identifiers.

## 2–3–6. AIRCRAFT TYPE

Use the approved aircraft type designator, in accordance with FAA Order 7360.1, Aircraft Type Designators.

## 2–3–7. USAF/USN UNDERGRADUATE PILOTS

To identify aircraft piloted by solo USAF/USN undergraduate student pilots (who may occasionally request revised clearances because they normally are restricted to flight in VFR conditions), the aircraft identification in the flight plan shall include the letter “Z” as a suffix. Do not use this suffix, however, in ground-to-air communication.

### **NOTE–**

*USAF solo students who have passed an instrument certification check may penetrate cloud layers in climb or descent only. Requests for revised clearances to avoid clouds in level flight can still be expected. This does not change the requirement to use the letter “Z” as a suffix to the aircraft identification.*

### **REFERENCE–**

FAA Order JO 7110.65, Para 2–4–20, Aircraft Identification.

FAA Order JO 7610.14, Chapter 7, Section 2, USAF Undergraduate Flying Training (UFT)/Pilot Instructor Training (PIT)/Introduction To Fighter Fundamentals.

## 2–3–8. AIRCRAFT EQUIPMENT SUFFIX

a. The aircraft equipment suffix identifying communication, navigation and surveillance (CNS) capability is generated by automation using the equipment codes of the ICAO flight plan. To change a suffix, the CNS equipment codes must be modified, allowing automation to translate them into the proper suffix. If using unsupported automation platforms (OFDPS and FDP2000), verbally coordinate changes with adjacent supported facilities.

## Section 6. Weather Information

### 2-6-1. FAMILIARIZATION

Controllers must become familiar with pertinent weather information when coming on duty, and stay aware of current and forecasted weather information needed to perform ATC duties.

**NOTE—**

*Every phase of flight has the potential to be impacted by weather, and emphasis must be placed on gathering, reporting and disseminating weather information.*

### 2-6-2. PIREP SOLICITATION AND DISSEMINATION

Emphasis must be placed on the solicitation and dissemination of Urgent (UUA) and Routine (UA) PIREPs. Timely dissemination of PIREPs alerts pilots to weather conditions and provides information useful to forecasters in the development of aviation forecasts. PIREPs also provide information required by ATC in the provision of safe and efficient use of airspace. This includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, braking action, volcanic eruptions and volcanic ash clouds, detection of sulfur gases in the cabin, and other conditions pertinent to flight safety. Controllers must provide the information in sufficient detail to assist pilots in making decisions pertinent to flight safety.

**NOTE—**

*Routine PIREPs indicating a lack of forecasted weather conditions, for example, a lack of icing or turbulence, are also valuable to aviation weather forecasters and pilots. This is especially true when adverse conditions are expected or forecasted but do not develop or no longer exist.*

**REFERENCE—**

FAA Order JO 7110.65, Para 3-1-8, Low Level Wind Shear/Microburst Advisories.

FAA Order JO 7110.65, Para 3-3-4, Braking Action.

P/CG Term— Braking Action.

FAA Order JO 7210.3, Para 6-3-1, Handling of SIGMETs, CWAs, and PIREPs.

AIM, Para 7-5-9, Flight Operations in Volcanic Ash.

FAA Order JO 7210.3, Para 10-3-1, SIGMET and PIREP Handling.

FAA Order JO 7110.10, Chapter 8, Section 1, Pilot Weather Reports.

**a.** Solicit PIREPs when requested, deemed necessary or any of the following conditions exists or is forecast for your area of jurisdiction:

**1.** Ceilings at or below 5,000 feet. These PIREPs must include cloud bases, tops and cloud coverage when available. Additionally, when providing approach control services, ensure that at least one descent/climb-out PIREP and other related phenomena is obtained each hour.

**2.** Visibility (surface or aloft) at or less than 5 miles.

**3.** Thunderstorms and related phenomena.

**4.** Turbulence of moderate degree or greater.

**5.** Icing of light degree or greater.

**6.** Wind shear.

**7.** Braking action reports less than good.

**8.** Volcanic ash clouds.

**9.** Detection of sulfur gases (SO<sub>2</sub> or H<sub>2</sub>S), associated with volcanic activity, in the cabin.

**NOTE—**

**1.** *The smell of sulfur gases in the cockpit may indicate volcanic activity that has not yet been detected or reported and/or*

possible entry into an ash-bearing cloud. SO<sub>2</sub> is identifiable as the sharp, acrid odor of a freshly struck match. H<sub>2</sub>S has the odor of rotten eggs.

**2. Pilots may forward PIREPs regarding volcanic activity using the format described in the Volcanic Activity Reporting Form (VAR) as depicted in the AIM, Appendix 2.**

**b. Record with the PIREPs:**

- 1. Time.**
- 2. Aircraft position.**
- 3. Type aircraft.**
- 4. Altitude.**
- 5. When the PIREP involves icing include:**
  - (a) Icing type and intensity.**
  - (b) Air temperature in which icing is occurring.**

**c. Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.**

**PHRASEOLOGY–**

*REQUEST/SAY FLIGHT CONDITIONS. Or if appropriate,  
REQUEST/SAY (specific conditions; i.e., ride, cloud, visibility, etc.) CONDITIONS.  
If necessary,  
OVER (fix),*

*or*

*ALONG PRESENT ROUTE,*

*or*

*BETWEEN (fix) AND (fix).*

**d. Disseminate PIREPs as follows:**

- 1. Relay pertinent PIREP information to concerned aircraft in a timely manner.**

**NOTE–**

*Use the word gain and/or loss when describing to pilots the effects of wind shear on airspeed.*

**EXAMPLE–**

*“Delta Seven Twenty-one, a Boeing Seven Thirty-seven, previously reported wind shear, loss of two five knots at four hundred feet.”*

*“Alaska One, a Boeing Seven Thirty-seven, previously reported wind shear, gain of two-five knots between niner hundred and six hundred feet, followed by a loss of five zero knots between five hundred feet and the surface.”*

**REFERENCE–**

*AIM, Para 7-1-22, Wind Shear PIREPs.*

- 2. EN ROUTE. Relay all operationally significant PIREPs to the facility weather coordinator.**

**REFERENCE–**

*FAA Order JO 7210.3, Para 6-3-1, Handling of SIGMETs, CWAs, and PIREPs.*

- 3. TERMINAL. Relay all operationally significant PIREPs to:**

- (a) The appropriate intrafacility positions.**
- (b) The OS/CIC for long line dissemination via an FAA approved electronic system (for example, AIS-R, or similar systems); or,**
- (c) Outside Alaska: The overlying ARTCC’s Flight Data Unit for long-line dissemination.**



## Section 7. Altimeter Settings

### 2-7-1. CURRENT SETTINGS

**a.** Current altimeter settings must be obtained from direct-reading instruments or directly from weather reporting stations.

**REFERENCE–**

FAA Order JO 7210.3, Chapter 2, Section 10, Wind/Altimeter Information.

**b.** If a pilot requests the altimeter setting in millibars, ask the nearest weather reporting station for the equivalent millibar setting.

**c.** USAF/USA. Use the term “Estimated Altimeter” for altimeter settings reported or received as estimated.

**REFERENCE–**

FAA Order JO 7110.65, Para 3-9-1, Departure Information.

FAA Order JO 7110.65, Para 3-10-1, Landing Information.

FAA Order JO 7110.65, Para 4-7-10, Approach Information.

### 2-7-2. ALTIMETER SETTING ISSUANCE BELOW LOWEST USABLE FL

**a. TERMINAL.** Identify the source of an altimeter setting when issued for a location other than the aircraft's departure or destination airport.

**b. EN ROUTE.** Identify the source of all altimeter settings when issued.

**PHRASEOLOGY–**

*(If the altimeter is one hour old or less),*

*THE (facility name) ALTIMETER (setting).*

*or*

*(If the altimeter is more than one hour old),*

*THE (facility name) ALTIMETER (setting) MORE THAN ONE HOUR OLD.*

**c.** Issue the altimeter setting:

**1.** To en route aircraft at least one time while operating in your area of jurisdiction. Issue the setting for the nearest reporting station along the aircraft's route of flight:

**NOTE–**

*14 CFR Section 91.121(1) requires that the pilot set his/her altimeter to the setting of a station along his/her route of flight within 100 miles of the aircraft if one is available. However, issuance of the setting of an adjacent station during periods that a steep gradient exists will serve to inform the pilot of the difference between the setting he/she is using and the pressure in the local area and better enable him/her to choose a more advantageous setting within the limitations of 14 CFR Section 91.121.*

**2. TERMINAL.** To all departures. Unless specifically requested by the pilot, the altimeter setting need not be issued to local aircraft operators who have requested this omission in writing or to scheduled air carriers.

**REFERENCE–**

FAA Order JO 7110.65, Para 3-9-1, Departure Information.

**3. TERMINAL.** To arriving aircraft on initial contact or as soon as possible thereafter. The tower may omit the altimeter if the aircraft is sequenced or vectored to the airport by the approach control having jurisdiction at that facility.

**REFERENCE–**

FAA Order JO 7110.65, Para 4-7-10, Approach Information.

FAA Order JO 7110.65, Para 5-10-2, Approach Information.

**4. EN ROUTE.** For the destination airport to arriving aircraft, approximately 50 miles from the destination, if an approach control facility does not serve the airport.

5. In addition to the altimeter setting provided on initial contact, issue changes in altimeter setting to aircraft executing a nonprecision instrument approach as frequently as practical when the official weather report includes the remarks “pressure falling rapidly.”

d. If the altimeter setting must be obtained by the pilot of an arriving aircraft from another source, instruct the pilot to obtain the altimeter setting from that source.

**NOTE–**

1. The destination altimeter setting, whether from a local or remote source, is the setting upon which the instrument approach is predicated.

2. Approach charts for many locations specify the source of altimeter settings as non–FAA facilities, such as UNICOMs.

e. When issuing clearance to descend below the lowest usable flight level, advise the pilot of the altimeter setting of the weather reporting station nearest the point the aircraft will descend below that flight level. Local directives may delegate this responsibility to an alternate sector when Optimized Profile Descents (OPD) commence in sectors consisting entirely of Class A airspace.

f. Department of Defense (DoD) aircraft that are authorized to operate in restricted areas, MOAs, and ATC assigned airspace areas on “single altimeter settings” (CFR Exemption 2861A), must be issued altimeter settings in accordance with standard procedures while the aircraft are en route to and from the restricted areas, MOAs, and ATC assigned airspace areas.

**NOTE–**

The DoD is responsible for conducting all “single altimeter setting” operations within the boundaries of MOAs, restricted areas, and ATCAAs. Under an LOA, the DoD provides safe altitude clearance between DoD aircraft and other aircraft operating within, above, and below the MOAs, restricted areas, and ATCAAs with appropriate clearance of terrain.

**REFERENCE–**

■ FAA Order JO 7610.14, Appendix 4, Document 4, Grant of Exemption No. 2861A – Single Altimeter Setting For Frequent Transit of FL180.

g. When the barometric pressure is greater than 31.00 inches Hg., issue the altimeter setting and:

1. En Route/Arrivals. Advise pilots to remain set on altimeter 31.00 until reaching final approach segment.

2. Departures. Advise pilots to set altimeter 31.00 prior to reaching any mandatory/crossing altitude or 1,500 feet AGL, whichever is lower.

**PHRASEOLOGY–**

*ALTIMETER (setting), SET THREE ONE ZERO ZERO UNTIL REACHING THE FINAL APPROACH FIX.*

*or*

*ALTIMETER (setting), SET THREE ONE ZERO ZERO PRIOR TO REACHING (mandatory/crossing altitude or 1,500 feet AGL, whichever is lower).*

**NOTE–**

1. Aircraft with Mode C altitude reporting will be displayed on the controller’s radar scope with a uniform altitude offset above the assigned altitude. With an actual altimeter of 31.28 inches Hg, the Mode C equipped aircraft will show 3,300 feet when assigned 3,000 feet. This will occur unless local directives authorize entering the altimeter setting 31.00 into the computer system regardless of the actual barometric pressure.

2. Flight Standards will implement high barometric pressure procedures by NOTAM defining the geographic area affected.

3. Airports unable to accurately measure barometric pressures above 31.00 inches Hg. will report the barometric pressure as “missing” or “in excess of 31.00 inches of Hg.” Flight operations to or from those airports are restricted to VFR weather conditions.

**REFERENCE–**

AIM, Para 7–2–2, Procedures.

FAA Order JO 7110.65, Para 3–10–1, Landing Information.

**5. Instrument approach and runway in use.**

**b. Man-Portable Air Defense Systems (MANPADS) alert and advisory.** Specify the nature and location of threat or incident, whether reported or observed and by whom, time (if known), and notification to pilots to advise ATC if they need to divert.

**EXAMPLE–**

1. “MANPADS alert. Exercise extreme caution. MANPADS threat reported by TSA, Chicago area.” “Advise on initial contact if you want to divert.”
2. “MANPADS alert. Exercise extreme caution. MANPADS attack observed by tower one-half mile northwest of airfield at one-two-five-zero Zulu.” “Advise on initial contact if you want to divert.”

**REFERENCE–**

FAA Order JO 7110.65, Para 10–2–13, MANPADS Alert.  
FAA Order JO 7210.3, Para 2–1–10, Handling MANPADS Incidents.

**c. Terminal facilities must include reported unauthorized laser illumination events on the ATIS broadcast for one hour following the last report.** Include the time, location, altitude, color, and direction of the laser as reported by the pilot.

**PHRASEOLOGY–**

UNAUTHORIZED LASER ILLUMINATION EVENT, (UTC time), (location), (altitude), (color), (direction).

**EXAMPLE–**

UNAUTHORIZED LASER ILLUMINATION EVENT, AT 0100z, 8 MILE FINAL RUNWAY 18R AT 3,000 FEET, GREEN LASER FROM THE SOUTHWEST.

**REFERENCE–**

FAA Order JO 7110.65, Para 10–2–14, Unauthorized Laser Illumination of Aircraft.  
FAA Order JO 7210.3, Para 2–1–30, Reporting Unauthorized Laser Illumination of Aircraft.

**d. The ceiling/sky condition, visibility, and obstructions to vision may be omitted if the ceiling is above 5,000 feet and the visibility is more than 5 miles.**

**EXAMPLE–**

A remark may be made, “The weather is better than five thousand and five.”

**e. Instrument/visual approach/es in use.** Specify landing runway/s unless the runway is that to which the instrument approach is made. Before advertising non-precision approaches, priority should be given to available precision, then APV approaches.

**f. Departure runway/s (to be given only if different from landing runway/s or in the instance of a “departure only” ATIS).**

**g. Taxiway closures which affect the entrance or exit of active runways, other closures which impact airport operations, other NOTAMs and PIREPs pertinent to operations in the terminal area.** Inform pilots of where hazardous weather is occurring and how the information may be obtained. Include available information of known bird activity.

**REFERENCE–**

FAA Order JO 7110.65, 2–1–23, Bird Activity Information.

**h. When a runway length has been temporarily or permanently shortened, ensure that the word “WARNING” prefaces the runway number, and that the word “shortened” is also included in the text of the message.**

**1. Available runway length, as stated in the NOTAM, must be included in the ATIS broadcast.** This information must be broadcast for the duration of the construction project.

**2. For permanently shortened runways, facilities must continue to broadcast this information for a minimum of 30 days or until the Chart Supplement U.S. has been updated, whichever is longer.**

**PHRASEOLOGY–**

WARNING, RUNWAY (number) HAS BEEN SHORTENED, (length in feet) FEET AVAILABLE.

**EXAMPLE–**

“Warning, Runway One-Zero has been shortened, niner-thousand eight hundred and fifty feet available.”

- i. Runway Condition Codes (RwyCC) when provided. Include the time of the report.

**PHRASEOLOGY–**

*RUNWAY (number) condition codes (first value, second value, third value) AT (time),*

**EXAMPLE–**

*“Runway Two Seven, condition codes two, two, one at one zero one eight Zulu.”*

**REFERENCE–**

*FAA Order JO 7110.65, Para 3–3–1, Landing Area Condition.*

- j. Runway Condition Codes “3/3/3” and the statement “Slippery When Wet.”

**EXAMPLE–**

*“Runway (number) condition codes three, three, three, Slippery When Wet at one two five five Zulu.”*

**NOTE–**

*A Slippery When Wet FICON NOTAM indicates a runway has failed a friction survey, for example, due to excessive rubber build-up. Airport Operators will notify ATCT operational personnel of this concern and issue a FICON NOTAM prior to the expected arrival of rain. The FICON NOTAM will be canceled when the rain has ended and the runway environment is determined to be dry by the Airport Operator.*

- k. Runway Condition codes “X/X/X.” When a FICON NOTAM indicates these values, the statement “Runway Condition Codes Missing” must be included on the ATIS broadcast.

**EXAMPLE–**

*“Runway (number) condition codes missing at one three four seven Zulu.”*

**NOTE–**

*A FICON NOTAM may be generated with “X/X/X” instead of Runway Condition Codes. This will occur when the NOTAM user interface is not functioning correctly; however, a FICON NOTAM is still present.*

- l. Other optional information as local conditions dictate in coordination with ATC. This may include such items as VFR arrival frequencies, temporary airport conditions, LAHSO operations being conducted, or other perishable items that may appear only for a matter of hours or a few days on the ATIS message.

- m. When all 3 runway segments (touchdown, midpoint, and rollout) are reporting a code of 6, the Airport Operator will notify ATC that runway condition codes are no longer reportable.

- n. Low level wind shear/microburst when reported by pilots or is detected on a wind shear detection system.

**REFERENCE–**

*FAA Order JO 7110.65, Para 3–1–8, Low Level Wind Shear/Microburst Advisories.*

- o. A statement which advises the pilot to read back instructions to hold short of a runway. The air traffic manager may elect to remove this requirement 60 days after implementation provided that removing the statement from the ATIS does not result in increased requests from aircraft for read back of hold short instructions.

- p. Instructions for the pilot to acknowledge receipt of the ATIS message by informing the controller on initial contact.

**EXAMPLE–**

*“Boston Tower Information Delta. One four zero zero Zulu. Wind two five zero at one zero. Visibility one zero. Ceiling four thousand five hundred broken. Temperature three four. Dew point two eight. Altimeter three zero one zero. ILS–DME Runway Two Seven Approach in use. Departing Runway Two Two Right. Hazardous Weather Information for (geographical area) available on Flight Service Frequencies. Advise on initial contact you have Delta.”*

**NOTE–**

*The term “nil” is used to indicate bad or no braking action.*

- b.** Include type of aircraft from which the report is received.

**EXAMPLE–**

*“Braking action medium, reported by a heavy Boeing Seven Sixty–Seven.”*

*“Braking action poor, reported by a Boeing Seven Thirty–Seven.”*

- c.** If the braking action report affects only a portion of a runway, obtain enough information from the pilot to describe the braking action in terms easily understood by other pilots.

**EXAMPLE–**

*“Braking action poor first half of runway, reported by a Boeing Seven Fifty–Seven.”*

*“Braking action good to medium beyond the intersection of Runway Two Seven, reported by an Airbus Three Twenty–One.”*

**NOTE–**

*Descriptive terms, such as the first or the last half of the runway, should normally be used rather than landmark descriptions, such as opposite the fire station, south of a taxiway, etc. Landmarks extraneous to the landing runway are difficult to distinguish during low visibility, at night, or anytime a pilot is busy landing an aircraft.*

- d.** Issue the runway surface condition and/or the Runway Condition Reading (RCR), if provided, to all USAF and ANG aircraft. Issue the RCR to other aircraft upon pilot request.

**EXAMPLE–**

*“Ice on runway, RCR zero five, patchy.”*

**NOTE–**

*USAF offices furnish RCR information at airports serving USAF and ANG aircraft.*

**REFERENCE–**

*FAA Order JO 7110.65, Para 4–7–12, Airport Conditions.*

*FAA Order JO 7110.65, Para 3–3–5, Braking Action Advisories.*

**3–3–5. BRAKING ACTION ADVISORIES**

- a.** When runway braking action reports are received from pilots which include the terms “medium,” “poor,” or “nil,” or whenever weather conditions are conducive to deteriorating or rapidly changing runway conditions, include on the ATIS broadcast the statement “Braking Action Advisories are in effect.”

**REFERENCE–**

*FAA Order JO 7210.3, Para 10–4–1, Automatic Terminal Information Service (ATIS).*

- b.** During the time Braking Action Advisories are in effect, take the following action:

**1.** Issue the latest braking action report for the runway in use to each arriving and departing aircraft early enough to be of benefit to the pilot. When possible, include reports from super or heavy aircraft when the arriving or departing aircraft is a super or heavy.

- 2.** If no report has been received for the runway of intended use, issue an advisory to that effect.

**PHRASEOLOGY–**

*NO BRAKING ACTION REPORTS RECEIVED FOR RUNWAY (runway number).*

- 3.** Advise the Airport Operator that runway braking action reports of “good to medium,” “medium,” “medium to poor,” “poor,” or “nil” have been received.

**REFERENCE–**

*FAA Order JO 7210.3, Para 4–3–1, Letters of Agreement.*

- 4.** Solicit PIREPs of runway braking action.

