

SUBJ: AIR TRAFFIC CONTROL

- 1. PURPOSE.** This change transmits revised pages to Order JO 7110.65S, Air Traffic Control, and the Briefing Guide.
- 2. DISTRIBUTION.** This change is distributed to select offices in Washington headquarters, regional offices, the William J. Hughes Technical Center, and the Mike Monroney Aeronautical Center; to all air traffic field facilities and international aviation field offices; and to interested aviation public.
- 3. EFFECTIVE DATE.** August 27, 2009.
- 4. EXPLANATION OF CHANGES.** See the Explanation of Changes attachment which has editorial corrections and changes submitted through normal procedures. The Briefing Guide lists only new or modified material, along with background information.
- 5. DISPOSITION OF TRANSMITTAL.** Retain this transmittal until superseded by a new basic order.
- 6. PAGE CONTROL CHART.** See the Page Control Chart attachment.



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Vice President, System Operations Services

Date: JUN 18 2009

Air Traffic Control Explanation of Changes

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

**a. 1-1-10. CONSTRAINTS GOVERNING
SUPPLEMENTS AND PROCEDURAL DEVIATIONS**

This change provides an address correction for future correspondence of air traffic related material.

b. 2-3-5. AIRCRAFT IDENTITY

These changes update abbreviated call signs for aircraft carrying the President, Vice-President, and/or their family members. This change cancels and incorporates N JO 7110.496, Aircraft Identity, effective February 23, 2009.

c. 3-6-5. RADAR-ONLY MODE

Adds new paragraph, Radar-Only Mode. This change cancels and incorporates N JO 7110.502, Airport Surface Detection Equipment System-Model X (ASDE-X) Radar-Only Mode, effective April 30, 2009.

d. 4-1-2. EXCEPTIONS;

4-4-2. ROUTE STRUCTURE TRANSITIONS;

5-5-1. APPLICATION; and

**6-5-4. MINIMA ALONG OTHER THAN
ESTABLISHED AIRWAYS OR ROUTES**

This change supports an exception to the radar monitoring/separation requirement for aircraft operating on random RNAV routes for properly-equipped aircraft on point-to-point RNAV routes in Anchorage ARTCC

controlled airspace, excluding oceanic airspace. This change cancels and incorporates N JO 7110.491, Random Point-to-Point GPS RNAV Routes within the Anchorage Air Route Traffic Control Center (ZAN) Controlled Airspace, Excluding Oceanic Airspace, effective October 1, 2008.

e. 4-5-2. FLIGHT DIRECTION

The section in Table 4-5-1 specifying a different altitude assignment for aircraft operating within Oceanic RVSM or RVSM transition airspace is removed. The note referring to supplemented Oceanic separation procedures is removed.

f. 8-1-3. VFR FLIGHT PLANS

This change defines operations on a VFR flight plan within the Miami, Houston, and San Juan Oceanic CTAs as permitted "below FL 180."

g. 9-3-3. VFR-ON-TOP

This change clarifies the intent that VFR-on-top aircraft shall conduct flight operations at least 500 feet above or 500 feet below any active Special Use Airspace.

h. 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. Introduction

Section 1. General

1-1-1. PURPOSE

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. DISTRIBUTION

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

1-1-3. CANCELLATION

FAA Order 7110.65R, Air Traffic Control, dated February 16, 2006, and all changes to it are canceled.

1-1-4. EXPLANATION OF MAJOR 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.

1-1-5. EFFECTIVE DATE

This order is effective **February 14, 2008**.

1-1-6. RECOMMENDATIONS FOR PROCEDURAL CHANGES

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 to Headquarters, FAA,

Vice President, System Operations Services, attention: System Operations Airspace and AIM.

1-1-7. 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.)

1-1-8. PUBLICATION AND DELIVERY DATES

a. This order and its changes are scheduled to be published according to TBL 1-1-1.