**REFERENCE–**

*FAA Order JO 7110.65, Para, 2–9–3, Content.*

*FAA Order JO 7110.65, Para 3–9–1, Departure Information.*

*FAA Order JO 7110.65, Para 3–10–1, Landing Information.*

*FAA Order JO 7110.65, Para 4–7–12, Airport Conditions.*

*FAA Order JO 7110.65, Para 2–6–2, PIREP Solicitation and Dissemination.*

### 3-3-6. ARRESTING SYSTEM OPERATION

a. For normal operations, arresting systems remotely controlled by ATC must remain in the retracted or down position.

**NOTE-**

1. *USN- Runway Arresting Gear- barriers are not operated by ATC personnel. Readiness/rigging of the equipment is the responsibility of the operations department.*

2. *A request to raise a barrier or hook cable means the barrier or cable on the departure end of the runway. If an approach end engagement is required, the pilot or military authority will specifically request that the approach end cable be raised.*

**REFERENCE-**

FAA Order JO 7610.14, Chapter 7, Section 1, Aircraft Arresting System, Single Frequency Approach (SFA), Simulated Flameout (SFO)/Emergency Landing Pattern (ELP) Operations, Celestial Navigation (CELNAV) Training.

b. Raise aircraft arresting systems whenever:

1. Requested by a pilot.

**NOTE-**

*The standard emergency phraseology for a pilot requesting an arresting system to be raised for immediate engagement is:*

*“BARRIER – BARRIER – BARRIER”*

*or*

*“CABLE – CABLE – CABLE.”*

2. Requested by military authority; e.g., airfield manager, supervisor of flying, mobile control officer, etc.

**NOTE-**

*USAF. Web barriers at the departure end of the runway may remain in the up position when requested by the senior operational commander. The IFR Enroute Supplement and AP-1 will describe specific barrier configuration. ATC will advise transient aircraft of the barrier configuration using the phraseology in subparagraph c, below.*

3. A military jet aircraft is landing with known or suspected radio failure or conditions (drag chute/hydraulic/electrical failure, etc.) that indicate an arresting system may be needed. Exceptions are authorized for military aircraft which cannot engage an arresting system (C-9, C-141, C-5, T-39, etc.) and should be identified in a letter of agreement and/or appropriate military directive.

c. When requested by military authority due to freezing weather conditions or malfunction of the activating mechanism, the barrier/cable may remain in a raised position provided aircraft are advised.

**PHRASEOLOGY-**

*YOUR DEPARTURE/LANDING WILL BE TOWARD/OVER A RAISED BARRIER/CABLE ON RUNWAY (number), (location, distance, as appropriate).*

d. Inform civil and U.S. Army aircraft whenever rubber supported cables are in place at the approach end of the landing runway, and include the distance of the cables from the threshold. This information may be omitted if it is published in the Domestic Notices webpage, International Notices webpage, or the DoD FLIP.

**EXAMPLE-**

*“Runway One Four arresting cable one thousand feet from threshold.”*

e. When arresting system operation has been requested, inform the pilot of the indicated barrier/cable position.

**PHRASEOLOGY-**

*(Identification), BARRIER/CABLE INDICATES UP/DOWN. CLEARED FOR TAKEOFF/TO LAND.*

f. Time permitting, advise pilots of the availability of all arresting systems on the runway in question when a pilot requests barrier information.

g. If an aircraft engages a raised barrier/cable, initiate crash alarm procedures immediately.

h. For preplanned practice engagements not associated with emergencies, crash alarm systems need not be activated if, in accordance with local military operating procedures, all required notifications are made before the practice engagement.

**NOTE–**

1. Practice precautionary/SFO/ELP approaches are authorized only for specific aircraft. Any aircraft, however, might make precautionary approaches, when engine failure is considered possible. The practice precautionary approach maneuvering area/altitudes may not conform to the standard SFO/ELP maneuvering area/altitudes.
2. SFO/ELP approaches generally require high descent rates. Visibility ahead and beneath the aircraft is greatly restricted.
3. Pattern adjustments for aircraft conducting SFOs and ELPs may impact the effectiveness of SFO and ELP training.

**REFERENCE–**

FAA Order JO 7110.65, Para 4–8–12, Low Approach and Touch-and-Go.

FAA Order JO 7610.14, Para 7–1–6, Simulated Flameout (SFO)/Emergency Landing Pattern (ELP) Operations. ■

**b. For overhead SFO/ELP approaches:**

1. Request a report at the entry point.

**PHRASEOLOGY–**

*REPORT (high or low) KEY (as appropriate).*

2. Request a report at low key.

**PHRASEOLOGY–**

*REPORT LOW KEY.*

3. At low key, issue low approach clearance or alternate instructions.

**REFERENCE–**

FAA Order JO 7110.65, Para 3–8–1, Sequence/Spacing Application.

FAA Order JO 7110.65, Para 10–1–7, Inflight Emergencies Involving Military Fighter-type Aircraft.

FAA Order JO 7610.14, Para 7–1–6, Simulated Flameout (SFO)/Emergency Landing Pattern (ELP) Operations. ■

**c. For straight-in simulation flameout approaches:**

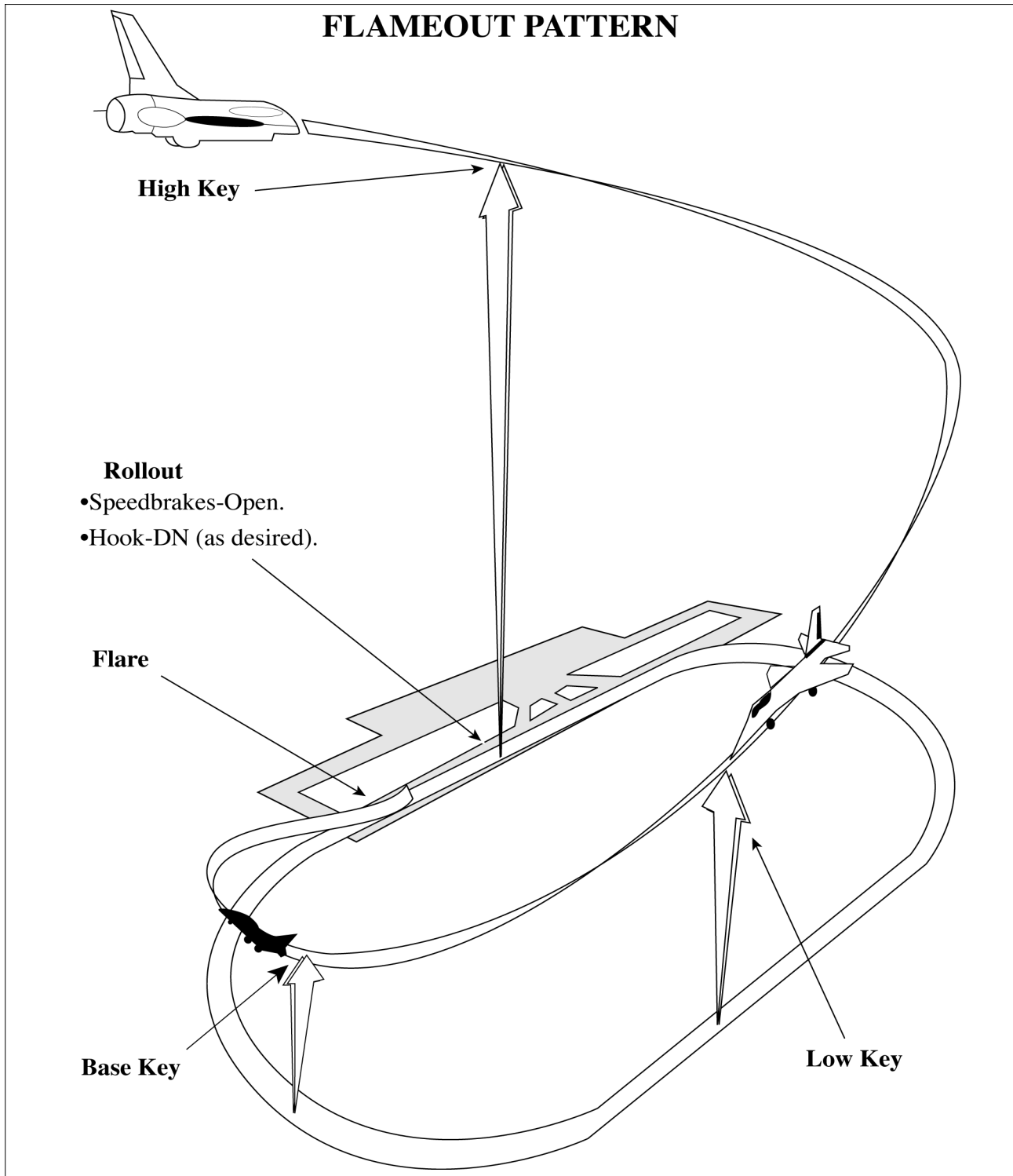
1. Request a position report from aircraft conducting straight-in SFO approaches.

**PHRASEOLOGY–**

*REPORT (distance) MILE SIMULATED FLAMEOUT FINAL.*

2. At the appropriate position on final (normally no closer than 3 miles), issue low approach clearance or alternate instruction. (See FIG 3–10–15.)

*FIG 3-10-14*  
**Simulated Flameout [1]**





## Section 7. Arrival Procedures

### 4-7-1. CLEARANCE INFORMATION

Clear an arriving aircraft to a clearance limit by specifying the following:

- a. Name of fix or airport.

**PHRASEOLOGY–**

*CLEARED TO (destination) AIRPORT.*

*Or*

*CLEARED TO (NAVAID name and type if known).*

*Or*

*CLEARED TO (intersection or waypoint name and type if known).*

- b. Route of flight including a STAR/RNAV STAR and STAR/RNAV STAR transition, if appropriate. Assign a STAR/RNAV STAR and STAR/RNAV STAR transition to any aircraft in lieu of other routes; e.g., airways or preferential arrival routes when the routings are the same. The clearance must include the name and transition, if necessary, of the STAR/RNAV STAR to be flown.

**TERMINAL:** When the STAR/RNAV STAR transition is designed to provide course guidance to multiple runways, the facility must state intended runway number on initial contact, or as soon as practical. If the runway assignment, or any subsequent runway change, is not issued prior to 10 NM from the runway transition waypoint, radar vectors to final must be provided.

**PHRASEOLOGY–**

*(STAR/RNAV STAR name and number) ARRIVAL.*

*(STAR/RNAV STAR name and number) ARRIVAL, (transition name) TRANSITION.*

*CHANGE/AMEND TRANSITION TO (runway number).*

*CHANGE/AMEND TRANSITION TO (runway number) TURN LEFT/RIGHT or HEADING (heading) FOR VECTOR TO FINAL APPROACH COURSE.*

**EXAMPLE–**

*“Rosewood One arrival.”*

*“Rosewood One arrival, Delta transition.”*

*“Change transition to Runway 09 right.”*

*“Amend transition to Runway 22 left, turn right heading 180 for vector to final approach course.”*

**NOTE–**

1. If a civil pilot does not wish to use a STAR issued in an ATC clearance or any other STAR published for that location, the pilot is expected to advise ATC.
2. Arrival procedure descriptive text contained within parentheses (for example, “Devine One (RNAV) Arrival”) are not included in arrival clearance phraseology.

- c. Altitude instructions, as follows:

1. Assigned altitude; or

2. Instructions to vertically navigate on the STAR or STAR transition.

**EXAMPLE–**

*“Bayview Three Arrival, Helen Transition, maintain Flight Level Three Three Zero.”*

*“Descend via the Civit One Arrival.”*

*“Descend via the Lendy One Arrival, Runway 22 left.”*

*“Cross JCT at Flight Level Two Four Zero.”*

*“Descend via the Coast Two Arrival.”*

*“Civit One Arrival, Descend and Maintain Flight Level Two Four Zero.”*

**REFERENCE–**

FAA Order JO 7110.65, Para 4-5-7, Altitude Information.

AIM, Para 5-4-1, Standard Terminal Arrival (STAR) Procedures.

- d. Issue holding instructions, EFC, and additional delay information as required.
- e. Instructions regarding further communications as appropriate.

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–17, Radio Communications.

**4–7–2. ADVANCE DESCENT CLEARANCE****EN ROUTE**

Take the following action when exercising control of aircraft landing at an airport located in an adjacent center's control area near the common boundary:

- a. Coordinate with the receiving facility for a lower altitude and issue a clearance to the aircraft as appropriate.
- b. Initiate this action at a distance sufficient from destination to allow for normal descent and speed reduction.

**4–7–3. SINGLE FREQUENCY APPROACHES (SFA)****TERMINAL**

Where SFA procedures for military single-piloted turbojet aircraft on an IFR flight plan are contained in a letter of agreement, do not require a radio frequency change after the aircraft begins approach or after initial contact during an en route descent until a landing or low approach has been completed except under the following conditions:

**REFERENCE–**

FAA Order JO 7610.14, Para 7–1–5, Single Frequency Approach (SFA).  
P/CG Term – Single-Piloted Aircraft.

- a. During daylight hours while the aircraft is in VFR conditions.
- b. On pilot request.
- c. When pilot cancels IFR flight plan.
- d. In an emergency situation.
- e. When aircraft is cleared for visual approach.

**4–7–4. RADIO FREQUENCY AND RADAR BEACON CHANGES FOR MILITARY AIRCRAFT**

When military single-piloted turbojet aircraft will conduct an approach wholly or partly in IFR conditions or at night, take the following action:

**NOTE–**

*It is known that the mental distraction and the inadvertent movement of aircraft controls resulting from the pilot's turning, reaching, or leaning to change frequencies can induce spatial disorientation (vertigo).*

a. Avoid radio frequency and radar beacon changes to the maximum extent that communications capabilities and traffic will permit. However, when changes are required:

1. Give instructions early enough to allow the change before the aircraft reaches the approach fix or handoff point.
2. Keep frequency/radar beacon changes to a minimum below 2,500 feet above the surface.
3. Avoid requiring frequency/radar beacon changes during the time the aircraft is making a turn.

b. When traffic volume requires, a frequency other than the one used by aircraft making approaches may be assigned for use in transferring control to the approach control facility.

**TERMINAL**

# Chapter 5. Radar

## Section 1. General

### 5-1-1. PRESENTATION AND EQUIPMENT PERFORMANCE

a. Provide radar services only if you are personally satisfied that the radar presentation and equipment performance is adequate for the service being provided.

**NOTE-**

*The provision of radar services is not limited to the distance and altitude parameters obtained during the commissioning flight check. FAA Order 8200.1, United States Standard Flight Inspection Manual, Chapter 14, Surveillance, describes the surveillance flight inspection procedures.*

b. Notify the OS/CIC of any radar malfunctions or unexpected outages. Advise adjacent facilities when appropriate.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-1-9, Reporting Essential Flight Information.*

*FAA Order JO 7210.3, Chapter 3, Chapter 7, Chapter 10 Section 5, and Chapter 12 Section 6.*

### 5-1-2. ATC SURVEILLANCE SOURCE USE

Use approved ATC Surveillance Sources.

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-13, Inoperative or Malfunctioning Interrogator.*

a. Secondary radar may be used as the sole display source as follows:

1. In Class A airspace.

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-14, Failed Transponder in Class A Airspace.*

*14 CFR Section 91.135, Operations in Class A Airspace.*

2. Outside Class A airspace, or where mix of Class A airspace/non-Class A airspace exists, only when:

(a) Additional coverage is provided by secondary radar beyond that of the primary radar, or

(b) The primary radar is temporarily unusable or out of service. Advise pilots when these conditions exist,

or

**PHRASEOLOGY-**

**PRIMARY RADAR UNAVAILABLE** (describe location). **RADAR SERVICES AVAILABLE ON TRANSPONDER OR ADS-B EQUIPPED AIRCRAFT ONLY.**

**NOTE-**

1. Advisory may be omitted when provided on ATIS and pilot indicates having ATIS information.

2. This provision is to authorize secondary radar only operations where there is no primary radar available and the condition is temporary.

(c) A secondary radar system is the only source of radar data for the area of service. **TERMINAL**. Advise pilots when these conditions exist.

**NOTE-**

*Advisory may be omitted when provided on ATIS or by other appropriate notice to pilots.*

b. **TERMINAL**. Do not use secondary radar only to conduct surveillance (ASR) final approaches unless an emergency exists and the pilot concurs.

c. Targets derived from ADS-B and WAM may be used for the provision of all terminal services when operating in STARS Fusion, STARS FMA, and STARS Multi-Sensor Mode, including those associated with any published instrument procedure annotated "radar required."

**NOTE–**

*Targets derived from WAM cannot be used to provide 3 NM separation in the EAS. 3 NM targets are not derived from WAM within the EAS.*

**REFERENCE–**

*FAA Order JO 7110.65, Para 4–1–2, Exceptions.*

*FAA Order JO 7110.65, Para 4–4–2, Route Structure Transitions.*

*FAA Order JO 7110.65, Para 5–5–1, Application.*

*FAA Order JO 7110.65, Para 6–5–4, Minima Along Other Than Established Airways or Routes.*

*FAA Order JO 7110.65, Chapter 6, Nonradar.*

*FAA Order JO 7110.65, Para 5–5–4, Minima.*

*FAA Order JO 7210.3, Para 3–6–2, ATC Surveillance Source Use.*

**5–1–3. ELECTRONIC ATTACK (EA) ACTIVITY**

- a. Refer all EA activity requests to the appropriate center supervisor.

**REFERENCE–**

*FAA Order JO 7610.4, Chapter 2, Section 3, Electronic Attack (EA) Mission Coordination.*

**NOTE–**

*EA activity can subsequently result in a request to apply EA videos to the radar system which may necessitate the decertification of the narrowband search radar. The Systems Engineer should be consulted concerning the effect of EA on the operational use of the narrowband radar prior to approving/disapproving requests to conduct EA activity.*

- b. When EA activity interferes with the operational use of radar:

1. **EN ROUTE.** Request the responsible military unit or aircraft, if initial request was received directly from pilot, to suspend the activity.

2. **TERMINAL.** Request suspension of the activity through the ARTCC. If immediate cessation of the activity is required, broadcast the request directly to the EA aircraft on the emergency frequency. Notify the ARTCC of direct broadcast as soon as possible.

- c. When previously suspended activity will no longer interfere:

1. **EN ROUTE.** Inform the NORAD unit or aircraft that it may be resumed.

2. **TERMINAL.** Inform the ARTCC or aircraft that it may be resumed. Obtain approval from the ARTCC prior to broadcasting a resume clearance directly to the aircraft.

- d. In each stop request, include your facility name, type of EA activity (chaff dispensing– “stream”/“burst” or electronic jamming– “buzzer”), radar band affected and, when feasible, expected duration of suspension.

**PHRASEOLOGY–**

*BIG PHOTO (identification, if known) (name) CENTER/TOWER/APPROACH CONTROL.*

*To stop EA activity:*

*STOP STREAM/BURST IN AREA (area name) (degree and distance from facility),*

*or*

*STOP BUZZER ON (frequency band or channel).*

*To resume EA activity:*

*RESUME STREAM/BURST,*

*or*

*RESUME BUZZER ON (frequency band or channel).*

**NOTE–**

*Instead of displaying “7400” in the data block, ERAM will display “LLNK,” and STARS/MEARTS will display “LL.”*

- a. Determine the lost link procedure, as outlined in the Special Airworthiness Certificate or Certificate of Waiver or Authorization (COA).
- b. Coordinate, as required, to allow UAS to execute the lost link procedure.
- c. Advise the OS/CIC, when feasible, so the event can be documented.
- d. If you observe or are informed by the PIC that the UAS is deviating from the programmed Lost Link procedure, or is encountering another anomaly, treat the situation in accordance with FAA Order JO 7110.65 Chapter 10, Section 1, paragraph 10–1–1c.

**NOTE–**

1. *The available lost link procedure should, at a minimum, include lost link route of flight, lost link orbit points, lost link altitudes, communications procedures and preplanned flight termination points if the event recovery of the UAS is deemed unfeasible.*
2. *Each lost link procedure may differ and is dependent upon airframe and operation. These items are contained in the flight’s Certificate of Authorization or Waiver (COA) and must be made available to ATC personnel in their simplest form at positions responsible for Unmanned Aircraft (UAs).*
3. *Some UA airframes (Global Hawk) will not be programmed upon the NAS Automation roll out to squawk 7400. These airframes will continue to squawk 7600 should a lost link occur. The ATC Specialist must apply the same procedures described above.*

**5–2–7. VFR CODE ASSIGNMENTS**

- a. For VFR aircraft receiving radar advisories, issue a computer–assigned beacon code.
  1. If the aircraft is outside of your area of responsibility and an operational benefit will be gained by retaining the aircraft on your frequency for the purpose of providing services, ensure that coordination has been effected:
    - (a) As soon as possible after positive identification, and
    - (b) Prior to issuing a control instruction or providing a service other than a safety alert/traffic advisory.