TBL 1-1-1
Publications Timetable

Basic or Change	Cutoff Date for Submission	Effective Date of Publication
7110.65S Basic	8/30/07	2/14/08
Change 1	2/14/08	7/31/08
Change 2	7/31/08	3/12/09
Change 3	3/12/09	8/27/09
7110.65T Basic	8/27/09	2/11/10

b. If an FAA facility **has not** received the order/changes at least 30 days before the above effective dates, the facility shall 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 shall notify its appropriate military headquarters. (See TBL 1-1-2.)

TBL 1-1-2
Military Distribution Contacts

Military Headquarters	DSN	Commercial
U.S. Army USAASA	656-4868	(703) 806-4868
U.S. Air Force		Contact Local *NIMA Customer Account Representative
U.S. Navy CNO (N785F)	664-7727	(703) 604-7727
*NIMA-National Imagery and Mapping Agency		

1-1-9. PROCEDURAL LETTERS OF AGREEMENT

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. Letters of agreement 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-

FAAO JO 7110.65, Para 2-1-1, ATC Service.

FAAO JO 7210.3, Para 4-3-1, Letters of Agreement.

1-1-10. 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, System Operations 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

Branch	Address
U.S. Navy	Department of the Navy Chief of Naval Operations N785F 2000 Navy Pentagon Washington, D.C. 20350-2000
U.S. Air Force	HQ AFFSA/A3A 7919 Mid-America Blvd Suite 300 Oklahoma City, OK 73135
U.S. Army	Director USAASA (MOAS-AS) 9325 Gunston Road, Suite N319 Ft. Belvoir, VA 22060-5582

NOTE-

Terminal: Headquarters USAF has delegated to Major Air Command, Directors of Operations (MAJCOM/DOs) authority to reduce same runway separation standards for military aircraft. These are specified and approved by affected ATC and user units. When applied, appropriate advisories may be required; e.g., "(A/C call sign) continue straight ahead on right side; F-16 landing behind on left." "(A/C call sign) hold position on right side; F-5 behind on left."

REFERENCE-

FAAO JO 7110.65, Para 3-1-3, Use of Active Runways.

1-1-11. 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.

d. Air traffic managers at automated terminal radar facilities may waive the requirement to use flight progress strips provided:

1. Backup systems such as multiple radar sites/systems or single site radars with CENRAP are utilized.

2. Local procedures are documented in a facility directive. These procedures should include but not be limited to:

- (a) Departure areas and/or procedures.
- (b) Arrival procedures.
- (c) Overflight handling procedures.
- (d) Transition from radar to nonradar.
- (e) Transition from ARTS to non-ARTS.
- (f) Transition from ASR to CENRAP.
- (g) Transition to or from ESL.

3. No misunderstanding will occur as a result of no strip usage.

4. Unused flight progress strips, facility developed forms and/or blank notepads shall be provided for controller use.

5. Facilities shall revert to flight progress strip usage if backup systems referred to in subpara d1 are not available.

e. Air traffic managers at FDIO locations may authorize reduced lateral spacing between fields so as to print all FDIO data to the left of the strip perforation. When using FAA Form 7230-7.2, all items will retain the same relationship to each other as they do when the full length strip (FAA Form 7230-7.1) is used.

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 air-carrier aircraft letter-digit registration number including the letter "T" prefix for air taxi aircraft, the letter "L" for lifeguard aircraft, 3-letter aircraft company designation or specified in FAAO 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 lifeguard 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 codes listed in Appendix A through Appendix C to indicate aircraft type.

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-

*FAAO JO 7110.65, Para 2-4-20, Aircraft Identification.
FAAO JO 7610.4, Chapter 12, Section 10, USAF Undergraduate Flying Training (UFT)/Pilot Instructor Training (PIT)/Introduction To Fighter Fundamentals.*

2-3-8. AIRCRAFT EQUIPMENT SUFFIX

a. Indicate, for both VFR and IFR operations, the aircraft’s radar transponder, DME, or navigation capability by adding the appropriate symbol, preceded by a slant. (See TBL 2-3-10.)

b. When forwarding this information, state the aircraft type followed by the word “slant” and the appropriate phonetic letter equivalent of the suffix.