**NOTE–**

*Safety alerts/traffic advisories may be issued to an aircraft prior to coordination if an imminent situation may be averted by such action. Coordination should be effected as soon as possible thereafter.*

- b. Instruct an IFR aircraft that cancels its IFR flight plan and is not requesting radar advisory service, or a VFR aircraft for which radar advisory service is being terminated, to squawk VFR.

**PHRASEOLOGY–**

**SQUAWK VFR.**

*or*

**SQUAWK 1200.**

**NOTE–**

1. *Aircraft not in contact with ATC may squawk 1255 in lieu of 1200 while en route to/from or within designated firefighting areas.*
2. *VFR aircraft that fly authorized SAR missions for the USAF or USCG may be advised to squawk 1277 in lieu of 1200 while en route to/from or within the designated search area.*
3. *VFR gliders should squawk 1202 in lieu of 1200. Gliders operate under some flight and maneuvering limitations. They may go from essentially stationary targets while climbing and thermaling to moving targets very quickly. They can be expected to make radical changes in flight direction to find lift and cannot hold altitude in a response to an ATC request. Gliders may congregate together for short periods of time to climb together in thermals and may cruise together in loose formations while traveling between thermals.*

4. The lead aircraft in a standard VFR formation flight not in contact with ATC should squawk 1203 in lieu of 1200. All other aircraft in the formation should squawk standby.

**REFERENCE–**

FAA Order JO 7110.66, National Beacon Code Allocation Plan.

c. When an aircraft changes from VFR to IFR, assign a beacon code to Mode C equipped aircraft that will allow MSAW alarms.

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## 5–2–8. BEACON CODES FOR PRESSURE SUIT FLIGHTS AND FLIGHTS ABOVE FL 600

Special use Mode 3/A codes are reserved for certain pressure suit flights and aircraft operations above FL 600 in accordance with FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations, Appendix 4, Document 2.

a. Ensure that these flights remain on one of the special use codes if filed in the flight plan, except:

b. When unforeseen events cause more than one aircraft to be in the same or adjacent ARTCC's airspace at the same time on the same special use discrete code, if necessary, you may request the pilot to make a code change, squawk standby, or stop squawk as appropriate.

**NOTE–**

1. Current FAA automation systems track multiple targets on the same beacon code with much greater reliability than their predecessors, and a code change may not be necessary for such flights.

2. The beacon code is often preset on the ground for such flights and is used throughout the flight profile, including operations below FL 600. Due to equipment inaccessibility, the flight crew may not be able to accept transponder changes identified in this subparagraph.

3. In case of emergency, Code 7700 can still be activated. Instead of displaying “7700” in the data block, ERAM will display “EMRG,” and STARS/MEARTS will display “EM.”

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## 5–2–9. AIR DEFENSE EXERCISE BEACON CODE ASSIGNMENT

### EN ROUTE

Ensure exercise FAKER aircraft remain on the exercise flight plan filed discrete beacon code.

**NOTE–**

1. NORAD will ensure exercise FAKER aircraft flight plans are filed containing discrete beacon codes from the Department of Defense code allocation specified in FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations, Appendix 6.

2. NORAD will ensure that those FAKER aircraft assigned the same discrete beacon code are not flight planned in the same or any adjacent ARTCC's airspace at the same time. (Simultaneous assignment of codes will only occur when operational requirements necessitate.)

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## 5–2–10. STANDBY OPERATION

You may instruct an aircraft operating on an assigned code to change the transponder/ADS–B to “standby” position:

a. When approximately 15 miles from its destination and you no longer desire operation of the transponder/ADS–B; or

b. When necessary to reduce clutter in a multi-target area, provided you instruct the pilot to return the transponder/ADS–B to “normal” position as soon as possible thereafter.

**PHRASEOLOGY–**  
**SQUAWK STANDBY,**

or

**SQUAWK NORMAL.**

**REFERENCE–**  
FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## **5–2–11. CODE MONITOR**

**a.** Continuously monitor the codes assigned to aircraft operating within your area of responsibility. Additionally, monitor **Code 1200, Code 1202, Code 1255, and Code 1277** unless your area of responsibility includes only Class A airspace. During periods when ring-around or excessive VFR target presentations derogate the separation of IFR traffic, the monitoring of VFR **Code 1200, Code 1202, Code 1255, and Code 1277** may be temporarily discontinued.

**b.** When your area of responsibility contains or is immediately adjacent to a restricted area, warning area, VR route, or other category where Code 4000 is appropriate, monitor **Code 4000** and any other code used in lieu of **4000**.

**REFERENCE–**  
FAA Order JO 7210.3, Para 3–6–3, Monitoring of Mode 3/A Radar Beacon Codes.

## **5–2–12. FAILURE TO DISPLAY ASSIGNED BEACON CODE OR INOPERATIVE/MALFUNCTIONING TRANSPONDER**

**a.** Inform an aircraft with an operable transponder that the assigned beacon code is not being displayed.

**PHRASEOLOGY–**  
(Identification) **RESET TRANSPONDER, SQUAWK (appropriate code).**

**b.** Inform an aircraft when its transponder appears to be inoperative or malfunctioning.

**PHRASEOLOGY–**  
(Identification) **YOUR TRANSPONDER APPEARS INOPERATIVE/MALFUNCTIONING, RESET, SQUAWK (appropriate code).**

**c.** Ensure that the subsequent control position in the facility or the next facility, as applicable, is notified when an aircraft transponder is malfunctioning/inoperative.

**REFERENCE–**  
FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## **5–2–13. INOPERATIVE OR MALFUNCTIONING INTERROGATOR**

Inform aircraft concerned when the ground interrogator appears to be inoperative or malfunctioning.

**PHRASEOLOGY–**  
(Name of facility or control function) **BEACON INTERROGATOR INOPERATIVE/MALFUNCTIONING.**

**REFERENCE–**  
FAA Order JO 7110.65, Para 5–1–2, ATC Surveillance Source Use.  
FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

## **5–2–14. FAILED TRANSPONDER OR ADS–B OUT TRANSMITTER**

Disapprove a request or withdraw a previously issued approval to operate with a failed transponder or ADS–B Out solely on the basis of traffic conditions or other operational factors.

**REFERENCE–**  
FAA Order JO 7110.65, Para 5–1–2, ATC Surveillance Source Use.  
FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

**5-2-15. VALIDATION OF MODE C ALTITUDE READOUT**

a. Ensure that Mode C altitude readouts are valid after:

1. Initial track start.
2. Track start from coast/frozen status.
3. During and after an unreliable Mode C readout.
4. Accepting an interfacility handoff, except:

(a) CTRD-equipped tower cabs are not required to validate Mode C altitude readouts after accepting interfacility handoffs from TRACONs according to the procedures in paragraph 5-4-3, Methods, subparagraph a4.

(b) ERAM facilities are not required to validate Mode C altitude readouts after accepting interfacility handoffs from other ERAM facilities, except:

(1) After initial track start or track start from coast is required, or

(2) During and after the display of a missing, unreasonable, exceptional, or otherwise unreliable Mode C readout indicator.

**NOTE-**

*Consider a Mode C readout unreliable when any condition exists that indicates the Mode C may be in error, not just those that display an indicator in the Data Block.*

b. Consider an altitude readout valid when:

1. It varies less than 300 feet from the pilot reported altitude, or

**PHRASEOLOGY-**

*(If aircraft is known to be operating below the lowest useable flight level),*

**SAY ALTITUDE.**

*or*

*(If aircraft is known to be operating at or above the lowest useable flight level),*

**SAY FLIGHT LEVEL.**

2. You receive a continuous readout from an aircraft on the airport and the readout varies by less than 300 feet from the field elevation, or

**NOTE-**

*A continuous readout exists only when the altitude filter limits are set to include the field elevation.*

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-21, Altitude Filters.*

*FAA Order JO 7110.65, Para 5-13-5, Selected Altitude Limits.*

3. You have correlated the altitude information in your data block with the validated information in a data block generated in another facility (by verbally coordinating with the other controller) and your readout is exactly the same as the readout in the other data block.

c. When unable to validate the readout, do not use the Mode C altitude information for separation.

d. Whenever you observe an invalid Mode C readout below FL 180:

1. Issue the correct altimeter setting and confirm the pilot has accurately reported the altitude.

**PHRASEOLOGY-**

*(Location) ALTIMETER (appropriate altimeter), VERIFY ALTITUDE.*

2. If the altitude readout continues to be invalid:



- (a) Instruct the pilot to turn off the altitude- reporting part of his/her transponder and include the reason; and
- (b) Notify the operations supervisor-in-charge of the aircraft call sign.

**PHRASEOLOGY–**

*STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.*

- e. Whenever you observe an invalid Mode C readout at or above FL 180, unless the aircraft is descending below Class A airspace:

- 1. Verify that the pilot is using 29.92 inches of mercury as the altimeter setting and has accurately reported the altitude.

**PHRASEOLOGY–**

*VERIFY USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING.*

*(If aircraft is known to be operating at or above the lowest useable flight level),*

*VERIFY FLIGHT LEVEL.*

- 2. If the Mode C readout continues to be invalid:

- (a) Instruct the pilot to turn off the altitude- reporting part of his/her transponder and include the reason; and
- (b) Notify the operations supervisor-in-charge of the aircraft call sign.

**PHRASEOLOGY–**

*STOP ALTITUDE SQUAWK. ALTITUDE DIFFERS BY (number of feet) FEET.*

- f. Whenever possible, inhibit altitude readouts on all consoles when a malfunction of the ground equipment causes repeated invalid readouts.

**5-2-16. ALTITUDE CONFIRMATION– MODE C**

Request a pilot to confirm assigned altitude on initial contact unless:

**NOTE–**

*For the purpose of this paragraph, “initial contact” means a pilot’s first radio contact with each sector/position.*

- a. The pilot states the assigned altitude, or
- b. You assign a new altitude to a climbing or a descending aircraft, or
- c. The Mode C readout is valid and indicates that the aircraft is established at the assigned altitude, or
- d. **TERMINAL.** The aircraft was transferred to you from another sector/position within your facility (intrafacility).

**PHRASEOLOGY–**

*(In level flight situations), VERIFY AT (altitude/flight level).*

*(In climbing/descending situations),*

*(if aircraft has been assigned an altitude below the lowest useable flight level),*

*VERIFY ASSIGNED ALTITUDE (altitude).*

*or*

*(If aircraft has been assigned a flight level at or above the lowest useable flight level),*

*VERIFY ASSIGNED FLIGHT LEVEL (flight level).*

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

**5–2–17. ALTITUDE CONFIRMATION– NON–MODE C**

- a. Request a pilot to confirm assigned altitude on initial contact unless:

**NOTE–**

For the purpose of this paragraph, “initial contact” means a pilot’s first radio contact with each sector/position.

1. The pilot states the assigned altitude, or
2. You assign a new altitude to a climbing or a descending aircraft, or
3. **TERMINAL.** The aircraft was transferred to you from another sector/position within your facility (intrafacility).

**PHRASEOLOGY–**

(In level flight situations), **VERIFY AT** (altitude/flight level).

(In climbing/descending situations), **VERIFY ASSIGNED ALTITUDE/FLIGHT LEVEL** (altitude/flight level).

- b. **USA.** Reconfirm all pilot altitude read backs.

**PHRASEOLOGY–**

(If the altitude read back is correct),

**AFFIRMATIVE** (altitude).

(If the altitude read back is not correct),

**NEGATIVE. CLIMB/DESCEND AND MAINTAIN** (altitude),

or

**NEGATIVE. MAINTAIN** (altitude).

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

**5–2–18. AUTOMATIC ALTITUDE REPORTING**

Inform an aircraft when you want it to turn on/off the automatic altitude reporting feature of its transponder.

**PHRASEOLOGY–**

**SQUAWK ALTITUDE,**

or

**STOP ALTITUDE SQUAWK.**

**NOTE–**

Controllers should be aware that not all aircraft have a capability to disengage the altitude squawk independently from the beacon code squawk. On some aircraft both functions are controlled by the same switch.

**REFERENCE–**

FAA Order JO 7110.65, Para 5–2–15, Validation of Mode C Altitude Readout.

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

P/CG Term – Automatic Altitude Report.

**5–2–19. INFLIGHT DEVIATIONS FROM TRANSPONDER/MODE C REQUIREMENTS BETWEEN 10,000 FEET AND 18,000 FEET**

Apply the following procedures to requests to deviate from the Mode C transponder requirement by aircraft operating in the airspace of the 48 contiguous states and the District of Columbia at and above 10,000 feet MSL and below 18,000 feet MSL, excluding the airspace at and below 2,500 feet AGL.

**NOTE–**

**1.** 14 CFR Section 91.215(b) provides, in part, that all U.S. registered civil aircraft must be equipped with an operable, coded radar beacon transponder when operating in the altitude stratum listed above. Such transponders must have a Mode 3/A 4096 code capability, replying to Mode 3/A interrogation with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC. The aircraft must also be equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments.

**2.** The exception to 14 CFR Section 91.215 (b) is 14 CFR Section 91.215(b)(5) which states: except balloons, gliders, and aircraft without engine-driven electrical systems.

**REFERENCE–**

FAA Order JO 7210.3, Chapter 20, Temporary Flight Restrictions.

**a.** Except in an emergency, do not approve inflight requests for authorization to deviate from 14 CFR Section 91.215(b)(5)(i) requirements originated by aircraft without transponder equipment installed.

**b.** Approve or disapprove other inflight deviation requests, or withdraw approval previously issued to such flights, solely on the basis of traffic conditions and other operational factors.

**c.** Adhere to the following sequence of action when an inflight VFR deviation request is received from an aircraft with an inoperative transponder or Mode C, or is not Mode C equipped:

**1.** Suggest that the aircraft conduct its flight in airspace unaffected by the CFRs.

**2.** Suggest that the aircraft file an IFR flight plan.

**3.** Suggest that the aircraft provide a VFR route of flight and maintain radio contact with ATC.

**d.** Do not approve an inflight deviation unless the aircraft has filed an IFR flight plan or a VFR route of flight is provided and radio contact with ATC is maintained.

**e.** You may approve an inflight deviation request which includes airspace outside your jurisdiction without the prior approval of the adjacent ATC sector/facility providing a transponder/Mode C status report is forwarded prior to control transfer.

**f.** Approve or disapprove inflight deviation requests within a reasonable period of time or advise when approval/disapproval can be expected.

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

**5–2–20. BEACON TERMINATION**

Inform the pilot when you want their aircraft's transponder and ADS–B Out turned off.

**PHRASEOLOGY–**

**STOP SQUAWK.**

*(For a military aircraft when you do not know if the military service requires that it continue operating on another mode),*

**STOP SQUAWK (mode in use).**

**REFERENCE–**

FAA Order JO 7110.65, Para 5–3–3, Beacon/ADS–B Identification Methods.

**5–2–21. ALTITUDE FILTERS****TERMINAL**

Set altitude filters to display Mode C altitude readouts to encompass all altitudes within the controller's jurisdiction. Set the upper limits no lower than 1,000 feet above the highest altitude for which the controller is responsible. In those stratified positions, set the lower limit to 1,000 feet or more below the lowest altitude for

which the controller is responsible. When the position's area of responsibility includes down to an airport field elevation, the facility will normally set the lower altitude filter limit to encompass the field elevation so that provisions of paragraph 2-1-6, Safety Alert, and paragraph 5-2-15, Validation of Mode C Altitude Readout, subparagraph b2 may be applied. Air traffic managers may authorize temporary suspension of this requirement when target clutter is excessive.

## **5-2-22. INOPERATIVE OR MALFUNCTIONING ADS-B TRANSMITTER**

**a.** When an aircraft's ADS-B transmitter appears to be inoperative or malfunctioning, notify the OS/CIC of the aircraft call sign, location, and time of the occurrence (UTC). Except for DoD aircraft or those provided for in paragraph 5-2-24, inform the pilot.

### **PHRASEOLOGY-**

*YOUR ADS-B TRANSMITTER APPEARS TO BE INOPERATIVE / MALFUNCTIONING.*

### **NOTE-**

*FAA Flight Standards Service, Safety Standards Division (AFS) is responsible for working with aircraft operators to correct ADS-B malfunctions. The intent of this paragraph is to capture ADS-B anomalies observed by ATC, such as errors in the data (other than Call Sign Mis-Match events, which are detected and reported to AFS automatically) or instances when civil ADS-B transmissions would normally be expected but are not received (e.g., ADS-B transmissions were observed on a previous flight leg).*

**b.** If a malfunctioning ADS-B transmitter is jeopardizing the safe execution of air traffic control functions, instruct the aircraft to stop ADS-B transmissions, and notify the OS/CIC.

### **PHRASEOLOGY-**

*STOP ADS-B TRANSMISSIONS, AND IF ABLE, SQUAWK THREE/ALFA (code).*

### **NOTE-**

*Not all aircraft have a capability to disengage the ADS-B transmitter independently from the beacon code squawk.*

### **REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-23, ADS-B Alerts.*

*FAA Order JO 7210.3, Para 2-1-34, Reporting Inoperative or Malfunctioning ADS-B Transmitters.*

*FAA Order JO 7210.3, Para 5-4-9, ADS-B Out OFF Operations.*

*FAA Order JO 7110.67, Para 19, ATC Security Procedures for ADS-B Out OFF Operations.*

## **5-2-23. ADS-B ALERTS**

**a.** Call Sign Mis-Match (CSMM). A CSMM alert will occur when the transmitted ADS-B Flight Identification (FLT ID) does not match the flight plan aircraft identification. Inform the aircraft of the CSMM.

### **PHRASEOLOGY-**

*YOUR ADS-B FLIGHT ID DOES NOT MATCH YOUR FLIGHT PLAN AIRCRAFT IDENTIFICATION.*

**b.** Duplicate ICAO Address. If the broadcast ICAO address is shared with one or more flights in the same ADS-B Service Area (regardless of altitude), and radar reinforcement is not available, target resolution may be lost on one or both targets.

### **NOTE-**

*Duplicate ICAO Address Alerts appear as "DA" and are associated with the Data Block (DB) on STARS systems. Duplicate ICAO Address Alerts appear as "DUP" and are associated with the DB on MEARTS systems. Duplicate ICAO Address Alerts appear as "Duplicate 24-bit Address" at the AT Specialist Workstation on ERAM systems.*

**c.** If a CSMM or Duplicate ICAO address is jeopardizing the safe execution of air traffic control functions, instruct the aircraft to stop ADS-B transmissions, and notify the OS/CIC.

### **PHRASEOLOGY-**

*STOP ADS-B TRANSMISSIONS, AND IF ABLE, SQUAWK THREE/ALFA (code).*

### **NOTE-**

*Not all aircraft are capable of disengaging the ADS-B transmitter independently from the transponder.*

**5-2-24. ADS-B OUT OFF OPERATIONS**

Operators of aircraft with functional ADS-B Out avionics installed and requesting an exception from the requirement to transmit at all times must obtain authorization from FAA System Operations Security. The OS/CIC should inform you of any ADS-B Out OFF operations in your area of jurisdiction.

- a. Do not inform such aircraft that their ADS-B transmitter appears to be inoperative.
- b. Do not approve any pilot request for ADS-B Out OFF operations. Notify the OS/CIC of the request, including the aircraft call sign and location.

**NOTE-**

*14 CFR Section 91.225(f) requires, in part, that “each person operating an aircraft equipped with ADS-B Out must operate this equipment in the transmit mode at all times unless otherwise authorized by the FAA when that aircraft is performing a sensitive government mission for national defense, homeland security, intelligence or law enforcement purposes, and transmitting would compromise the operations security of the mission or pose a safety risk to the aircraft, crew, or people and property in the air or on the ground.”*

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-22, Inoperative or Malfunctioning ADS-B Transmitter.*

*FAA Order JO 7210.3, Para 5-4-9, ADS-B Out OFF Operations.*

*FAA Order JO 7110.67, Para 11, Responsibilities.*



**b.** If identification is questionable for any reason, take immediate action to re-identify the aircraft or terminate radar service. Identify the aircraft as follows:

**1.** As described in paragraph 5-3-2, Primary Radar Identification Methods, or paragraph 5-3-3, Beacon/ADS-B Identification Methods.

**2.** En route. Ensure that all primary targets are displayed when radar identification is lost or is questionable.

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-4-3, Methods.*

### **5-3-6. POSITION INFORMATION**

Inform an aircraft of its position whenever radar identification is established by means of identifying turns or by any of the beacon identification methods outlined in paragraph 5-3-3, Beacon/ADS-B Identification Methods. Position information need not be given when identification is established by position correlation or when a departing aircraft is identified within 1 mile of the takeoff runway end.

### **5-3-7. IDENTIFICATION STATUS**

**a.** Inform an aircraft of radar contact when:

**1.** Initial radar identification in the ATC system is established.

**2.** Subsequent to loss of radar contact or terminating radar service, radar identification is reestablished.

**PHRASEOLOGY-**

*RADAR CONTACT (position if required).*

**b.** Inform an aircraft when radar contact is lost.

**PHRASEOLOGY-**

*RADAR CONTACT LOST (alternative instructions when required).*

### **5-3-8. DATA BLOCKS**

**EN ROUTE**

Retain data blocks that are associated with the appropriate target symbol in order to maintain continuous identity of aircraft. Retain the data block until the aircraft has exited the sector or delegated airspace, and all potential conflicts have been resolved; including an aircraft that is a point out. The data block must display flight identification and altitude information, as a minimum. The displayed altitude may be assigned, interim, or reported.