EXAMPLE-

“Cessna Three-ten slant Tango.”

“A-Ten slant November.”

“F-Sixteen slant Papa.”

“Seven-sixty-seven slant Golf.”

c. Utilize aircraft equipment suffix /H to indicate “RVSM-capable, no transponder.”

NOTE-

/H is for ATC use only. Users are not authorized to file this suffix.

2-3-9. CLEARANCE STATUS

Use an appropriate clearance symbol followed by a dash (–) and other pertinent information to clearly show the clearance status of an aircraft. To indicate delay status use:

a. The symbol “H” at the clearance limit when holding instructions have been included in the aircraft’s original clearance. Show detailed holding information following the dash when holding differs from the established pattern for the fix; i.e., turns, leg lengths, etc.

b. The symbols “F” or “O” to indicate the clearance limit when a delay is not anticipated.

Section 6. Airport Surface Detection Procedures

3-6-1. EQUIPMENT USAGE

a. The operational status of ASDE systems shall be determined during the relief briefing, or as soon as possible after assuming responsibility for the associated position.

b. Use ASDE systems to augment visual observation of aircraft landing or departing, and aircraft or vehicular movements on runways and taxiways, or other parts of the movement area.

1. ASDE systems with safety logic shall be operated continuously.

2. ASDE systems without safety logic shall be operated:

(a) Continuously between sunset and sunrise.

(b) When visibility is less than the most distant point in the active movement area, or

(c) When, in your judgment, its use will assist you in the performance of your duties at any time.

3-6-2. IDENTIFICATION

a. To identify an observed target/track on an ASDE system display, correlate its position with one or more of the following:

1. Pilot/vehicle operator position report.

2. Controller's visual observation.

3. An identified target observed on the ASR or CTRD.

b. An observed target/track on an ASDE system display may be identified as a false target by visual observation. If the area containing a suspected false target is not visible from the tower, an airport operations vehicle or pilots of aircraft operating in the area may be used to conduct the visual observation.

c. After positive verification that a target is false, through pilot/vehicle operator position report or controller visual observation, the track may be temporarily dropped, which will remove the target from the display and safety logic processing. A notation shall be made to FAA Form 7230-4, Daily Record of Facility Operation, when a track is temporarily dropped.

3-6-3. INFORMATION USAGE

a. ASDE system derived information may be used to:

1. Formulate clearances and control instructions to aircraft and vehicles on the movement area.

REFERENCE-

FAAO JO 7210.3, Para 3-7-2, Radar Use.

2. Position aircraft and vehicles using the movement area.

3. Determine the exact location of aircraft and vehicles, or spatial relationship to other aircraft/vehicles on the movement area.

4. Monitor compliance with control instructions by aircraft and vehicles on taxiways and runways.

5. Confirm pilot reported positions.

6. Provide directional taxi information, as appropriate.

PHRASEOLOGY-

TURN (left/right) ON THE TAXIWAY/RUNWAY YOU ARE APPROACHING.

b. Do not provide specific navigational guidance (exact headings to be followed) unless an emergency exists or by mutual agreement with the pilot.

NOTE-

It remains the pilot's responsibility to navigate visually via routes to the clearance limit specified by the controller and to avoid other parked or taxiing aircraft, vehicles, or persons in the movement area.

c. Do not allow an aircraft to begin departure roll or cross the landing threshold whenever there is an unidentified target/track displayed on the runway.