ERAM: When you have separation responsibility for an aircraft and a paired track exists, display a full data block (FDB).

### **5-3-9. DATA BLOCKS**

**TERMINAL**

**a.** Retain data blocks that are associated with the appropriate target symbol in order to maintain continuous identity of aircraft. Retain the data block until the aircraft has exited the sector or delegated airspace, and all potential conflicts have been resolved; including an aircraft that is a point out. The data block must display flight identification and altitude information, as a minimum.

**NOTE-**

*Where delegated airspace extends beyond Class B and/or Class C airspace, the following will apply: If a VFR aircraft is clear of Class B and Class C airspace and radar services have been terminated then retention of the data block is no longer required.*

**b.** During prearranged coordination procedures, the controllers who penetrate another controller's airspace must display data block information of that controller's aircraft which must contain, at a minimum, the position symbol and altitude information.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-1-14, Coordinate Use of Airspace.*

*FAA Order JO 7110.65, Para 5-4-3, Methods.*

*FAA Order JO 7110.65, Para 5-4-8, Automated Information Transfer (AIT).*

*FAA Order JO 7110.65, Para 5-4-9, Prearranged Coordination.*

■ *FAA Order JO 7210.3, Para 3-6-6, Prearranged Coordination.*



*UNABLE (appropriate information, as required).*

**d.** If any doubt as to target identification exists after attempting confirmation in accordance with this section, apply the provisions of paragraph 5-3-5, Questionable Identification.

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-2-15, Validation of Mode C Altitude Readout.*

#### **5-4-4. TRAFFIC**

**a.** When using the term “traffic” for coordinating separation, the controller issuing traffic must issue appropriate restrictions.

**b.** The controller accepting the restrictions must be responsible to ensure that approved separation is maintained between the involved aircraft.

#### **5-4-5. TRANSFERRING CONTROLLER HANDOFF**

Unless otherwise coordinated or specified in an LOA or facility directive, the transferring controller must:

**a.** Complete a handoff prior to an aircraft entering the airspace delegated to the receiving controller.

**b.** Verbally obtain the receiving controller’s approval prior to making any changes to an aircraft’s flight path, altitude, speed, or data block information while the handoff is being initiated or after acceptance.

**c.** Advise the receiving controller of pertinent information not contained in the data block or flight progress strip, including:

- 1.** Assigned heading.
- 2.** Airspeed restrictions.
- 3.** Altitude information issued.
- 4.** Observed track or deviation from the last route clearance.
- 5.** The beacon code, if different from that normally used or previously coordinated.
- 6.** Any other pertinent information.

**d.** Initiate verbal coordination to verify the position of primary or nondiscrete targets, except for intrafacility automated handoffs in STARS, ERAM, or MEARTS in Fused Display Mode.

**e.** Initiate verbal coordination before transferring control of a track when “CST,” “FAIL,” “NONE,” “IF,” “NT,” or “TRK” is displayed in the data block.

**f.** Advise the receiving controller if radar monitoring is required.

**REFERENCE-**

*FAA Order JO 7110.65, Para 4-1-2, Exceptions.*

*FAA Order JO 7110.65, Para 4-4-2, Route Structure Transitions.*

**g.** Consider the target being transferred as identified on the receiving controller’s display when the receiving controller acknowledges receipt verbally or accepts the automated handoff.

**h.** Prior to transferring communications:

**1.** Resolve any potential violations of adjacent airspace and potential conflicts with other aircraft in your area of jurisdiction.

**2.** Coordinate with any controller whose area of jurisdiction the aircraft will transit prior to entering the receiving controller’s area of jurisdiction.

**3.** Forward to the receiving controller any restrictions issued to ensure separation.

**4. Comply with restrictions issued by the receiving controller.**

**i.** Comply with the provisions of paragraph 2–1–17, Radio Communications. To the extent possible, transfer communications when the handoff has been accepted.

**NOTE–**

*Before the STARS “modify/quick look” function is used to effect a handoff, a facility directive that specifies communication transfer points is required.*

**j.** After transferring communications, continue to comply with the requirements of subparagraphs h1 and h2.

**k.** Before releasing control of the aircraft, issue restrictions to the receiving controller that are necessary to maintain separation from other aircraft within your area of jurisdiction.

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–1–14, Coordinate Use of Airspace.*

*FAA Order JO 7110.65, Para 2–1–15, Control Transfer.*

*FAA Order JO 7110.65, Para 5–4–6, Receiving Controller Handoff.*

*FAA Order JO 7110.65, Para 5–4–8, Automated Information Transfer (AIT).*

*FAA Order JO 7210.3, Para 4–3–8, Automated Information Transfer (AIT).*

## **5–4–6. RECEIVING CONTROLLER HANDOFF**

The receiving controller must:

**a.** Ensure that the target position corresponds with the position given by the transferring controller or that there is an appropriate association between an automated data block and the target being transferred before accepting a handoff.

**REFERENCE–**

*FAA Order JO 7110.65, Para 2–1–14, Coordinate Use of Airspace.*

*FAA Order JO 7110.65, Para 2–1–15, Control Transfer.*

*FAA Order JO 7110.65, Para 5–4–5, Transferring Controller Handoff.*

**b.** Issue restrictions that are needed for the aircraft to enter your sector safely before accepting the handoff.

**c.** Comply with restrictions issued by the transferring controller unless otherwise coordinated.

**d.** After accepting a handoff from another facility, confirm the identification of a primary target by advising the aircraft of its position, and of a nondiscrete beacon target by observing a code change, an “ident” reply, or a “standby” squawk unless one of these was used during handoff. These provisions do not apply at those towers and GCAs that have been delegated the responsibility for providing radar separation within designated areas by the overlying approach control facility and the aircraft identification is assured by sequencing or positioning prior to the handoff.

**REFERENCE–**

*FAA Order JO 7110.65, Para 5–9–5, Approach Separation Responsibility.*

**e.** Consider a beacon target’s identity to be confirmed when:

**1.** The data block associated with the target being handed off indicates the computer assigned discrete beacon code is being received; or

**2.** You observe the deletion of a discrete code that was displayed in the data block; or

**NOTE–**

*When the beacon code received from the aircraft does not match the computer assigned beacon code, the code received (ERAM, MEARTS) or the site–adapted code (received, computer–assigned, or both for STARS) will be displayed in the data block. When the aircraft changes to the computer assigned code, the code is automatically removed from the data block. In this instance, the observance of code removal from the data block satisfies confirmation requirements.*

**3.** You observe the numeric display of a discrete code that an aircraft has been instructed to squawk or reports squawking.

**f.** Take the identified action prior to accepting control of a track when the following indicators are displayed in the data block:

## Section 5. Radar Separation

### 5-5-1. APPLICATION

a. Radar separation must be applied to all RNAV aircraft operating at and below FL450 on Q routes or random RNAV routes, excluding oceanic airspace.

EXCEPTION. GNSS-equipped aircraft /G, /L, /S, and /V on point-to-point routes, or transitioning between two point-to-point routes via an impromptu route.

#### REFERENCE-

FAA Order JO 7110.65, Para 2-3-8, Aircraft Equipment Suffixes.

FAA Order JO 7110.65, TBL 2-3-10, Aircraft Equipment Suffixes.

FAA Order JO 7110.65, Para 4-4-1, Route Use.

AIM, Para 5-1-8, Area Navigation (RNAV).

AIM, Para 5-3-4, Area Navigation (RNAV) Routes.

P/CG Term – Global Navigation Satellite System (GNSS)[ICAO].

P/CG Term – Global Positioning Satellite/ Wide Area Augmentation Minimum En Route IFR Altitude (GPS/WAAS MEA).

P/CG Term – Parallel Offset Route.

b. Radar separation may be applied between:

1. Radar identified aircraft.

2. An aircraft taking off and another radar identified aircraft when the aircraft taking off will be radar-identified within 1 mile of the runway end.

3. A radar-identified aircraft and one not radar-identified when either is cleared to climb/descend through the altitude of the other provided:

(a) The performance of the radar system is adequate and, as a minimum, primary radar targets or ASR-9/Full Digital Radar Primary Symbol targets are being displayed on the display being used within the airspace within which radar separation is being applied; and

(b) Flight data on the aircraft not radar-identified indicate it is a type which can be expected to give adequate primary/ASR-9/Full Digital Radar Primary Symbol return in the area where separation is applied; and

(c) The airspace within which radar separation is applied is not less than the following number of miles from the edge of the radar display:

(1) When less than 40 miles from the antenna– 6 miles;

(2) When 40 miles or more from the antenna– 10 miles;

(3) Narrowband radar operations– 10 miles; and

(d) Radar separation is maintained between the radar-identified aircraft and all observed primary, ASR-9/Full Digital Radar Primary Symbol, and secondary radar targets until nonradar separation is established from the aircraft not radar identified; and

(e) When the aircraft involved are on the same relative heading, the radar-identified aircraft is vectored a sufficient distance from the route of the aircraft not radar identified to assure the targets are not superimposed prior to issuing the clearance to climb/descend.

#### REFERENCE-

FAA Order JO 7110.65, Para 4-1-2, Exceptions.

FAA Order JO 7110.65, Para 4-4-1, Route Use.

FAA Order JO 7110.65, Para 5-3-1, Application.

FAA Order JO 7110.65, Para 5-5-8, Additional Separation for Formation Flights.

FAA Order JO 7110.65, Para 5-9-5, Approach Separation Responsibility.

4. A radar-identified aircraft and one not radar-identified that is in transit from oceanic airspace or non-radar offshore airspace into an area of known radar coverage where radar separation is applied as specified in

paragraph 8-5-5, Radar Identification Application, until the transiting aircraft is radar-identified or the controller establishes other approved separation in the event of a delay or inability to establish radar identification of the transiting aircraft.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-2-6, IFR Flight Progress Data.*

*FAA Order JO 7110.65, Para 5-1-1, Presentation and Equipment Performance.*

*FAA Order JO 7110.65, Para 5-3-1, Application.*

*FAA Order JO 7110.65, Para 8-1-8, Use of Control Estimates.*

*FAA Order JO 7110.65, Para 8-5-5, Radar Separation.*

## **5-5-2. TARGET SEPARATION**

Apply radar separation:

- a. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.
- b. Between the ends of beacon control slashes.
- c. Between the end of a beacon control slash and the center of a primary target.
- d. All-digital displays. Between the centers of digital targets; do not allow digital targets to touch.

**REFERENCE-**

*FAA Order JO 7110.65, Para 5-9-7, Simultaneous Independent Approaches- Dual & Triple.*

## **5-5-3. TARGET RESOLUTION**

- a. A process to ensure that correlated radar targets or digitized targets do not touch.
- b. Mandatory traffic advisories and safety alerts must be issued when this procedure is used.

**NOTE-**

*This procedure must not be provided utilizing mosaic radar systems.*

- c. Target resolution must be applied as follows:
  - 1. Between the edges of two primary targets or the edges of primary digitized targets.
  - 2. Between the end of the beacon control slash and the edge of a primary target or primary digitized target.
  - 3. Between the ends of two beacon control slashes.

## **5-5-4. MINIMA**

Separate aircraft by the following minima:

- a. **TERMINAL.** Single Sensor ASR or Digital Terminal Automation System (DTAS):

**NOTE-**

1. *Includes single sensor long range radar mode.*

2. *ADS-B and WAM are not selectable sources when in Single Sensor Mode.*

- 1. When less than 40 miles from the antenna- *3 miles.*
- 2. When 40 miles or more from the antenna- *5 miles.*

3. For single sensor monopulse secondary surveillance radar (MSSR), when less than 60 miles from the antenna- *3 miles.*

**NOTE-**

*Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.*

- 4. If TRK appears in the data block, handle in accordance with paragraph 5-3-7, Identification Status, subparagraph b, and take appropriate steps to establish nonradar separation.

**NOTE–**

TRK appears in the data block whenever the aircraft is being tracked by a radar site other than the radar currently selected. Current equipment limitations preclude a target from being displayed in the single sensor mode; however, a position symbol and data block, including altitude information, will still be displayed. Therefore, low altitude alerts must be provided in accordance with paragraph 2–1–6, Safety Alert.

**b. TERMINAL. FUSION:**

1. Fusion target symbol – 3 miles.
2. When displaying ISR in the data block- 5 miles.

**NOTE–**

In the event of an unexpected ISR on one or more aircraft, the ATCS working that aircraft must transition from 3–mile to 5–mile separation, or establish some other form of approved separation as soon as feasible. This action must be timely, but taken in a reasonable fashion, using the controller's best judgment, as not to reduce safety or the integrity of the traffic situation. For example, if ISR appears when an aircraft is established on final with another aircraft on short final, it would be beneficial from a safety perspective to allow the trailing aircraft to continue the approach and land rather than terminate a stabilized approach.

3. If TRK appears in the data block, handle in accordance with paragraph 5–3–7, Identification Status, subparagraph b, and take appropriate steps to establish non-radar separation.

4. The ADS-B Computer Human Interface (CHI) may be implemented by facilities on a sector by sector or facility wide basis when the determination is made that utilization of the ADS-B CHI provides an operational advantage to the controller.

**c. STARS Multi–Sensor Mode – 5 miles.****NOTE–**

STARS Multi–Sensor Mode displays target symbols derived from radar, ADS–B, and WAM.

**d. ERAM:**

1. Below FL 600- 5 miles.
2. At or above FL 600- 10 miles.
3. Up to and including FL 230 where all the following conditions are met – 3 miles:
  - (a) Within the 3 NM separation area, and:
    - (1) Within 40 NM of the preferred radar; or
    - (2) Within 60 NM of the preferred radar when using an MSSR; or
    - (3) When operating in track–based display mode.
  - (b) The preferred sensor and/or ADS–B is providing reliable targets.
  - (c) Facility directives specifically define the 3 NM separation area.
  - (d) The 3 NM separation area is displayable on the video map.
  - (e) Involved aircraft are displayed using the 3 NM target symbol.

**NOTE–**

ADS–B allows the expanded use of 3 NM separation in approved areas. It is not required for and does not affect the use of radar for 3 NM separation.

4. When transitioning from terminal to en route control, 3 miles increasing to 5 miles or greater, provided:
  - (a) The aircraft are on diverging routes/courses, and/or
  - (b) The leading aircraft is and will remain faster than the following aircraft; and
  - (c) Separation constantly increasing and the first center controller will establish 5 NM or other appropriate form of separation prior to the aircraft departing the first center sector; and

(d) The procedure is covered by a letter of agreement between the facilities involved and limited to specified routes and/or sectors/positions.

**REFERENCE–**

FAA Order JO 7210.3, Para 8–2–1, Three Mile Airspace Operations.

**e. MEARTS Mosaic Mode:**

1. Below FL 600- 5 miles.
2. At or above FL 600- 10 miles.
3. For areas meeting all of the following conditions – 3 miles:
  - (a) Radar site adaptation is set to single sensor mode.

**NOTE–**

1. Single Sensor Mode displays information from the radar input of a single site.
2. Procedures to convert MEARTS Mosaic Mode to MEARTS Single Sensor Mode at each PVD/MDM will be established by facility directive.

(b) Significant operational advantages can be obtained.

(c) Within 40 NM of the sensor or within 60 NM of the sensor when using an MSSR and within the 3 NM separation area.

(d) Up to and including FL230.

(e) Facility directives specifically define the area where the separation can be applied and define the requirements for displaying the area on the controller's PVD/MDM.

**4. MEARTS Mosaic Mode Utilizing Single Source Polygon (San Juan CERAP and Honolulu Control Facility only) when meeting all of the following conditions– 3 miles:**

(a) Up to and including FL230 within 40 miles from the antenna or within 60 NM when using an MSSR and targets are from the adapted sensor.

(b) The single source polygon must be displayed on the controller's PVD/MDM.

(c) Significant operational advantages can be obtained.

(d) Facility directives specifically define the single source polygon area where the separation can be applied and specify procedures to be used.

(e) Controller must commence a transition to achieve either vertical separation or 5 mile lateral separation in the event that either target is not from the adapted sensor.

<b>WAKE TURBULENCE APPLICATION</b>
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**f. Separate aircraft operating directly behind or following an aircraft conducting an instrument approach by the minima specified and in accordance with the following:**

**NOTE–**

Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

**1. When operating within 2,500 feet of the flight path of the leading aircraft over the surface of the earth and less than 1,000 feet below:**

(a) **TERMINAL.** Behind super:

- (1) Heavy - 6 miles.
- (2) Large - 7 miles.
- (3) Small - 8 miles.

(b) *EN ROUTE*. Behind super - 5 miles, unless the super is operating at or below FL240 and below 250 knots, then:

(1) Heavy - 6 miles.

(2) Large - 7 miles.

(3) Small - 8 miles.

(c) Behind heavy:

(1) Heavy - 4 miles.

(2) Large or small - 5 miles.

2. Separate small aircraft behind a B757 by 4 miles when operating within 2,500 feet of the flight path of the leading aircraft over the surface of the earth and/or less than 500 feet below.

3. *TERMINAL*. When departing parallel runways separated by less than 2,500 feet, the 2,500 feet requirement in subparagraph 2 is not required when a small departs the parallel runway behind a B757. Issue a wake turbulence cautionary advisory and instructions that will establish lateral separation in accordance with subparagraph 2. Do not issue instructions that will allow the small to pass behind the B757.

**NOTE—**

1. The application of paragraph 5–8–3, *Successive or Simultaneous Departures*, satisfies this requirement.
2. Consider runways separated by less than 700 feet as a single runway because of the possible effects of wake turbulence.

<b>WAKE TURBULENCE APPLICATION</b>
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g. In addition to subparagraph f, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

**NOTE—**

Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Small behind large— 4 miles.

2. Small behind heavy— 6 miles.

If the landing threshold cannot be determined, apply the above minima as constant or increasing at the closest point that can be determined prior to the landing threshold.

h. *TERMINAL*. When NOWGT is displayed in an aircraft data block, provide 10 miles separation behind the preceding aircraft and 10 miles separation to the succeeding aircraft.

i. *TERMINAL*. 2.5 nautical miles (NM) separation is authorized between aircraft established on the final approach course within 10 NM of the landing runway when operating in FUSION, or single sensor slant range mode if the aircraft remains within 40 miles of the antenna and:

1. The leading aircraft's weight class is the same or less than the trailing aircraft;
2. Super and heavy aircraft are permitted to participate in the separation reduction as the trailing aircraft only;
3. An average runway occupancy time of 50 seconds or less is documented;
4. CTRDs are operational and used for quick glance references;

**REFERENCE—**

FAA Order JO 7110.65, Para 3–1–9, *Use of Tower Radar Displays*.

5. Turnoff points are visible from the control tower.

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–19, Wake Turbulence.  
 FAA Order JO 7110.65, Para 3–9–6, Same Runway Separation.  
 FAA Order JO 7110.65, Para 5–5–7, Passing or Diverging.  
 FAA Order JO 7110.65, Para 5–5–9, Separation from Obstructions.  
 FAA Order JO 7110.65, Para 5–8–3, Successive or Simultaneous Departures.  
 FAA Order JO 7110.65, Para 5–9–5, Approach Separation Responsibility.  
 FAA Order JO 7110.65, Para 7–6–7, Sequencing.  
 FAA Order JO 7110.65, Para 7–7–3, Separation.  
 FAA Order JO 7110.65 Para 7–8–3, Separation.  
 FAA Order JO 7210.3, Para 10–4–10, Reduced Separation on Final.

**5–5–5. VERTICAL APPLICATION**

Aircraft not laterally separated, may be vertically separated by one of the following methods:

**a.** Assign altitudes to aircraft, provided valid Mode C altitude information is monitored and the applicable separation minima is maintained at all times.

**REFERENCE–**

FAA Order JO 7110.65, Para 4–5–1, Vertical Separation Minima.  
 FAA Order JO 7110.65, Para 5–2–15, Validation of Mode C Altitude Readout.  
 FAA Order JO 7110.65, Para 7–7–3, Separation.  
 FAA Order JO 7110.65, Para 7–8–3, Separation.  
 FAA Order JO 7110.65, Para 7–9–4, Separation.

**b.** Assign an altitude to an aircraft after the aircraft previously at that altitude has been issued a climb/descent clearance and is observed (valid Mode C), or reports leaving the altitude.

**NOTE–**

1. Consider known aircraft performance characteristics, pilot furnished and/or Mode C detected information which indicate that climb/descent will not be consistent with the rates recommended in the AIM.
2. It is possible that the separation minima described in paragraph 4–5–1, Vertical Separation Minima, paragraph 7–7–3, Separation, paragraph 7–8–3, Separation, or paragraph 7–9–4, Separation, might not always be maintained using subparagraph b. However, correct application of this procedure will ensure that aircraft are safely separated because the first aircraft must have already vacated the altitude prior to the assignment of that altitude to the second aircraft.

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–3, Procedural Preference.  
 FAA Order JO 7110.65, Para 4–5–1, Vertical Separation Minima.  
 FAA Order JO 7110.65, Para 5–2–15, Validation of Mode C Altitude Readout.  
 FAA Order JO 7110.65, Para 6–6–1, Application.

**5–5–6. EXCEPTIONS**

**a.** Do not use Mode C to effect vertical separation with an aircraft on a cruise clearance, contact approach, or as specified in paragraph 5–14–4, System Requirements, subparagraph f3.

**REFERENCE–**

FAA Order JO 7110.65, Para 6–6–2, Exceptions.  
 FAA Order JO 7110.65, Para 7–4–7, Contact Approach.  
 P/CG Term – Cruise.

**b.** Assign an altitude to an aircraft only after the aircraft previously at that altitude is observed at or passing through another altitude separated from the first by the appropriate minima when:

1. Severe turbulence is reported.
2. Aircraft are conducting military aerial refueling.

**REFERENCE–**

FAA Order JO 7110.65, Para 9–2–13, Military Aerial Refueling.

**3.** The aircraft previously at that altitude has been issued a climb/descent at pilot's discretion.

**c. EN ROUTE.** When the position symbol associated with the data block falls more than one history behind the actual aircraft target or there is no target symbol displayed, the Mode C information in the data block must not be used for the purpose of determining separation.



## 5-5-7. PASSING OR DIVERGING

**a. TERMINAL.** In accordance with the following criteria, all other approved separation may be discontinued and passing or diverging separation applied when:

### 1. Single Site ASR or FUSION Mode

(a) Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 15 degrees.

#### NOTE-

*Two aircraft, both assigned courses and/or radar vectors with an angular difference of at least 15 degrees, is considered a correct application of this paragraph.*

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

#### REFERENCE-

*FAA Order JO 7110.65, Para 1-2-2, Course Definitions.*

**2. Single Site ARSR or FUSION Mode when target refresh is only from an ARSR or when in FUSION Mode – ISR is displayed.**

(a) Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 45 degrees.

#### NOTE-

*Two aircraft, both assigned courses and/or radar vectors with an angular difference of at least 45 degrees, is considered a correct application of this paragraph.*

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

**3. Although approved separation may be discontinued, the requirements of paragraph 5-5-4, Minima, subparagraph g must be applied when wake turbulence separation is required.**

#### REFERENCE-

*FAA Order JO 7110.65, Para 1-2-2, Course Definitions.*

**b. EN ROUTE, TERMINAL (when STARS Multi-Sensor Mode is selected).** Vertical separation between aircraft may be discontinued when they are on opposite courses as defined in paragraph 1-2-2, Course Definitions; and

1. You are in communications with both aircraft involved; and
2. You tell the pilot of one aircraft about the other aircraft, including position, direction, type; and
3. One pilot reports having seen the other aircraft and that the aircraft have passed each other; and
4. You have observed that the radar targets have passed each other; and
5. You have advised the pilots if either aircraft is classified as a super or heavy aircraft.

**6. Although vertical separation may be discontinued, the requirements of paragraph 5-5-4, Minima, subparagraph g must be applied when wake turbulence separation is required.**

#### EXAMPLE-

*“Traffic, twelve o’clock, Boeing Seven Twenty Seven, opposite direction. Do you have it in sight?”*

*(If the answer is in the affirmative):*

*“Report passing the traffic.”*

*(When pilot reports passing the traffic and the radar targets confirm that the traffic has passed, issue appropriate control instructions.)*

### **5-5-8. ADDITIONAL SEPARATION FOR FORMATION FLIGHTS**

Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions. Provide supplemental separation for formation flights as follows:

- a. Separate a standard formation flight by adding 1 mile to the appropriate radar separation minima.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-1-13, Formation Flights.*

*FAA Order JO 7110.65, Para 5-5-1, Application.*

*FAA Order JO 7110.65, Para 7-7-3, Separation.*

*P/CG Term – Formation Flight.*

- b. Separate two standard formation flights from each other by adding 2 miles to the appropriate separation minima.

- c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

- d. If necessary for separation between a nonstandard formation and other aircraft, assign an appropriate beacon code to each aircraft in the formation or to the first and last aircraft in-trail.

**NOTE-**

*The additional separation provided in paragraph 5-5-8, Additional Separation for Formation Flights, is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).*

**REFERENCE-**

*FAA Order JO 7110.65, Para 9-2-13, Military Aerial Refueling.*

### **5-5-9. SEPARATION FROM OBSTRUCTIONS**

- a. **TERMINAL.** Separate aircraft from prominent obstructions depicted on the radar display by the following minima:

1. When less than 40 miles from the antenna– *3 miles.*
2. When 40 miles or more from the antenna– *5 miles.*
3. For single sensor MSSR, when less than 60 miles from the antenna – *3 miles.*

- 4. **FUSION:**

- (a) Fusion target symbol – *3 miles.*
- (b) When ISR is displayed – *5 miles.*

**NOTE-**

*When operating in FUSION, distances from the antenna listed in paragraph 5-5-9, a1 through a3, do not apply.*

5. **STARS Multi-Sensor Mode** – *5 miles.*

- b. **TERMINAL.** Vertical separation of aircraft above a prominent obstruction depicted on the radar display and contained within a buffer area may be discontinued after the aircraft has passed the obstruction.

- c. **EAS.** Apply the radar separation minima specified in paragraph 5-5-4, Minima.

### **5-5-10. ADJACENT AIRSPACE**

- a. If coordination between the controllers concerned has not been effected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used by the following minima:

**b.** The following conditions are required when applying the minimum radar separation on adjacent final approach courses allowed in subparagraph a:

**NOTE–**

1. Established on RNP (EoR) operations are not authorized in conjunction with simultaneous dependent approaches.
2. Simultaneous dependent approaches may only be conducted where instrument approach charts specifically authorize simultaneous approaches.

1. Apply this separation standard only after aircraft are established on the parallel final approach course.
2. Straight-in landings will be made.
3. Missed approach procedures do not conflict.
4. Aircraft are informed that approaches to both runways are in use. This information may be provided through the ATIS.

5. Approach control must have the interphone capability of communicating directly with the local controller at locations where separation responsibility has not been delegated to the tower.

**NOTE–**

*The interphone capability is an integral part of this procedure when approach control has the sole separation responsibility.*

**REFERENCE–**

FAA Order JO 7110.65, Para 5–9–5, Approach Separation Responsibility.

FAA Order JO 7210.3, Para 2–1–16, Authorization for Separation Services by Towers.

**c.** Consideration should be given to known factors that may in any way affect the safety of the instrument approach phase of flight, such as surface wind direction and velocity, wind shear alerts/reports, severe weather activity, etc. Closely monitor weather activity that could impact the final approach course. Weather conditions in the vicinity of the final approach course may dictate a change of approach in use.

**REFERENCE–**

FAA Order JO 7110.65, Para 5–9–2, Final Approach Course Interception.

## **5–9–7. SIMULTANEOUS INDEPENDENT APPROACHES– DUAL & TRIPLE**

### **TERMINAL**

- a.** Apply the following minimum separation when conducting simultaneous independent approaches:
  1. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft :
    - (a) during turn–on to parallel final approach, or
    - (b) until aircraft are established on a published segment of an approach authorized for Established on RNP (EoR) operations.

**NOTE–**

*Aircraft are considered EoR on an initial or intermediate segment of an instrument approach authorized for EoR operations after the approach clearance has been issued, read back by the pilot and the aircraft is observed on the published procedure (lateral and vertical path, and within any procedure specified speed restriction), and is conducting a simultaneous independent parallel approach with an authorized simultaneous instrument approach to a parallel runway.*

**REFERENCE–**

FAA Order JO 7210.3, Para 10–4–6, Simultaneous Independent Approaches.

P/CG Term – Required Navigation Performance (RNP).

P/CG Term – Established on RNP Concept.

2. Dual parallel runway centerlines are at least 3,600 feet apart, or dual parallel runway centerlines are at least 3,000 feet apart with a 2.5° to 3.0° offset approach to either runway.
3. Triple parallel approaches may be conducted when:
  - (a) Parallel runway centerlines are at least 3,900 feet apart; or
  - (b) Parallel runway centerlines are at least 3,000 feet apart, a 2.5° to 3.0° offset approach to both outside runways; or

(c) Parallel runway centerlines are at least 3,000 feet apart, a single 2.5° to 3.0° offset approach to either outside runway while parallel approaches to the remaining two runways are separated by at least 3,900 feet.

(d) Parallel approaches to airports where the airport field elevation is more than 2,000 feet MSL require the use of the final monitor aid (FMA) system.

4. Provide the minimum applicable radar separation between aircraft on the same final approach course.

**NOTE—**

*Except when conducting an EoR operation, no two aircraft will be assigned the same altitude during turn-on to final. All three aircraft will be assigned altitudes which differ by a minimum of 1,000 feet. Example: 3,000, 4,000, 5,000; 7,000, 8,000, 9,000.*

**HIGH UPDATE RATE SURVEILLANCE**

b. At locations with high update rate surveillance capable of update rates of 1.2 seconds or faster, and where fusion display mode is utilized, simultaneous independent approaches may be conducted under the following conditions:

1. Dual parallel runway centerlines are at least 3,100 feet apart, or dual parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to either runway.

2. Triple parallel runway centerlines are at least 3,100 feet apart, or triple parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to both outside runways, or triple parallel runway centerlines are at least 2,500 feet apart, and a single 2.5° to 3.0° offset approach to either outside runway while parallel approaches to the remaining two runways are separated by at least 3,100 feet.

**NOTE—**

*Aircraft without functioning ADS-B Out are restricted from utilizing these high update rate (HUR) procedures unless an alternative HUR surveillance source providing one-second or faster target report updating is utilized.*

3. A surveillance update rate of at least 1.2 seconds is required for monitoring the no transgression zone (NTZ) when conducting simultaneous independent approaches to the runway centerline spacing (RCLS) provided in this paragraph.

**NOTE—**

1. HUR procedures cannot be conducted if notified that a 1.2-second update rate is not being provided.

2. Where RCLS is  $\leq 3400$  feet, the normal operating zone (NOZ) is constant at 700 feet; and for RCLS  $\geq 3400$  feet, the no transgression zone (NTZ) remains constant at 2000 feet.

4. Provide the minimum applicable radar separation between aircraft on the same final approach course.

c. A color digital display set to a 4 to 1 (4:1) aspect ratio (AR) with visual and aural alerts, such as the STARS final monitor aid (FMA), and a surveillance update rate at 4.8 seconds or faster must be used to monitor approaches where:

1. Dual parallel runway centerlines are at least 2,500 and less than 4,300 feet apart.

2. Triple parallel runway centerlines are at least 2,500 but less than 5,000 feet apart.

3. Triple parallel approaches to airports where the airport field elevation is more than 2,000 feet MSL require use of the FMA system.

**NOTE—**

*At locations where the airfield elevation is 2000 feet or less, FMA is not required to monitor the NTZ for runway centerlines 4,300 feet or greater for dual runways, and 5,000 feet or greater for triple operations.*

d. The following conditions must be met when conducting dual or triple simultaneous independent approaches:

**NOTE—**

*Simultaneous independent approaches may only be conducted where instrument approach charts specifically authorize simultaneous approaches.*

pilot–applied visual separation must be provided by the succeeding aircraft until it is established on the extended centerline of the nearer runway.

**NOTE–**

1. *The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the extended centerline of the runway and preclude side-by-side operations with one or both aircraft in a “belly-up” configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn are factors to be considered when vectoring aircraft to parallel runways.*
2. *The 30–degree intercept angle is not necessary when approved separation is maintained until the aircraft are established on the extended centerline of the assigned runway.*
3. *Variances between heading assigned to intercept the extended centerline of the runway and aircraft ground track are expected due to the effect of wind and course corrections after completion of the turn and pilot acknowledgment of a visual approach clearance.*
4. *Procedures using Radius-to-Fix legs that intercept final may be used in lieu of 30-degree intercept provisions contained in this paragraph.*

(e) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to other runways, provided the conditions of subparagraph (a), (b), or (d) are met.

4. Intersecting and converging runways. Visual approaches may be conducted simultaneously with visual or instrument approaches to other runways, provided:

(a) Approved separation is maintained until the aircraft conducting the visual approach has been issued, and the pilot has acknowledged receipt of, the visual approach clearance.

(b) When aircraft flight paths intersect, approved separation must be maintained until visual separation is provided.

**NOTE–**

*Although simultaneous approaches may be conducted to intersecting runways, staggered approaches may be necessary to meet the airport separation requirements specified in paragraph 3–10–4, Intersecting Runway/Intersecting Flight Path Separation.*

**REFERENCE–**

FAA Order JO 7110.65, Para 7–7–3, Separation.

FAA Order JO 7110.65, Para 7–8–3, Separation.

FAA Order JO 7110.65, Para 7–9–4, Separation.

## **7–4–5. CHARTED VISUAL FLIGHT PROCEDURES (CVFP). USA/USN NOT APPLICABLE**

Clear an aircraft for a CVFP only when the following conditions are met:

- a. There is an operating control tower.
- b. The published name of the CVFP and the landing runway are specified in the approach clearance, the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA, and the visibility is 3 miles or more, unless higher minimums are published for the particular CVFP.
- c. When using parallel or intersecting/converging runways, the criteria specified in paragraph 7–4–4, Approaches to Multiple Runways, are applied.
- d. An aircraft not following another aircraft on the approach reports sighting a charted visual landmark, or reports sighting a preceding aircraft landing on the same runway and has been instructed to follow that aircraft.

**PHRASEOLOGY–**

(Ident) **CLEARED** (name of CVFP) **APPROACH**.

## **7–4–6. RNAV VISUAL FLIGHT PROCEDURES (RVFP)**

RNAV Visual Flight Procedures (RVFPs) are special procedures flown in VMC and clear of clouds and used by authorized operators only. Clear an aircraft for an RVFP when:

- a. Requested by the pilot, or if necessary, as addressed in a Letter of Agreement (LOA).
- b. The pilot reports the airport in sight or, at locations with an operating control tower, the preceding aircraft in sight.
- c. An altitude is assigned at or above the MVA/MIA, before issuing an approach clearance when conducting an RVFP. The pilot should join the RVFP at the beginning of the charted procedure, or if necessary, may join at another waypoint along the path of the charted procedure, except for waypoints beginning or within an RF leg.
- d. The official weather at the airport of intended landing indicates VFR and should meet or exceed the ceiling and visibility specified on the RVFP.
- e. The published name of the RVFP and the landing runway are specified in the approach clearance.

**PHRASEOLOGY–**

*(Ident) CLEARED RNAV VISUAL RUNWAY (number) APPROACH*

**NOTE–**

*Refer to the facility RVFP LOAs, if applicable, to determine the authorized operators.*

**REFERENCE–**

*FAA Order 8260.60, Special Procedures.*

**7-4-7. CONTACT APPROACH**

Clear an aircraft for a contact approach only if the following conditions are met:

- a. The pilot has requested it.

**NOTE–**

*When executing a contact approach, the pilot is responsible for maintaining the required flight visibility, cloud clearance, and terrain/obstruction clearance. Unless otherwise restricted, the pilot may find it necessary to descend, climb, and/or fly a circuitous route to the airport to maintain cloud clearance and/or terrain/obstruction clearance. It is not in any way intended that controllers will initiate or suggest a contact approach to a pilot.*

- b. The reported ground visibility is at least 1 statute mile.
- c. A standard or special instrument approach procedure has been published and is functioning for the airport of intended landing.
- d. Approved separation is applied between aircraft so cleared and other IFR or SVFR aircraft. When applying vertical separation, do not assign a fixed altitude but clear the aircraft at or below an altitude which is at least 1,000 feet below any IFR traffic but not below the minimum safe altitude prescribed in 14 CFR Section 91.119.

**NOTE–**

*14 CFR Section 91.119 specifies the minimum safe altitude to be flown:*

- (a) Anywhere.*
- (b) Over congested areas.*
- (c) Other than congested areas. To provide for an emergency landing in the event of power failure and without undue hazard to persons or property on the surface.*
- (d) Helicopters. May be operated at less than the minimums prescribed in (b) and (c) above if the operation is conducted without hazard to persons or property on the surface.*

- e. An alternative clearance is issued when weather conditions are such that a contact approach may be impracticable.

**PHRASEOLOGY–**

*CLEARED CONTACT APPROACH,*

*And if required,*

*AT OR BELOW (altitude) (routing).*

*IF NOT POSSIBLE, (alternative procedures), AND ADVISE.*

## Section 2. Special Operations

### 9-2-1. AIRCRAFT CARRYING DANGEROUS MATERIALS

a. Provide the following special handling to military aircraft or military contracted aircraft carrying dangerous materials when:

1. The words “dangerous cargo,” or “inert devices,” or both are contained in the remarks section of the filed flight plan, or

**NOTE—**

1. *Certain types of military flights carrying dangerous materials require strict adherence to military regulations and flight planning along carefully selected routes. These flights must avoid heavily populated areas.*

2. *“Inert devices” are devices containing no dangerous materials but closely resembling nuclear or explosive items that are classified as dangerous and could be easily mistaken for their dangerous counterparts.*

2. The pilot uses these words in radio communication.

b. If it becomes necessary to issue a clearance to amend the route/altitude, advise the pilot:

1. Of the proposed change, and

2. The amount of delay to expect if it is necessary to maintain the present route/altitude.

c. When it becomes necessary for the pilot to refuse a clearance amending his/her route/altitude, he/she will advise if the traffic delay is acceptable or if an alternate route/altitude is desired. In such cases, offer all possible assistance.

d. When the aircraft is provided an en route descent, do not vector the aircraft from the planned route unless the pilot concurs.

e. Use special patterns and routings in areas where they have been developed for these flights. If special patterns and routings have not been developed, employ normal procedures.

### 9-2-2. CELESTIAL NAVIGATION TRAINING

**EN ROUTE**

a. Approve flight plans specifying celestial navigation only when it is requested for USAF or USN aircraft.

**NOTE—**

*An ATC clearance must be obtained by the pilot before discontinuing conventional navigation to begin celestial navigation training. The pilot will advise when discontinuing celestial navigation and resuming conventional navigation. Celestial navigation training will be conducted within 30 NM of the route centerline specified in the en route clearance unless otherwise authorized by ATC. During celestial navigation training, the pilot will advise ATC before initiating any heading changes which exceed 20 degrees.*

b. Within conterminous U.S. airspace, limit celestial navigation training to transponder-equipped aircraft within areas of ARTCC radar coverage.

c. Prior to control transfer, ensure that the receiving controller is informed of the nature of the celestial navigation training leg.

**REFERENCE—**

FAA Order JO 7110.65, Para 2-2-6, IFR Flight Progress Data.

### 9-2-3. EXPERIMENTAL AIRCRAFT OPERATIONS

a. When notified that an experimental aircraft requires special handling:

**NOTE–**

*14 CFR Section 91.319(d)(3) requires that each person operating an aircraft with an experimental certificate must notify the control tower of the experimental nature of the aircraft when operating into or out of airports with operating control towers.*

1. Clear the aircraft according to pilot requests as traffic permits and if not contrary to ATC procedures.
  2. Once approved, do not ask the pilot to deviate from a planned action except to preclude an emergency situation.
- b. At locations where volume or complexity of experimental aircraft operations warrant, a letter of agreement may be consummated between the facility and operator.

**9–2–4. FAA RESEARCH AND DEVELOPMENT FLIGHTS**

When coordinated in advance and traffic permits, approve requests for special flight procedures from aircraft participating in FAA research and development test activities. These special procedures must be applied to participating aircraft/vehicles.

**NOTE–**

*Special flight procedures for FAA research and development test activities must be approved by the facility air traffic manager prior to their use.*

**9–2–5. FLYNET**

Provide expeditious handling for U.S. Government, civil or military aircraft using the code name “FLYNET.” Relay the code name as an element in the remarks position of the flight plan.

**NOTE–**

*The code name “FLYNET” indicates that an aircraft is transporting a nuclear emergency team or a disaster control team to the location of a potential or actual nuclear accident or an accident involving chemical agents or hazardous materials. It is in the public interest that they reach their destination as rapidly as possible.*

**REFERENCE–**

FAA Order JO 7110.65, Para 2–1–4, Operational Priority.

FAA Order JO 7610.4, Para 9–4–1, “FLYNET” Flights, Nuclear Emergency Teams.

**9–2–6. IFR MILITARY TRAINING ROUTES**

- a. Except for aircraft operating in the same altitude reservation, clear aircraft into an MTR provided separation will be applied between successive aircraft unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned ATC facility.

**PHRASEOLOGY–**

*CLEARED INTO IR (designator).*

*MAINTAIN (altitude),*

*or*

*MAINTAIN IR (designator) ALTITUDE(S),*

*or*

*MAINTAIN AT OR BELOW (altitude),*

*or*

*CRUISE (altitude),*

*and if required,*



*CROSS (fix) AT OR LATER THAN (time).*

**b.** Unless otherwise covered in a letter of agreement between the military scheduling activity and the concerned FAA facility, clear aircraft to exit an MTR.