3-6-4. SAFETY LOGIC ALERT RESPONSES

When the system generates an alert, the controller shall immediately assess the situation visually and as presented on the ASDE system display, then take appropriate action as follows:

a. When an arrival aircraft (still airborne, prior to the landing threshold) activates a warning alert, the controller shall issue go-around instructions. (Exception: Alerts involving known formation flights, as they cross the landing threshold, may be disregarded if all other factors are acceptable.)

NOTE-

The intent of this paragraph is that an aircraft does not land on the runway, on that approach, when the safety logic system has generated a warning alert. A side-step maneuver or circle to land on another runway satisfies this requirement.

REFERENCE-

FAAO JO 7110.65, Para 3-8-1, Sequence/Spacing Application.

FAAO JO 7110.65, Para 3-9-6, Same Runway Separation.

FAAO JO 7110.65, Para 3-10-3, Same Runway Separation.

P/CG Term- Go Around.

b. When two arrival aircraft, or an arrival aircraft and a departing aircraft activate an alert, the controller will issue go-around instructions or take appropriate action to ensure intersecting runway separation is maintained.

REFERENCE-

FAAO JO 7110.65, Para 3-9-8, Intersecting Runway Separation.

FAAO JO 7110.65, Para 3-10-4, Intersecting Runway Separation.

c. For other safety logic system alerts, issue instructions/clearances based on good judgment and evaluation of the situation at hand.

3-6-5. RADAR-ONLY MODE

Radar-only mode is an enhancement of the ASDE-X system which allows the system to stay operational with safety logic processing, despite a critical fault in the Multilateration (MLAT) subsystem. The system stays in full core alert status under radar-only mode without data block capability.

Chapter 4. IFR

Section 1. NAVAID Use Limitations

4-1-1. ALTITUDE AND DISTANCE LIMITATIONS

When specifying a route other than an established airway or route, do not exceed the limitations in the table on any portion of the route which lies within controlled airspace. (For altitude and distance limitations, see TBL 4-1-1, TBL 4-1-2, TBL 4-1-3, and TBL 4-1-4.) (For correct application of altitude and distance limitations see FIG 4-1-1 and FIG 4-1-2.)

REFERENCE-

FAAO JO 7110.65, Para 4-1-5, Fix Use.

FAAO JO 7110.65, Para 5-6-2, Methods.

TBL 4-1-1

VOR/VORTAC/TACAN NAVAIDS

Normal Usable Altitudes and Radius Distances

Class	Altitude	Distance (miles)
T	12,000 and below	25
L	Below 18,000	40
H	Below 14,500	40
H	14,500 - 17,999	100
H	18,000 - FL 450	130
H	Above FL 450	100

TBL 4-1-2

L/MF Radio Beacon (RBN)

Usable Radius Distances for All Altitudes

Class	Power (watts)	Distance (miles)
CL	Under 25	15
MH	Under 50	25
H	50 - 1,999	50
HH	2,000 or more	75

TBL 4-1-3

ILS

Usable Height and Distance*

Height (feet) above transmitter	Distance (miles from transmitter)
4,500	10 (for glideslope)
4,500	18 (for localizer)
*Use the current flight check height/altitude limitations if different from the above minima.	

TBL 4-1-4

MLS

Usable Height and Distance*

Height (feet) above transmitter	Distance (miles from transmitter)
20,000	20 (for glideslope)
20,000	20 (for azimuth)
*Use the current flight check height/altitude limitations if different from the above minima.	

FIG 4-1-1

Application of Altitude and Distance Limitations [Application 1]