**PHRASEOLOGY–**

*CLEARED TO (destination/clearance limit) FROM IR (designator/exit fix) VIA (route).*

*MAINTAIN (altitude).*

**c.** If the provisions of subparagraph a above cannot be accomplished, MTRs may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes must be covered in a letter of agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

**NOTE–**

*For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.*

**d.** The lateral airspace to be protected along an MTR is the designated width of the route.

**e.** Prior to an aircraft entering an MTR, request the pilot's estimate for the route's exit/alternate exit fix, the pilot's requested altitude after exiting and, if applicable, the number of reentries on a Strategic Training Range (STR).

**PHRASEOLOGY–**

*(Call sign) VERIFY YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,*

*and if applicable,*

**THE NUMBER OF REENTRIES.**

**f.** Forward estimates for exit/alternate exit fixes, requested altitude after exit, and, if applicable, the number of reentries on the STR.

**g.** Apply the procedures of paragraph 6–1–2, Nonreceipt of Position Report, based upon the pilot's estimate for the route exit fix.

**h.** Clearance may be issued to amend or restrict operations on a route for ATC considerations. Where a route has been designated MARSA in accordance with subparagraph c, ATC must not amend or restrict operations in such a manner as to compromise MARSA provisions.

**NOTE–**

*When MARSA is provided through route scheduling and circumstances prevent the pilot from entering the route within established time limits, it must be the responsibility of the pilot to inform the ATC facility and advise his/her intentions.*

**i.** If an aircraft on an IR experiences a two-way radio communications failure and you are unable to determine if the aircraft is proceeding VFR in accordance with 14 CFR Section 91.185(b) or the aircraft has not been positively radar identified:

**1.** Provide separation to the destination airport based on the aircraft complying with the following:

**(a)** Maintain to the exit/alternate exit fix the higher of the following altitudes:

- (1)** The minimum IFR altitude for each of the remaining route segment(s) remaining on the route.
- (2)** The highest altitude assigned in the last ATC clearance.

**(b)** Depart the exit/alternate exit fix at the appropriate altitude specified in subparagraph (a) above, then climb/descend to the altitude filed in the flight plan for the remainder of the flight, or

**NOTE–**

*In the event of a two-way communications failure, ATC will be based on the following anticipated pilot action at the exit fix.*

*Unless otherwise covered in a letter of agreement, and if the pilot is unable to comply with the VFR provisions of 14 CFR Section 91.185/FLIP IFR Supplement, the pilot will exercise his/her emergency authority, squawk transponder **Code 7700**, depart the exit/alternate exit fix and climb/descend (continuing to squawk 7700) to the altitude filed in the flight plan. Subsequent transponder operations will be in accordance with paragraph 10-4-4, Communications Failure. Air traffic controller action from the exit fix is as prescribed in paragraph 10-1-1, Emergency Determinations.*

(c) Proceed in accordance with the lost communication procedure contained in letters of agreement.

2. Continue to monitor the last ATC assigned discrete code.

**NOTE-**

*Pilots who experience a two-way radio failure will adjust their transponder to **Code 7700** during climb/descent to altitude filed for the next leg of the flight plan; then change to **Code 7600** for a period of 15 minutes. At the end of each 15-minute period, he/she will squawk 7700 for a period of 1 minute; all other times he/she will squawk 7600.*

j. Impose delays, if needed, to eliminate conflict with nonparticipating IFR aircraft when necessary to preclude denial of IR usage. Advise the pilot of the expected length and reason for delay.

## **9-2-7. INTERCEPTOR OPERATIONS**

Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense (scrambles) missions until the unknown aircraft is identified in accordance with the policies and procedures published in FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations.

**NOTE-**

*The FAA and the military have mutually agreed to the implementation of policies and procedures for control of air defense interceptor operations. Effective coordination and cooperation between FAA and the military at all levels are essential if policy objectives are to be met.*

a. The ADCF initiating the SCRAMBLE must identify the mission as an active air defense mission.

b. ATC services must be used for active air defense missions insofar as the circumstances and situation permits.

c. Upon request, the ATC facility must expedite transfer of the control jurisdiction of the interceptors to the requesting ADCF.

## **9-2-8. SPECIAL INTEREST SITES**

a. Immediately relay any reports or information regarding unusual aircraft activities in the vicinity of special interest sites such as nuclear power plants, power plants, dams, refineries, etc., to supervisory/CIC personnel.

**NOTE-**

*Air traffic controllers have no responsibilities to monitor or observe aircraft in the vicinity of special interest sites unless directed by supervisory/CIC personnel.*

## **9-2-9. SPECIAL AIR TRAFFIC RULES (SATR) AND SPECIAL FLIGHT RULES AREA (SFRA)**

The Code of Federal Regulations prescribes special air traffic rules for aircraft operating within the boundaries of certain designated airspace. These areas are listed in 14 CFR Part 93 and can be found throughout the NAS. Procedures, nature of operations, configuration, size, and density of traffic vary among the identified areas.

a. Special Flight Rules Areas are areas of airspace wherein the flight of aircraft is subject to special air traffic rules set forth in 14 CFR Part 93, unless otherwise authorized by air traffic control. Not all areas listed in 14 CFR Part 93 are Special Flight Rules Areas, but special air traffic rules apply to all areas designated as SFRA.

**REFERENCE-**

*14 CFR Part 93, Special Air Traffic Rules.*

*P/CG, SPECIAL AIR TRAFFIC RULES (SATR)*

*P/CG, SPECIAL FLIGHT RULES AREA (SFRA)*

b. Each person operating an aircraft to, from, or within airspace designated as a SATR area or SFRA must adhere to the special air traffic rules set forth in 14 CFR Part 93, as applicable, unless otherwise authorized or required by ATC.

**REFERENCE–**

FAA Order JO 7110.67, *Air Traffic Management Security Procedures and Requirements for Special Operations*.

**9–2–13. MILITARY AERIAL REFUELING**

Authorize aircraft to conduct aerial refueling along published or special tracks at their flight plan altitudes, unless otherwise requested.

**PHRASEOLOGY–**

*CLEARED TO CONDUCT REFUELING ALONG (number) TRACK,*

*or*

*FROM (fix) TO (fix),*

*and*

*MAINTAIN BLOCK (altitude) THROUGH (altitude),*

*or*

*COMMENCING AT (altitude), DESCENDING TO (altitude).*

**NOTE–**

1. During aerial refueling, tanker aircraft are responsible for receiver aircraft communication with ATC and for their navigation along the track.
2. Aerial refueling airspace is not sterilized airspace and other aircraft may transit this airspace provided vertical or lateral separation is provided from refueling aircraft.
3. MARSA begins between the tanker and receiver when the tanker and receiver(s) have entered the air refueling airspace and the tanker advises ATC that he/she is accepting MARSA.
4. MARSA ends between the tanker and receiver when the tanker advises ATC that the tanker and receiver aircraft are vertically positioned within the air refueling airspace and ATC advises MARSA is terminated.

**REFERENCE–**

FAA Order JO 7110.65, *Para 2–1–II, Use of MARSA*.

FAA Order JO 7110.65, *Para 5–5–8, Additional Separation for Formation Flights*.

FAA Order JO 7610.14, *Chapter 5, Aerial Refueling*.

- a. Provide radar assistance to the rendezvous for participating aircraft:
  1. When requested, and
  2. By providing vertical separation prior to MARSA declaration.
- b. Do not request receiver aircraft that have been cleared to conduct air refueling and have departed the ARIP to:
  1. Make code changes when less than 5 miles from the tanker.
  2. Squawk standby when less than 1 mile or more than 3 miles from the tanker.

**NOTE–**

*Requests for receiver aircraft to make code changes during air refueling diverts the receiver pilot's attention during a critical phase of flight.*

- c. When issuing an initial air refueling clearance, you may request a receiver to squawk standby when the receiver reaches a point 3 miles from the tanker.

**NOTE–**

1. Receiver aircraft will squawk normal when separation from the tanker is greater than 3 miles.
2. Once rendezvous is completed, heading and altitude assignments may be made with the tanker concurrence with MARSA remaining in effect.

3. Upon rendezvous completion, the tanker must keep receiver aircraft within 3 miles of the tanker until MARSA is terminated.

d. After MARSA has been declared, you should avoid issuing course or altitude changes prior to rendezvous.

**NOTE–**

*Altitude or course changes issued will automatically void MARSA.*

e. Do not use the altitude vacated during the refueling operation until the refueling aircraft has reported reaching the next IFR altitude.

**REFERENCE–**

*FAA Order JO 7110.65, Para 6–6–2, Exceptions.*

f. Approve requests by the tanker pilot for vectors or alternative routes or altitudes as follows:

1. Furnish vectors or alternative altitudes at any time.
2. Furnish nonradar routes only after the refueling aircraft have passed the ARCP.

**NOTE–**

1. To meet a training requirement that aerial refueling be accomplished in a nonradar environment, the military has requested that vectors be furnished only upon request.

2. The tanker commander is responsible for coordinating all inflight requests with other aircraft in the refueling mission before submission of such requests to the center.

3. Normally, aircraft conducting aerial refueling operations will utilize at least three consecutive altitudes.

g. Unless a vector or alternative route has been furnished, clear the aircraft to depart the refueling track at a navigational reference point or egress fix.

h. Request an aircraft to report the ARIP, ARCP, or egress fix as necessary.

**PHRASEOLOGY–**

**REPORT:**

*A–R–I–P,*

*or*

*A–R–C–P,*

*or*

**EGRESS FIX.**

i. Expect the following procedures in addition to those required by the appropriate parts of Title 14 of the Code of Federal Regulations in the event of two-way communications failure:

1. The tanker will depart the track from the highest altitude in the block.
2. The receiver will depart the track from the lowest altitude in the block.
3. Aircraft will squawk 7600 for at least 2 minutes prior to departing the track.

**REFERENCE–**

*FAA Order JO 7110.65, Para 9–2–14, Military Operations Above FL 600.*

## **9–2–14. MILITARY OPERATIONS ABOVE FL 600**

Control aircraft operating above FL 600 using the following procedures:

a. Flight plans involving supersonic flight are required 16 hours in advance of proposed departure times for processing and approval by the ARTCCs concerned. The originating ARTCC, where the flight plan is first filed, may waive the 16–hour advance filing requirement.

1. Altitude.
2. Direction of flight.
3. ETA at the point closest to drop area (or at the fix/intersection where drop will occur).

**NOTE–**

A dropsonde is a 14–inch long cardboard cylinder about 2.75 inches in diameter, that weighs approximately 14 ounces (400 grams), and has a parachute attached. When released from the aircraft it will fall at a rate of approximately 2,500 feet per minute. Controllers should recognize that a dropsonde released at FL 310 will be a factor for traffic at FL 210 four minutes later. It is the aircraft commanders responsibility to delay release of dropsondes if traffic is a factor. Aircraft commanders will delay release of dropsondes based solely upon traffic as issued by ATC.

b. When advised that an airborne TEAL or NOAA aircraft is requesting a clearance via CARCAH, issue the clearance in accordance with Chapter 4, IFR, Section 2, Clearances.

**REFERENCE–**

FAA Order JO 7110.65, Para 4–2–1, Clearance Items.

FAA Order JO 7110.65, Para 4–2–2, Clearance Prefix.

FAA Order JO 7110.65, Para 4–2–3, Delivery Instructions.

c. If a TEAL or NOAA mission aircraft must be contacted but is out of VHF, UHF, and HF radio range, advise the supervisory traffic management coordinator–in–charge.

**REFERENCE–**

FAA Order JO 7210.3, Para 5–3–4, Weather Reconnaissance Flights.

FAA Order JO 7110.65, Para 2–1–4, Operational Priority.

d. Aircraft operations associated with a Weather Reconnaissance Area (WRA) must be conducted in accordance with the Memorandum of Agreement between the National Oceanic and Atmospheric Administration Aircraft Operations Center, U.S. Air Force Reserve Command 53rd Weather Reconnaissance Squadron, and the Federal Aviation Administration Air Traffic Organization in Support of the National Hurricane Operations Plan (FAA Order JO 7610.14, Appendix 3, Document 1), and the associated letters of agreement.

**9–2–20. EVASIVE ACTION MANEUVER**

Approve a pilot request to conduct an evasive action maneuver only on the basis of a permissible traffic situation. Specify the following items, as necessary, when issuing approval:

**NOTE–**

The “evasive action” maneuver is performed by a bomber/fighter bomber aircraft at or above FL 250 along a 60 NM long segment of the flight plan route overlying a RBS or other site and includes:

1. Flying a zigzag pattern on both the left and right side of the flight plan route centerline. Altitude deviations are made in conjunction with the lateral maneuvering.
2. Lateral deviations from the route centerline will not normally exceed 12 miles. Altitude variations must not exceed plus or minus 1,000 feet of the assigned flight level; i.e., confined within a 2,000 foot block.

- a. Specific route segment on which the maneuver will take place.
- b. Distance of maximum route deviation from the centerline in miles.
- c. Altitude.

**PHRASEOLOGY–**

CLEARED TO CONDUCT EVASIVE ACTION

MANEUVER FROM (fix) TO (fix),

and

(number of miles) EITHER SIDE OF CENTERLINE,

and

*MAINTAIN (altitude) THROUGH (altitude),*

*and*

*COMPLETE MANEUVER AT (fix) AT (altitude).*

## **9-2-21. NONSTANDARD FORMATION/CELL OPERATIONS**

Occasionally the military is required to operate in a nonstandard cell formation and controllers should be knowledgeable of the various tactics employed and the procedures used.

### **REFERENCE-**

■ *FAA Order JO 7610.14, Chapter 7, Section 3, Military Formation Flight.*

- a.** Formation leaders are responsible for obtaining ATC approval to conduct nonstandard formation/cell operations.
- b.** When nonstandard formation/cell operations have been approved, controllers must assign sufficient altitudes to allow intra-cell vertical spacing of 500 feet between each aircraft in the formation.
- c.** Control nonstandard formation/cell operations on the basis that MARSAs are applicable between the participating aircraft until they establish approved separation which is acknowledged by ATC.
- d.** Apply approved separation criteria between the approved nonstandard formation/cell envelope and nonparticipating aircraft.
- e.** Clear aircraft operating in a nonstandard formation/cell to the breakup fix as the clearance limit. Forward data pertaining to route or altitude beyond the breakup point to the center concerned as a part of the routine flight plan information.
- f. EN ROUTE.** If the breakup occurs in your area, issue appropriate clearances to authorize transition from formation to individual routes or altitudes. If a breakup cannot be approved, issue an appropriate clearance for the flight to continue as a formation.

## Section 2. Emergency Assistance

### 10-2-1. INFORMATION REQUIREMENTS

a. Start assistance as soon as enough information has been obtained upon which to act. Information requirements will vary, depending on the existing situation. Minimum required information for inflight emergencies is:

**NOTE—**

*In the event of an ELT signal see paragraph 10-2-10, Emergency Locator Transmitter (ELT) Signals.*

1. Aircraft identification and type.
2. Nature of the emergency.
3. Pilot's desires.

b. After initiating action, obtain the following items or any other pertinent information from the pilot or aircraft operator, as necessary:

**NOTE—**

1. *Emergency Autoland systems may not provide all of the required information for emergencies. Use the information provided to develop an appropriate course of action to assist the aircraft.*

2. *If an emergency has been declared by an Emergency Autoland system, transmissions to the aircraft may go unanswered.*

3. *Normally, do not request this information from military fighter-type aircraft that are at low altitudes (for example, on approach, immediately after departure, on a low level route). However, request the position of an aircraft that is not visually sighted or displayed on radar if the location is not given by the pilot.*

1. Aircraft altitude.
2. Fuel remaining in time.
3. Pilot reported weather.
4. Pilot capability for IFR flight.
5. Time and place of last known position.
6. Heading since last known position.
7. Airspeed.
8. Navigation equipment capability.
9. NAVAID signals received.
10. Visible landmarks.
11. Aircraft color.
12. Number of people on board.
13. Point of departure and destination.
14. Emergency equipment on board.

### 10-2-2. FREQUENCY CHANGES

Although 121.5 MHz and 243.0 MHz are emergency frequencies, it might be best to keep the aircraft on the initial contact frequency. Change frequencies only when there is a valid reason.

### 10-2-3. AIRCRAFT ORIENTATION

Orientate an aircraft by the means most appropriate to the circumstances. Recognized methods include:

- a. Radar.
- b. NAVAIDs.
- c. Pilotage.
- d. Sighting by other aircraft.

#### 10-2-4. ALTITUDE CHANGE FOR IMPROVED RECEPTION

When you consider it necessary and if weather and circumstances permit, recommend that the aircraft maintain or increase altitude to improve communications or radar.

**NOTE-**

*Aircraft with high-bypass turbofan engines (such as B747) encountering volcanic ash clouds have experienced total loss of power to all engines. Damage to engines due to volcanic ash ingestion increases as engine power is increased, therefore, climb while in the ash cloud is to be avoided where terrain permits.*

**REFERENCE-**

*AIM, Para 7-5-9, Flight Operations in Volcanic Ash.*

#### 10-2-5. EMERGENCY SITUATIONS

Consider that an aircraft emergency exists and inform the RCC or ARTCC if:

**NOTE-**

*USAF facilities are only required to notify the ARTCC.*

- a. An emergency is declared by any of the following:
  - 1. The pilot.
  - 2. Facility personnel.
  - 3. Officials responsible for the operation of the aircraft.
  - 4. A system-generated transmission from an aircraft.
- b. There is unexpected loss of radar contact and radio communications with any IFR or VFR aircraft.
- c. Reports indicate it has made a forced landing, is about to do so, or its operating efficiency is so impaired that a forced landing will be necessary.
- d. Reports indicate the crew has abandoned the aircraft or is about to do so.
- e. An emergency transponder code is displayed or reported.

**NOTE-**

*EN ROUTE. ERAM: Code 7700 causes an emergency indicator to blink in the data block.*

- f. Intercept or escort aircraft services are required.
- g. The need for ground rescue appears likely.
- h. An Emergency Locator Transmitter (ELT) signal is heard or reported.

**REFERENCE-**

*FAA Order JO 7110.65, Para 10-1-3, Providing Assistance.*

*FAA Order JO 7110.65, Para 10-2-10, Emergency Locator Transmitter (ELT) Signals.*

#### 10-2-6. HIJACKED AIRCRAFT

Hijack attempts or actual events are a matter of national security and require special handling. FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations, describes additional procedures and reporting requirements that must be followed.

**REFERENCE-**

*FAA Order JO 7610.4, Chapter 7, Procedures for Handling Suspicious Flight Situations and Hijacked Aircraft.*

*FAA Order JO 7110.65, Para 5-2-11, Code Monitor.*



- b. When you receive the nearest location of the explosive detection K-9 team, relay the information to the pilot.
- c. If the aircraft wishes to divert to the airport location provided, obtain an estimated arrival time from the pilot and advise your supervisor.

### 10-2-13. MANPADS ALERT

When a threat or attack from Man-Portable Air Defense Systems (MANPADS) is determined to be real, notify and advise aircraft as follows:

- a. Do not withhold landing clearance. To the extent possible, issue information on MANPADS threats, confirmed attacks, or post-event activities in time for it to be useful to the pilot. The pilot or parent company will determine the pilot's actions.
- b. MANPADS information will be disseminated via the ATIS and/or controller-to-pilot transmissions.
- c. Disseminate via controller-to-pilot transmission until the appropriate MANPADS information is broadcast via the ATIS and pilots indicate they have received the appropriate ATIS code. MANPADS information will include nature and location of threat or incident, whether reported or observed and by whom, time (if known), and when transmitting to an individual aircraft, a request for pilot's intentions.

#### PHRASEOLOGY-

*ATTENTION (aircraft identification), MANPADS ALERT. EXERCISE EXTREME CAUTION. MANPADS THREAT/ ATTACK/POST-EVENT ACTIVITY OBSERVED/ REPORTED BY (reporting agency) (location) AT (time, if known). (When transmitting to an individual aircraft) SAY INTENTIONS.*

#### EXAMPLE-

*"Attention Eastern Four Seventeen, MANPADS alert. Exercise extreme caution. MANPADS threat reported by TSA, LaGuardia vicinity. Say intentions."*

*"Attention all aircraft, MANPADS alert. Exercise extreme caution. MANPADS post-event activity observed by tower south of airport at two-one-zero-zero Zulu."*

- d. Report MANPADS threat/attack/post-event activity via the ATIS and/or controller-to-pilot transmissions until notified otherwise by the Domestic Events Network (DEN) Air Traffic Security Coordinator (ATSC).

#### REFERENCE-

*FAA Order JO 7110.65, Para 2-9-3, Content.*

*FAA Order JO 7210.3, Para 2-1-10, Handling MANPADS Incidents.*

*FAA Order JO 7610.4, Para 3-1-3, Responsibilities.*

### 10-2-14. UNAUTHORIZED LASER ILLUMINATION OF AIRCRAFT

- a. When a laser event is reported to an air traffic facility, broadcast on all appropriate frequencies a general caution warning every five minutes for 20 minutes following the last report.

#### PHRASEOLOGY-

*UNAUTHORIZED LASER ILLUMINATION EVENT, (location), (altitude).*

- b. Terminal facilities must include reported unauthorized laser illumination events on the ATIS broadcast for one hour following the last report. Include the time, location, altitude, color, and direction of the laser as reported by the pilot.

#### NOTE-

*All personnel can expect aircrews to regard lasers as an inflight emergency and may take evasive action to avoid laser illumination. Additionally, other aircraft may request clearance to avoid the area.*

#### REFERENCE-

*FAA Order JO 7110.65, Para 2-9-3, Content.*

*FAA Order JO 7210.3, Para 2-1-30, Reporting Unauthorized Laser Illumination of Aircraft.*

### 10-2-15. EMERGENCY AIRPORT RECOMMENDATION

- a. Consider the following factors when recommending an emergency airport:

1. Remaining fuel in relation to airport distances.
2. Weather conditions.

**NOTE—**

*Depending on the nature of the emergency, certain weather phenomena may deserve weighted consideration when recommending an airport; e.g., a pilot may elect to fly farther to land at an airport with VFR instead of IFR conditions.*

3. Airport conditions.
4. NAVAID status.
5. Aircraft type.
6. Pilot's qualifications.
7. Vectoring or homing capability to the emergency airport.

**NOTE—**

*In the event of an Emergency Autoland system activation, the system will select a suitable airport and advise ATC. The Emergency Autoland system does not consider closed runways, equipment on the runway, construction, or other possible airport hazards when selecting a suitable airport.*

b. Consideration to the provisions of subparagraph a and paragraph 10–2–16, Guidance to Emergency Airport, must be used in conjunction with the information derived from any automated emergency airport information source.

#### **10–2–16. GUIDANCE TO EMERGENCY AIRPORT**

a. When necessary, use any of the following for guidance to the airport:

1. Radar.
2. Following another aircraft.
3. NAVAIDs.
4. Pilotage by landmarks.
5. Compass headings.

b. Consideration to the provisions of paragraph 10–2–15, Emergency Airport Recommendation, must be used in conjunction with the information derived from any automated emergency airport information source.

#### **10–2–17. EMERGENCY OBSTRUCTION VIDEO MAP (EOVM)**

a. The EOVM is intended to facilitate advisory service to an aircraft in an emergency situation wherein an appropriate terrain/obstacle clearance minimum altitude cannot be maintained. It must only be used and the service provided under the following conditions:

1. The pilot has declared an emergency, or
2. The controller has determined that an emergency condition exists or is imminent because of the pilot's inability to maintain an appropriate terrain/obstacle clearance minimum altitude.

**NOTE—**

*Appropriate terrain/obstacle clearance minimum altitudes may be defined as Minimum IFR Altitude (MIA), Minimum En Route Altitude (MEA), Minimum Obstruction Clearance Altitude (MOCA), or Minimum Vectoring Altitude (MVA).*

b. When providing emergency vectoring service, the controller must advise the pilot that any headings issued are emergency advisories intended only to direct the aircraft toward and over an area of lower terrain/obstacle elevation.

**NOTE—**

*Altitudes and obstructions depicted on the EOVM are the actual altitudes and locations of the obstacle/terrain and contain no lateral or vertical buffers for obstruction clearance.*

**REFERENCE–**

FAA Order JO 7210.3, Para 3–8–4, Emergency Obstruction Video Map (EOVM).

**10–2–18. VOLCANIC ASH**

- a. If a volcanic ash cloud is known or forecast to be present:

1. Relay all information available to pilots to ensure that they are aware of the ash cloud's position and altitude(s).
2. Suggest appropriate reroutes to avoid the area of known or forecast ash clouds.

**NOTE–**

*Volcanic ash clouds are not normally detected by airborne or air traffic radar systems.*

- b. If advised by an aircraft that it has entered a volcanic ash cloud and indicates that a distress situation exists:

1. Consider the aircraft to be in an emergency situation.
2. Do not initiate any climb clearances to turbine-powered aircraft until the aircraft has exited the ash cloud.
3. Do not attempt to provide escape vectors without pilot concurrence.

**NOTE–**

1. *The recommended escape maneuver is to reverse course and begin a descent (if terrain permits). However, it is the pilot's responsibility to determine the safest escape route from the ash cloud.*

2. *Controllers should be aware of the possibility of complete loss of power to any turbine-powered aircraft that encounters an ash cloud.*

**REFERENCE–**

FAA Order JO 7110.65, Para 10–2–4, Altitude Change for Improved Reception.

AIM, Para 7–5–9, Flight Operations in Volcanic Ash.

**10–2–19. REPORTING DEATH, ILLNESS, OR OTHER PUBLIC HEALTH RISK ON BOARD AIRCRAFT**

- a. If an air traffic controller receives a report of the death of person, an illness, and/or other public health risk obtain the following information and notify the operations manager in charge (OMIC)/operations supervisor (OS)/controller-in-charge (CIC) as soon as possible.

1. Call sign.
2. Number of suspected cases of illness on board.
3. Nature of the illnesses or other public health risk, if known.
4. Number of persons on board.
5. Number of deaths, if applicable.
6. Pilot's intent (for example, continue to destination or divert).
7. Any request for assistance (for example, needing emergency medical services to meet the aircraft at arrival).

- b. The OMIC/OS/CIC must relay the information to the DEN as soon as possible.

**NOTE–**

1. *If the ATC facility is not actively monitoring the DEN or does not have a dedicated line to the DEN, they must call into the DEN directly via 844–432–2962 (toll free).*

2. *Except in extraordinary circumstances, such as a situation requiring ATC intervention, follow-on coordination regarding the incident will not involve ATC frequencies.*

3. *The initial report to a U.S. ATC facility may be passed from a prior ATC facility along the route of flight.*

**REFERENCE–**

FAA Order JO 7210.3, Para 2–1–37, Reporting Death, Illness, or Other Public Health Risk On Board Aircraft.



# 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. Terms used in this glossary that apply to flight service station (FSS) roles are included when they differ from air traffic control functions. These terms are followed by "[FSS]."

d. This Glossary will be revised, as necessary, to maintain a common understanding of the system.

## EXPLANATION OF CHANGES

e. Terms Added:

AUTOMATED SERVICES  
ENHANCED SPECIAL REPORTING SERVICE  
FLIGHT DATA  
INFLIGHT SERVICES  
SE SAR  
SPECIALIST-PROVIDED SERVICES  
SURVEILLANCE ENHANCED SEARCH AND RESCUE

f. Terms Modified:

PILOT BRIEFING  
TRAFFIC PATTERN

g. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes.



**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 SERVICES**–Services delivered via an automated system (that is, without human interaction). For example, flight plans, Notices to Air Missions (NOTAM), interactive maps, computer-generated text-to-speech messages, short message service, or email.

**AUTOMATED TERMINAL PROXIMITY ALERT (ATPA)**– Monitors the separation of aircraft on the Final Approach Course (FAC), displaying a graphical notification (cone and/or mileage) when a potential loss of separation is detected. The warning cone (Yellow) will display at 45 seconds and the alert cone (Red) will display at 24 seconds prior to predicted loss of separation. Current distance between two aircraft on final will be displayed in line 3 of the full data block of the trailing aircraft in corresponding colors.

**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) 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 GNSS-derived position and other required information such as identity and velocity, which is then received by a ground-based or space-based receiver for processing and display at an air traffic control facility, as well as by suitably equipped aircraft.

(See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST IN.)

(See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST OUT.)

(See COOPERATIVE SURVEILLANCE.)

(See GLOBAL POSITIONING SYSTEM.)

(See SPACE–BASED ADS–B.)

**AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST IN (ADS–B In)**– Aircraft avionics capable of receiving ADS–B Out transmissions directly from other aircraft, as well as traffic or weather information transmitted from ground stations.

(See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST OUT.)

(See AUTOMATIC DEPENDENT SURVEILLANCE–REBROADCAST.)

(See FLIGHT INFORMATION SERVICE–BROADCAST.)

(See TRAFFIC INFORMATION SERVICE–BROADCAST.)

**AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST OUT (ADS–B Out)**– The transmitter onboard an aircraft or ground vehicle that periodically broadcasts its GNSS–derived position along with other required information, such as identity, altitude, and velocity.

(See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST.)

(See AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST IN.)

**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/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.



# 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.)

**EMBEDDED ROUTE TEXT**– An EDST notification that an ADR/ADAR/AAR has been applied to the flight plan. Within the route field, sub-fields consisting of an adapted route or an embedded change in the route are color-coded in cyan with cyan brackets around the sub-field.

(See EN ROUTE DECISION SUPPORT TOOL.)

**EMERGENCY**– A distress or an urgency condition.

**EMERGENCY AUTOLAND SYSTEM**– This system, if activated, will determine an optimal airport, plot a course, broadcast the aircraft's intentions, fly to the airport, land, and (depending on the model) shut down the engines. Though the system will broadcast the aircraft's intentions, the controller should assume that transmissions to the aircraft will not be acknowledged.

**EMERGENCY DESCENT MODE**– This automated system senses conditions conducive to hypoxia (cabin depressurization). If an aircraft is equipped and the system is activated, it is designed to turn the aircraft up to 90 degrees, then descend to a lower altitude and level off, giving the pilot(s) time to recover.

**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.

**ENHANCED SPECIAL REPORTING SERVICE (eSRS)**– An automated service used to enhance search and rescue operations that provides flight service specialists in Alaska direct information from the aircraft's registered tracking device.

**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 WARNING (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 TRANSITION**–

(See SEGMENTS OF A SID/STAR.)

**EN ROUTE TRANSITION WAYPOINT**

(See SEGMENTS OF A SID/STAR.)

**eSRS**–

(See ENHANCED SPECIAL REPORTING SERVICE.)

**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.

**ESTABLISHED ON RNP (EoR) CONCEPT**– A system of authorized instrument approaches, ATC procedures, surveillance, and communication requirements that allow aircraft operations to be safely conducted with approved reduced separation criteria once aircraft are established on a PBN segment of a published instrument flight procedure.

**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.



**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 PERSON VIEW**– UAS operation in which imagery is transmitted to the UAS pilot by an onboard UA camera.

**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 DATA [FSS]**– The primary task of the FSS flight data position is information management. Flight data services include the development, translation, processing, and coordination of aeronautical, meteorological, and aviation information.

**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 electronically, orally, or in writing with an FSS, third–party vendor, 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 Air Missions, and broadcast aviation weather and aeronautical information. 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-BY WAYPOINT**– A fly-by waypoint requires the use of turn anticipation to avoid overshoot of the next flight segment.

**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-OVER WAYPOINT**– A fly-over waypoint precludes any turn until the waypoint is overflowed and is followed by an intercept maneuver of the next flight segment.

**FLY VISUAL TO AIRPORT**–

(See PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT.)

**FLYAWAY**– When the pilot is unable to effect control of the aircraft and, as a result, the UA is not operating in a predictable or planned manner.

**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 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.

**FRIA–**

(See FAA–RECOGNIZED IDENTIFICATION AREA.)

**FRICTION 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]–** 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).



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.

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 5 NM separation. 3 NM separation, 1 ½ NM 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 SERVICES [FSS]– Services provided to or affecting aircraft inflight or otherwise operating on the airport surface. This includes services to airborne aircraft, such as the delivery of ATC clearances, advisories or requests, issuance of military flight advisory messages, NOTAM delivery, search and rescue communications searches, flight plan handling, transcribed or live broadcasts, weather observations, PIREPs, and pilot briefings.

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.)



**NON-COOPERATIVE SURVEILLANCE**– Any surveillance system, such as primary radar, that is not dependent upon the presence of any equipment on the aircraft or vehicle to be tracked.

(See COOPERATIVE SURVEILLANCE.)

(See RADAR.)

**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 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 AIR MISSIONS.)

**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 AIR MISSIONS (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.

**a. 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.

**b. FDC NOTAM**– A NOTAM regulatory in nature, transmitted by USNOF and given system wide dissemination.

(See ICAO term NOTAM.)

**NRR**–

(See NON-RESTRICTIVE ROUTING.)

**NRS**–

(See NAVIGATION REFERENCE SYSTEM.)

**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.)



# 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.)

**PAO–**

(See PUBLIC AIRCRAFT OPERATION.)

**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.)

**PDRR–**

(See PRE-DEPARTURE REROUTE.)

**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.

**PERTI–**

(See PLAN, EXECUTE, REVIEW, TRAIN, IMPROVE.)

**PGUI–**

(See PLANVIEW GRAPHICAL USER INTERFACE.)

**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–** The gathering, translation, interpretation, and summarization of weather and aeronautical information into a form usable by the pilot or flight supervisory personnel to assist in flight planning and decision-making for the safe and efficient operation of aircraft. These briefings may include, but are not limited to, weather observations, forecasts, and aeronautical information (for example, NOTAMs, military activities, flow control information, and temporary flight restrictions [TFR]).

(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.

**PLAN, EXECUTE, REVIEW, TRAIN, IMPROVE (PERTI)–** A process that delivers a one-day detailed plan for NAS operations, and a two-day outlook, which sets NAS performance goals for high impact constraints. **PLAN:** Increase lead time for identifying aviation system constraint planning and goals while utilizing historical NAS performance data and constraints to derive successful and/or improved advance planning strategies. **EXECUTE:** Set goals and a strategy. The Air Traffic Control System Command Center (ATCSCC), FAA field facilities, and aviation stakeholders execute the strategy and work to achieve the desired/planned outcomes. **REVIEW:** Utilize post event analysis and lessons learned to define and implement future strategies and operational triggers based on past performance and outcomes, both positive and negative. **TRAIN:** Develop training that includes rapid and continuous feedback to operational personnel and provides increased data and weather knowledge and tools for analytical usage and planning. **IMPROVE:** Implement better information sharing processes, technologies, and procedures that improve the skills and technology needed to implement operational insights and improvements.

**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)

**PLANVIEW GRAPHICAL USER INTERFACE (PGUI)–** A TBFM display that provides a spatial display of individual aircraft track information.

**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.

**PRE-DEPARTURE REROUTE (PDRR)**– A capability within the Traffic Flow Management System that enables ATC to quickly amend and execute revised departure clearances that mitigate en route constraints or balance en route traffic flows.

**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.

(See GLIDEPATH.)

(See PAR.)

(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.

**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.

**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., and are also available at [https://www.fly.faa.gov/rmt/nfdc\\_preferred\\_routes\\_database.jsp](https://www.fly.faa.gov/rmt/nfdc_preferred_routes_database.jsp). 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 may be defined by DPs, SIDs, or STARs; NAVAIDs, Waypoints, etc.; high or low altitude airways; or any combinations thereof. Because they often share elements with adapted routes, pilots' use of preferred IFR routes can minimize flight plan route amendments.

(See ADAPTED ROUTES.)

(See CENTER'S AREA.)

(See INSTRUMENT APPROACH PROCEDURE.)

(See INSTRUMENT DEPARTURE PROCEDURE.)

(See STANDARD TERMINAL ARRIVAL.)

(Refer to CHART SUPPLEMENT U.S.)

**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 AREA NAVIGATION (RNAV) GLOBAL POSITIONING SYSTEM (GPS) PRECISION RUNWAY MONITORING (PRM) APPROACH.)

(See PRM APPROACH.)

(See PRECISION RUNWAY MONITOR SYSTEM.)

**PRM APPROACH**– An instrument approach procedure titled ILS PRM, RNAV PRM, LDA PRM, or GLS PRM conducted to parallel runways separated by less than 4,300 feet and at least 3,000 feet where independent closely spaced approaches are permitted. Use of an enhanced display with alerting, a No Transgression Zone (NTZ), secondary monitor frequency, pilot PRM training, and publication of an Attention All Users Page are required for all PRM approaches. Depending on the runway spacing, the approach courses may be parallel or one approach course must be offset. PRM procedures are also used to conduct Simultaneous Offset Instrument Approach (SOIA) operations. In SOIA, one straight-in ILS PRM, RNAV PRM, GLS PRM, and one offset LDA PRM, RNAV PRM or GLS PRM approach are utilized. PRM procedures are terminated and a visual segment begins at the offset approach missed approach point where the minimum distance between the approach courses is 3000 feet. Runway spacing can be as close as 750 feet.

(Refer to AIM.)

**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 10 NM from the DER, and that penetrates that airport/heliport's diverse departure obstacle clearance surface (OCS).

**c.** An obstacle beyond 10 NM from an airport/heliport that requires an obstacle departure procedure (ODP) to ensure obstacle avoidance.

(See OBSTACLE.)

(See OBSTRUCTION.)

**PROPELLER (PROP) WASH (PROP BLAST)–** The disturbed mass of air generated by the motion of a propeller.

**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.)

**PUBLIC AIRCRAFT OPERATION (PAO)–** A UAS operation meeting the qualifications and conditions required for the operation of a public aircraft.

(See AC-1.1)

(See AIM)

**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.)

# S

SAA–

(See SENSE AND AVOID.)

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**.)

**SATELLITE-BASED AUGMENTATION SYSTEM (SBAS)** – A wide coverage augmentation system in which the user receives augmentation information from a satellite-based transmitter.

(See **WIDE-AREA AUGMENTATION SYSTEM (WAAS)**.)

**SAW**–

(See **AVIATION WATCH NOTIFICATION MESSAGE**.)

**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**.)

**SE SAR**–

(See **SURVEILLANCE ENHANCED SEARCH AND RESCUE**.)

**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 canceled.

**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 A SID/STAR**–

**a. En Route Transition**– The segment(s) of a SID/STAR that connect to/from en route flight. Not all SIDs/STARs will contain an en route transition.

**b. En Route Transition Waypoint**– The NAVAID/fix/waypoint that defines the beginning of the SID/STAR en route transition.

**c. Common Route**– The segment(s) of a SID/STAR procedure that provides a single route serving an airport/runway or multiple airports/runways. The common route may consist of a single point. Not all conventional SIDs will contain a common route.

**d. Runway Transition**– The segment(s) of a SID/STAR between the common route/point and the runway(s). Not all SIDs/STARs will contain a runway transition.

**e. Runway Transition Waypoint (RTW)**– On a STAR, the NAVAID/fix/waypoint that defines the end of the common route or en route transition and the beginning of a runway transition (In the arrival route description found on the STAR chart, the last fix of the common route and the first fix of the runway transition(s)).

**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.)

**SELF-BRIEFING**– A self-briefing is a review, using automated tools, of all meteorological and aeronautical information that may influence the pilot in planning, altering, or canceling a proposed route of flight.

**SENSE AND AVOID (SAA)** – The capability of an unmanned aircraft to detect (sense) and avoid collisions with other aircraft and all obstacles, whether airborne or on the ground while operating in the NAS.

**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 **GRAPHICAL AIRMEN'S METEOROLOGICAL INFORMATION**.)

(See **SIGMET**.)

**SFA**–

(See **SINGLE FREQUENCY APPROACH**.)

**SFO**–

(See **SIMULATED FLAMEOUT**.)

**SFI**

(See **SPECIAL GOVERNMENT INTEREST**.)

**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 CONVECTIVE SIGMET.)

(See CWA.)

(See GRAPHICAL ARMEN'S METEOROLOGICAL INFORMATION.)

(See ICAO term SIGMET INFORMATION.)

(See SAW.)

(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.)

**SLOW TAXI**– To taxi a float plane at low power or low RPM.

**SMALL UNMANNED AIRCRAFT SYSTEM (sUAS)**– An unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft.

**SN**–

(See SYSTEM STRATEGIC NAVIGATION.)

**SPACE-BASED ADS-B (SBA)**– A constellation of satellites that receives ADS-B Out broadcasts and relays that information to the appropriate surveillance facility. The currently deployed SBA system is only capable of receiving broadcasts from 1090ES-equipped aircraft, and not from those equipped with only a universal access transceiver (UAT). Also, aircraft with a top-of-fuselage-mounted transponder antenna (required for TCAS II installations) will be better received by SBA, especially at latitudes below 45 degrees.

(See AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST.)

(See AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST OUT.)

**SPACE LAUNCH AND REENTRY AREA**– Locations where commercial space launch and/or reentry operations occur. For pilot awareness, a rocket-shaped symbol is used to depict space launch and reentry areas on sectional aeronautical charts.

***SPEAK SLOWER***– Used in verbal communications as a request to reduce speech rate.

**SPECIAL GOVERNMENT INTEREST (SGI)**– A near real-time airspace authorization for Part 91 or Part 107 UAS, which supports activities that answer significant and urgent governmental interests. These include: national defense, homeland security, law enforcement, and emergency operations objectives.

**SPECIAL ACTIVITY AIRSPACE (SAA)**– Airspace with defined dimensions within the National Airspace System wherein limitations may be imposed upon operations for national defense, homeland security, public interest, or public safety. Special activity airspace includes but is not limited to the following: Air Traffic Control Assigned Airspace (ATCAA), Altitude Reservations (ALTRV), Military Training Routes (MTR), Air Refueling Tracks and Anchors, Temporary Flight Restrictions (TFR), Special Security Instructions (SSI), etc. Special Use Airspace (SUA) is a subset of Special Activity Airspace.