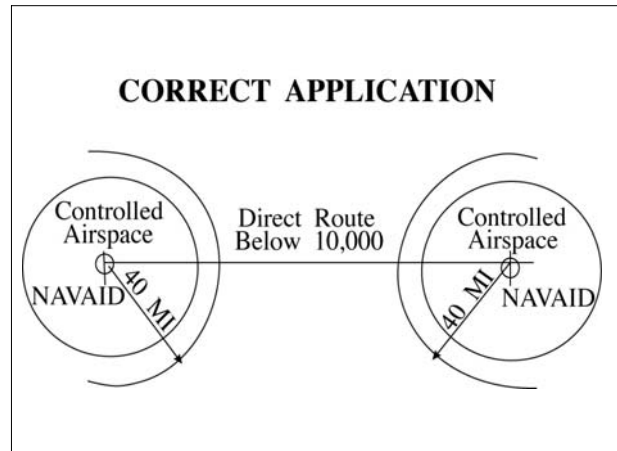
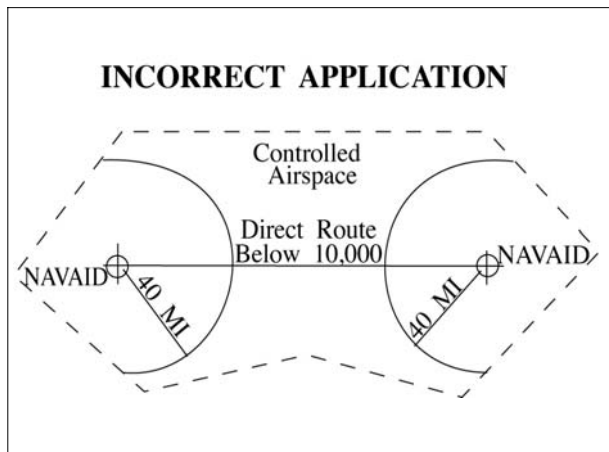


FIG 4-1-2
Application of Altitude and Distance Limitations
[Application 2]



4-1-2. EXCEPTIONS

Altitude and distance limitations need not be applied when any of the following conditions are met:

a. Routing is initiated by ATC or requested by the pilot and the following is provided:

1. Radar monitoring.
2. As necessary, course guidance unless the aircraft is /E, /F, /G, or /R equipped.

NOTE-

1. Para 5-5-1, Application, requires radar separation be provided to RNAV aircraft on random (impromptu) routes at FL 450 and below.

2. EN ROUTE. Radar monitoring is not required for aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace), where ATC surveillance coverage is not available. Additionally, in accordance with para 5-5-1, Application; such aircraft described herein may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

3. When a clearance is issued beyond the altitude and/or distance limitations of a NAVAID, in addition to being responsible for maintaining separation from other aircraft and airspace, the controller is responsible for providing aircraft with information and advice related to significant deviations from the expected flight path.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference.

FAAO JO 7110.65, Para 4-4-2, Route Structure Transitions.

FAAO JO 7110.65, Para 6-5-4, Minima Along Other Than Established Airways or Routes.

P/CG Term- Radar Monitoring.

b. Operational necessity requires and approval has been obtained from the Frequency Management and Flight Inspection Offices to exceed them.

c. Requested routing is via an MTR.

REFERENCE-

FAAO JO 7110.65, Para 5-6-2, Methods.

4-1-3. CROSSING ALTITUDE

Use an altitude consistent with the limitations of the aid when clearing an aircraft to cross or hold at a fix.

REFERENCE-

FAAO JO 7110.65, Para 5-6-2, Methods.

4-1-4. VFR-ON-TOP

Use a route not meeting service volume limitations only if an aircraft requests to operate "VFR-on-top" on this route.

NOTE-

Aircraft equipped with TACAN only are expected to:

1. Define route of flight between TACAN or VORTAC NAVAIDs in the same manner as VOR-equipped aircraft.

2. Except in Class A airspace, submit requests for "VFR-on-top" flight where insufficient TACAN or VORTAC NAVAIDs exist to define the route.

REFERENCE-

FAAO JO 7110.65, Para 5-6-2, Methods.

4-1-5. FIX USE

Request aircraft position reports only over fixes shown on charts used for the altitude being flown, except as follows:

NOTE-

Waypoints filed in random RNAV routes automatically become compulsory reporting points for the flight unless otherwise advised by ATC.

a. Unless the pilot requests otherwise, use only those fixes shown on high altitude en route charts, high altitude instrument approach procedures charts, and SID charts when clearing military turbojet single-piloted aircraft.

b. Except for military single-piloted turbojet aircraft, unpublished fixes may be used if the name of

the NAVAID and, if appropriate, the radial/course/azimuth and frequency/channel are given to the pilot. An unpublished fix is defined as one approved and planned for publication which is not yet depicted on the charts or one which is used in accord with the following:

REFERENCE-

FAAO 7130.3, *Holding Pattern Criteria*.

1. Unpublished fixes are formed by the en route radial and either a DME distance from the same NAVAID or an intersecting radial from an off-route VOR/VORTAC/TACAN. DME shall be used in lieu of off-route radials, whenever possible.

2. Except where known signal coverage restrictions exist, an unpublished fix may be used for ATC purposes if its location does not exceed NAVAID altitude and distance limitation, and when off-route radials are used, the angle of divergence meets the criteria prescribed below.

NOTE-

Unpublished fixes should not negate the normal use of published intersections. Frequent routine use of an unpublished fix would justify establishing a fix.

REFERENCE-

FAAO JO 7110.65, *Para 4-1-1, Altitude and Distance Limitations*.

3. Do not hold aircraft at unpublished fixes below the lowest assignable altitude dictated by terrain clearance for the appropriate holding pattern airspace area (template) regardless of the MEA for the route being flown.

4. When the unpublished fix is located on an off-route radial and the radial providing course guidance, it shall be used consistent with the following divergence angles:

(a) When holding operations are involved with respect to subparas (b) and (c) below, the angle of divergence shall be at least 45 degrees.

(b) When both NAVAIDs involved are located within 30 NM of the unpublished fix, the minimum divergence angle is 30 degrees.

(c) When the unpublished fix is located over 30 NM from the NAVAID generating the off-course radial, the minimum divergence angle shall increase 1 degree per NM up to 45 NM; e.g., 45 NM would require 45 degrees.

(d) When the unpublished fix is located beyond 45 NM from the NAVAID generating the off-course radial, the minimum divergence angle shall increase $\frac{1}{2}$ degree per NM; e.g., 130 NM would require 88 degrees.

c. Fixes contained in the route description of MTRs are considered filed fixes.

d. TACAN-only aircraft (type suffix M, N, or P) possess TACAN with DME, but no VOR or LF navigation system capability. Assign fixes based on TACAN or VORTAC facilities only.

NOTE-

TACAN-only aircraft can never be held overhead the NAVAID, be it TACAN or VORTAC.

e. DME fixes shall not be established within the no-course signal zone of the NAVAID from which inbound holding course information would be derived.

REFERENCE-

FAAO JO 7110.65, *Para 2-5-3, NAVAID Fixes*.

FAAO JO 7110.65, *Para 5-6-2, Methods*.

Section 4. Route Assignment

4-4-1. ROUTE USE

Clear aircraft via routes consistent with the altitude stratum in which the operation is to be conducted by one or more of the following:

NOTE-

Except for certain NAVAIDs/routes used by scheduled air carriers or authorized for specific uses in the control of IFR aircraft, Air Traffic Service (ATS) routes, and NAVAIDs established for use at specified altitudes are shown on U.S. government charts or DOD FLIP charts.

REFERENCE-

FAAO JO 7110.65, Para 2-5-2, NAVAID Terms.

FAAO JO 7110.65, Para 4-1-2, Exceptions.

FAAO JO 7110.65, Para 4-5-6, Minimum En Route Altitudes.

FAAO JO 7110.65, Para 5-6-1, Application.

- a. Designated ATS routes.

PHRASEOLOGY-

VIA:

VICTOR (color) (airway number)(the word Romeo when RNAV for existing Alaska routes),

or

J (route number) (the word Romeo when RNAV for existing Alaska routes),

or

SUBSTITUTE (ATS route) FROM (fix) to (fix),

or

IR (route number).