(See SPECIAL USE AIRSPACE.)

**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. National Security Area (NSA)**– Airspace of defined vertical and lateral dimensions established at locations where there is a requirement for increased security of ground facilities. Pilots are requested to voluntarily avoid flying through the depicted NSA. When a greater level of security is required, flight through an NSA may be temporarily prohibited by establishing a TFR under the provisions of 14 CFR Section 99.7. Such prohibitions will be issued by FAA Headquarters and disseminated via the U.S. NOTAM System.

(Refer to AIM)

**e. 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.)

**f. 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.)

**g. 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.)

**SPECIALIST–PROVIDED SERVICES**–

Services delivered directly by a flight service specialist via ground/ground communication, air/ground communication, in-person, or technology (for example, speech-to-text, email, or short message service).

**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.

**SPOOFING**– Denotes emissions of GNSS-like signals that may be acquired and tracked in combination with or instead of the intended signals by civil receivers. The onset of spoofing effects can be instantaneous or delayed, and effects can persist after the spoofing has ended. Spoofing can result in false and potentially confusing, or hazardingly misleading, position, navigation, and/or date/time information in addition to loss of GNSS use.

**SPEED ADVISORY**– Speed advisories that are generated within Time-Based Flow Management to assist controllers to meet the Scheduled Time of Arrival (STA) at the meter fix/meter arc. See also Ground-Based Interval Management–Spacing (GIM–S) Speed Advisory.

**SQUAWK (Mode, Code, Function)**– Used by ATC to instruct a pilot to activate the aircraft transponder and ADS–B Out with altitude reporting enabled, or (military) to activate only specific modes, codes, or functions. Examples: “Squawk five seven zero seven;” “Squawk three/alpha, two one zero five.”

(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 AIRSPACE RESERVATION**– The term used in oceanic ATC for airspace that encompasses activities in a fixed volume of airspace to be occupied for a specified time period. Stationary Airspace 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.

(See STATIONARY ALTITUDE RESERVATION.)

**STATIONARY ALTITUDE RESERVATION (STATIONARY ALTRV)**– An altitude reservation which encompasses activities in a fixed volume of airspace to be occupied for a specified time period. Stationary ALTRVs 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.

**STNR ALT RESERVATION**– An abbreviation for Stationary Altitude Reservation commonly used in NOTAMs.

(See STATIONARY ALTITUDE RESERVATION.)

**STOL AIRCRAFT**–

(See SHORT TAKEOFF AND LANDING AIRCRAFT.)

**STOP ALTITUDE SQUAWK**– Used by ATC to instruct a pilot to turn off the automatic altitude reporting feature of the aircraft transponder and ADS–B Out. It is issued when a verbally reported altitude varies by 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 instruct a pilot to stop transponder and ADS–B transmissions, or to turn off only specified functions of the aircraft transponder (military).

(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.

**sUAS**–

(See **SMALL UNMANNED AIRCRAFT SYSTEM**.)

**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.

**SURFACE METERING PROGRAM**– A capability within Terminal Flight Data Manager that provides the user with the ability to tactically manage surface traffic flows through adjusting desired minimum and maximum departure queue lengths to balance surface demand with capacity. When a demand/capacity imbalance for a surface resource is predicted, a metering procedure is recommended.

**SURFACE VIEWER**– A capability within the Traffic Flow Management System that provides situational awareness for a user–selected airport. The Surface Viewer displays a top–down view of an airport depicting runways, taxiways, gate areas, ramps, and buildings. The display also includes icons representing aircraft and vehicles currently on the surface, with identifying information. In addition, the display includes current airport configuration information such as departure/arrival runways and airport departure/arrival rates.

**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.)

**SURVEILLANCE ENHANCED SEARCH AND RESCUE (SE SAR)**– An automated service used to enhance search and rescue operations that provides federal contract flight service specialists direct information from the aircraft's registered tracking device.

**SUSPICIOUS UAS**– Suspicious UAS operations may include operating without authorization, loitering in the vicinity of sensitive locations, (e.g., national security, law enforcement facilities, and critical infrastructure), or disrupting normal air traffic operations resulting in runway changes, ground stops, pilot evasive action, etc. The report of a UAS operation alone does not constitute suspicious activity. Development of a comprehensive list of suspicious activities is not possible due to the vast number of situations that could be considered suspicious. ATC must exercise sound judgment when identifying situations that could constitute or indicate a suspicious activity.

**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.

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 INITIATIVE (TMI)**– Tools used to manage demand with capacity in the National Airspace System (NAS.) TMIs can be used to manage NAS resources (e.g., airports, sectors, airspace) or to increase the efficiency of the operation. TMIs can be either tactical (i.e., short term) or strategic (i.e., long term), depending on the type of TMI and the operational need.

**TRAFFIC MANAGEMENT PROGRAM ALERT**– A term used in a Notice to Air Missions (NOTAM) issued in conjunction with a special traffic management program to alert pilots to the existence of the program and to refer them to 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.

**NOTE–**

ATC may instruct a pilot to report a “2-mile left base” to Runway 22. This instruction means that the pilot is expected to maneuver their aircraft into a left base leg that will intercept a straight-in final 2 miles from the approach end of Runway 22 and advise ATC.

**REFERENCE–**

Pilot's Handbook of Aeronautical Knowledge, FAA-H-8083-25, Chapter 14, Airport Operations, Traffic Patterns.

- 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.

**NOTE–**

ATC may instruct a pilot to report “5-mile final” to Runway 22. This instruction means that the pilot should maneuver their aircraft onto a straight-in final and advise ATC when they are five miles from the approach end of Runway 22.

**REFERENCE–**

■ *Pilot's Handbook of Aeronautical Knowledge, FAA–H–8083–25, Chapter 14, Airport Operations, Traffic Patterns.*

(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-BASED OPERATIONS (TBO)–** An Air Traffic Management method for strategically planning and managing flights throughout the operation by using Time-Based Management (TBM), information exchange between air and ground systems, and the aircraft's ability to fly trajectories in time and space. Aircraft trajectory is defined in four dimensions – latitude, longitude, altitude, and time.

**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.

**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–** 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.

**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.

**TRANSITIONAL AIRSPACE–** That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

**TRANSITIONAL HAZARD AREA (THA)**– Used by ATC. Airspace normally associated with an Aircraft Hazard Area within which the flight of aircraft is subject to restrictions.

(See AIRCRAFT HAZARD AREA.)

(See CONTINGENCY HAZARD AREA.)

(See REFINED HAZARD AREA.)

**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).

(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.)

**TRUST**–

(See THE RECREATIONAL UAS SAFETY TEST.)

**TSAS**–

(See TERMINAL SEQUENCING AND SPACING.)

**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.)

**TWO-WAY RADIO COMMUNICATIONS FAILURE**–

(See LOST COMMUNICATIONS.)

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# BRIEFING GUIDE

**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

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**1. PARAGRAPH NUMBER AND TITLE: 2-1-4. OPERATIONAL PRIORITY**

**2. BACKGROUND:** The Department of Defense (DoD) has requested modifications to National Airborne Operations Center (NAOC) and Special Air Missions (SCOOT) mission procedures and information in FAA Orders JO 7610.4, Sensitive Procedures and Requirements for Special Operations; and JO 7110.65, Air Traffic Control.

**3. CHANGE:****OLD****2-1-4. OPERATIONAL PRIORITY****Title through e**

**f.** Provide priority handling to NIGHT WATCH aircraft when NAOC (pronounced NA-YOCK) is indicated in the remarks section of the flight plan or in air/ground communications.

**NOTE-**

*The term “NAOC” will not be a part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.*

**REFERENCE-**

FAA Order JO 7610.4, Para 12-1-1, Applications.

**g through i REFERENCE**

**j.** Provide priority handling to Special Air Mission aircraft when SCOOT is indicated in the remarks section of the flight plan or used in air/ground communications.

**NOTE-**

*The term “SCOOT” will not be part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.*

**REFERENCE-**

FAA Order JO 7610.4, Para 12-6-1, Applications.

**NEW****2-1-4. OPERATIONAL PRIORITY****No Change**

**f.** Provide priority handling to NIGHT WATCH **“NAOC” (pronounced NAY-OCK) aircraft when notified via landline or when “NAOC” is used** in air/ground communications. **When the term “NAOC” is used, approve any request(s) as soon as practicable.**

**NOTE-**

*The term “NAOC” will not be a part of the Flight ID in the flight plan or used in conjunction with the call sign but may otherwise be used when the aircraft is airborne.*

**No Change****No Change**

**j.** Provide priority handling to Special Air Mission **“SCOOT”** aircraft when **notified via landline or when “SCOOT” is** used in air/ground communications. **When the term “SCOOT” is used, approve any request(s) as soon as practicable.**

**NOTE-**

*The term “SCOOT” will not be a part of the Flight ID in the flight plan but may be used during radio communications in conjunction with the call sign.*

**No Change****1. PARAGRAPH NUMBER AND TITLE: 5-2-15. VALIDATION OF MODE C READOUT**

**2. BACKGROUND:** FAA Order JO 7110.65, paragraph 5-2-15, Validation of Mode C Readout, makes reference to a “Coast/Suspend Tabular List” that is no longer used in ERAM. The reference will be modified/updated accordingly to reflect the current environment.

**3. CHANGE:****OLD****5-2-15. VALIDATION OF MODE C READOUT**

Ensure that Mode C altitude readouts are valid after accepting an interfacility handoff, initial track start, track start from coast/suspend tabular list, or during and after an unreliable Mode C readout, except as follows:

**NEW****5-2-15. VALIDATION OF MODE C ALTITUDE READOUT**

**a.** Ensure that Mode C altitude readouts are valid after:

**NOTE-**

Consider a Mode C readout unreliable when any condition, not just those that display an indicator in the Data Block, exists that indicates that the Mode C may be in error.

Delete

Add

Add

Add

Add

**a.** CTRD-equipped tower cabs are not required to validate Mode C altitude readouts after accepting interfacility handoffs from TRACONs according to the procedures in paragraph 5-4-3, Methods, subparagraph a4.

**b.** ERAM facilities are not required to validate Mode C altitude readouts after accepting interfacility handoffs from other ERAM facilities, except:

**1.** After initial track start or track start from coast is required, or

**2.** During and after the display of a missing, unreasonable, exceptional, or otherwise unreliable Mode C readout indicator.

Add

**c through g****1. Initial track start.****2. Track start from coast/frozen status.****3. During and after an unreliable Mode C readout.****4. Accepting an interfacility handoff, except:**

**(a)** CTRD-equipped tower cabs are not required to validate Mode C altitude readouts after accepting interfacility handoffs from TRACONs according to the procedures in paragraph 5-4-3, Methods, subparagraph a4.

**(b)** ERAM facilities are not required to validate Mode C altitude readouts after accepting interfacility handoffs from other ERAM facilities, except:

**(1)** After initial track start or track start from coast is required, or

**(2)** During and after the display of a missing, unreasonable, exceptional, or otherwise unreliable Mode C readout indicator.

**NOTE-**

Consider a Mode C readout unreliable when any condition exists that indicates the Mode C may be in error, not just those that display an indicator in the Data Block.

Re-letter as **b** through **f****1. PARAGRAPH NUMBER AND TITLE:**

5-5-4. MINIMA

5-5-9. SEPARATION FROM OBSTRUCTIONS

**2. BACKGROUND:** The Surveillance Acquisition and Sustainment Group of the Program Management Office (PMO) is undertaking the Mode S Beacon Replacement System (MSBRS) beginning in 2023. This secondary radar refresh seeks the replacement of all legacy Mode S and Condor MK2 beacon systems associated with ASR-8/9 and ASR-11 terminal airport surveillance radar (ASR) systems. The impending replacement requires the relevant provisions in JO 7110.65 to reflect the new system infrastructure. There will be no changes in separation standards as a result of this system replacement.

**3. CHANGE:****OLD****5-5-4. MINIMA**

Separate aircraft by the following minima:

**a. TERMINAL.** Single Sensor ASR or Digital Terminal Automation System (DTAS):

**NEW****5-5-4. MINIMA**

No Change

No Change

**NOTE–**

1. Includes single sensor long range radar mode.
2. ADS-B and WAM are not selectable sources when in Single Sensor Mode.

1. When less than 40 miles from the antenna– 3 miles.

2. When 40 miles or more from the antenna– 5 miles.

3. For single sensor ASR-9 with Mode S, when less than 60 miles from the antenna– 3 miles.

4. For single sensor ASR-11 MSSR Beacon, when less than 60 miles from the antenna– 3 miles.

**NOTE–**

Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

5. If TRK appears in the data block, handle in accordance with paragraph 5-3-7, Identification Status, subparagraph b, and take appropriate steps to establish nonradar separation.

**NOTE–**

TRK appears in the data block whenever the aircraft is being tracked by a radar site other than the radar currently selected. Current equipment limitations preclude a target from being displayed in the single sensor mode; however, a position symbol and data block, including altitude information, will still be displayed. Therefore, low altitude alerts must be provided in accordance with paragraph 2-1-6, Safety Alert.

**b through d3(a)(1)**

- (2) Within 60 NM of the preferred radar when using ASR-9 with Mode S or ASR-11 MSSR Beacon; or

**d3(a)(1) through e3(b)**

- (c) Within 40 NM of the sensor or within 60 NM of the sensor when using ASR-9 with Mode S or ASR-11 MSSR Beacon and within the 3 NM separation area.

**e3(d) through e4**

- (a) Up to and including FL230 within 40 miles from the antenna or within 60 NM when using ASR-9 with Mode S or ASR-11 MSSR Beacon and targets are from the adapted sensor.

No Change

No Change

No Change

No Change

3. For single sensor **monopulse secondary surveillance radar (MSSR)**, when less than 60 miles from the antenna– 3 miles.

Delete

No Change

4. If TRK appears in the data block, handle in accordance with paragraph 5-3-7, Identification Status, subparagraph b, and take appropriate steps to establish nonradar separation.

No Change

No Change

- (2) Within 60 NM of the preferred radar when using **an** MSSR; or

No Change

- (c) Within 40 NM of the sensor or within 60 NM of the sensor when using **an** MSSR and within the 3 NM separation area.

No Change

- (a) Up to and including FL230 within 40 miles from the antenna or within 60 NM when using **an** MSSR and targets are from the adapted sensor.

**OLD****5-5-9. SEPARATION FROM OBSTRUCTIONS**

a. TERMINAL. Separate aircraft from prominent obstructions depicted on the radar display by the following minima:

1. When less than 40 miles from the antenna– 3 miles.

2. When 40 miles or more from the antenna– 5 miles.

3. For single sensor ASR-9 with Mode S, when less than 60 miles from the antenna – 3 miles.

4. For single sensor ASR-11 MSSR Beacon, when less than 60 miles from the antenna – 3 miles.

5. FUSION:

(a) Fusion target symbol – 3 miles.

(b) When ISR is displayed – 5 miles.

**NOTE–**

When operating in FUSION, distances from the antenna listed in paragraph 5-5-9, a1 through a4, do not apply.

**a6**

**NEW****5-5-9. SEPARATION FROM OBSTRUCTIONS**

No Change

No Change

No Change

3. For single sensor MSSR, when less than 60 miles from the antenna – 3 miles.

Delete

4. FUSION:

No Change

No Change

**NOTE–**

When operating in FUSION, distances from the antenna listed in paragraph 5-5-9, a1 through a3, do not apply.

Renumber as **a5**

**1. PARAGRAPH NUMBER AND TITLE:** 5-9-7. SIMULTANEOUS INDEPENDENT APPROACHES

**2. BACKGROUND:** In May 2021, Flight Standards Flight Research and Analysis Branch, AFS-430, completed a supplemental analysis of DOT/FAA/AFS-400/2018/R/22 which provided the foundational analysis for implementation of the revised High Update Rate (HUR) surveillance procedures now published in JO 7110.65 and JO 7210.3. This supplemental analysis was requested after a 2020 safety risk management panel on the subject. It was found that through additional review of ADS-B surveillance accuracy that was not known at the time of the first report, that runway centerline spacing (RCLS) could be further reduced.

**3. CHANGE:**

**OLD****5-9-7. SIMULTANEOUS INDEPENDENT APPROACHES– DUAL & TRIPLE**

**Title through HIGH UPDATE RATE SURVEILLANCE**

b. At locations with high update rate surveillance, simultaneous independent approaches may be conducted where the surveillance update rate is 1 second or faster, the system processing time is 3 seconds or faster, and under the following conditions:

1. Dual parallel runway centerlines are at least 3,200 feet apart, or dual parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to either runway.

**NEW****5-9-7. SIMULTANEOUS INDEPENDENT APPROACHES– DUAL & TRIPLE**

No Change

b. At locations with high update rate surveillance **capable of update rates of 1.2 seconds or faster, and where fusion display mode is utilized,** simultaneous independent approaches may be conducted under the following conditions:

1. Dual parallel runway centerlines are at least 3,100 feet apart, or dual parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to either runway.



2. Triple parallel runway centerlines are at least 3,400 feet apart, or triple parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to both outside runways, or triple parallel runway centerlines are at least 2,500 feet apart, a single 2.5° to 3.0° offset approach to either outside runway while parallel approaches to the remaining two runways are separated by at least 3,400 feet.

**NOTE–**

*Aircraft without functioning ADS–B Out are restricted from utilizing these high update rate (HUR) procedures unless an alternative HUR surveillance source providing one–second or faster target report updating is utilized.*

3. A surveillance update rate of at least 1 second is required for monitoring the no transgression zone (NTZ) when conducting simultaneous independent approaches to the runway centerline spacing (RCLS) provided in this paragraph.

**NOTE–**

1. HUR procedures cannot be conducted if notified that a one second update rate is not being provided.

2. Where RCLS is  $\leq 3400$  feet, the normal operating zone (NOZ) is constant at 700 feet; and for RCLS  $\geq 3400$  feet, the no transgression zone (NTZ) remains constant at 2000 feet.

**b4 through c**

1. Dual parallel runway centerlines are at least 3,000 and less than 4,300 feet apart.

2. Triple parallel runway centerlines are at least 3,000 but less than 5,000 feet apart.

2. Triple parallel runway centerlines are at least 3,100 feet apart, or triple parallel runway centerlines are at least 2,500 feet apart with a 2.5° to 3.0° offset approach to both outside runways, or triple parallel runway centerlines are at least 2,500 feet apart, **and** a single 2.5° to 3.0° offset approach to either outside runway while parallel approaches to the remaining two runways are separated by at least 3,100 feet.

No Change

3. A surveillance update rate of at least 1.2 seconds is required for monitoring the no transgression zone (NTZ) when conducting simultaneous independent approaches to the runway centerline spacing (RCLS) provided in this paragraph.

**NOTE–**

1. HUR procedures cannot be conducted if notified that a 1.2-second update rate is not being provided.

No Change

No Change

1. Dual parallel runway centerlines are at least 2,500 and less than 4,300 feet apart.

2. Triple parallel runway centerlines are at least 2,500 but less than 5,000 feet apart.

**1. PARAGRAPH NUMBER AND TITLE:** 7–4–6. RNAV VISUAL FLIGHT PROCEDURES (RVFP)

**2. BACKGROUND:** RNAV Visual Flight Procedures (RVFP) have been approved for use in the National Airspace System (NAS) as special procedures by the Flight Standards Service since 2010. These special procedures leverage the navigation data base and automation on board many modern aircraft. Facility personnel are made aware of RVFPs during the design and implementation process. Due to the nature of these procedures, RVFPs can only be issued to authorized operators.

**3. CHANGE:**

**OLD**

Add

Add

**NEW**

**7–4–6. RNAV VISUAL FLIGHT PROCEDURES (RVFP)**

**RNAV Visual Flight Procedures (RVFPs) are special procedures flown in VMC and clear of clouds and used by authorized operators only. Clear an aircraft for an RVFP when:**

Add	<u>a. Requested by the pilot, or if necessary, as addressed in a Letter of Agreement (LOA).</u>
Add	<u>b. The pilot reports the airport in sight or, at locations with an operating control tower, the preceding aircraft in sight.</u>
Add	<u>c. An altitude is assigned at or above the MVA/MIA, before issuing an approach clearance when conducting an RVFP. The pilot should join the RVFP at the beginning of the charted procedure, or if necessary, may join at another waypoint along the path of the charted procedure, except for waypoints beginning or within an RF leg.</u>
Add	<u>d. The official weather at the airport of intended landing indicates VFR and should meet or exceed the ceiling and visibility specified on the RVFP.</u>
Add	<u>e. The published name of the RVFP and the landing runway are specified in the approach clearance.</u>
Add	<u>PHRASEOLOGY–</u> <u>(Ident) CLEARED RNAV VISUAL RUNWAY (number) APPROACH</u>
Add	<u>NOTE–</u> <u>Refer to the facility RVFP LOAs, if applicable, to determine the authorized operators.</u>
Add	<u>REFERENCE–</u> <u>FAA Order 8260.60, Special Procedures.</u>
<b>7-4-6</b>	Renumber as <b>7-4-7</b>

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