CROSS/JOIN VICTOR/(color) (airway number), (number of miles) MILES (direction) OF (fix).

- b. Radials, courses, azimuths, or direct to or from NAVAIDs.

PHRASEOLOGY-

DIRECT.

VIA;

(name of NAVAID) (specified) RADIAL/COURSE/AZIMUTH,

or

(fix) AND (fix),

or

RADIALS OF (ATS route) AND (ATS route).

- c. DME arcs of VORTAC, MLS, or TACAN aids.

- d. Radials, courses, azimuths, and headings of departure or arrival routes.

- e. SIDs/STARs/FMSPs.

- f. Vectors.

- g. Fixes defined in terms of degree-distance from NAVAIDs for special military operations.

- h. Courses, azimuths, bearings, quadrants, or radials within a radius of a NAVAID.

PHRASEOLOGY-

CLEARED TO FLY (general direction from NAVAID) OF (NAVAID name and type) BETWEEN (specified) COURSES TO/BEARINGS FROM/RADIALS (NAVAID name when a NDB) WITHIN (number of miles) MILE RADIUS,

or

CLEARED TO FLY (specified) QUADRANT OF (NAVAID name and type) WITHIN (number of miles) MILE RADIUS.

or

CLEARED TO FLY (general direction from MLS) OF (name or MLS) BETWEEN (specified) AZIMUTHS WITHIN/BETWEEN (number of miles) MILE RADIUS.

EXAMPLE-

1. "Cleared to fly east of Allentown VORTAC between the zero four five and the one three five radials within four zero mile radius."

2. "Cleared to fly east of Crystal Lake radio beacon between the two two five and the three one five courses to Crystal Lake within three zero mile radius."

3. "Cleared to fly northeast quadrant of Philipsburg VORTAC within four zero mile radius."

"Cleared to fly east of the Montgomery M-L-S runway two eight left between the two seven zero and the two four zero azimuth within a 5 mile radius."

- i. Fixes/waypoints defined in terms of:

- 1. Published name; or

- 2. Degree-distance from NAVAIDs; or

3. Latitude/longitude coordinates, state the latitude and longitude in degrees and minutes including the direction from the axis such as North or West; or

PHRASEOLOGY-

*“32 DEGREES, 45 MINUTES NORTH,
105 DEGREES, 37 MINUTES WEST.”*

4. Offset from published or established ATS route at a specified distance and direction for random (impromptu) RNAV Routes.

PHRASEOLOGY-

DIRECT (fix/waypoint)

DIRECT TO THE (facility) (radial) (distance) FIX.

OFFSET(distance) RIGHT/LEFT OF (route).

EXAMPLE-

“Direct SUNOL.”

“Direct to the Appleton three one zero radial two five mile fix.”

“Offset eight miles right of Victor six.”

j. RNAV aircraft transitioning to/from High Altitude Redesign (HAR) or Point-to-point (PTP) operations via pitch/catch points.

REFERENCE-

FAAO JO 7110.65, Para 2-3-8, Aircraft Equipment Suffix.

FAAO JO 7110.65, Para 2-5-3, NAVAID Fixes.

FAAO JO 7110.65, Chapter 5, Section 5, Radar Separation, Para 5-5-1, Application.

4-4-2. ROUTE STRUCTURE TRANSITIONS

To effect transition within or between route structure, clear an aircraft by one or more of the following methods, based on VOR, VORTAC, TACAN, or MLS NAVAIDs (unless use of other NAVAIDs are essential to aircraft operation or ATC efficiency):

a. Vector aircraft to or from radials, courses, or azimuths of the ATS route assigned.

b. Assign a SID/STAR/FMSP.

c. Clear departing or arriving aircraft to climb or descend via radials, courses, or azimuths of the ATS route assigned.

d. Clear departing or arriving aircraft directly to or between the NAVAIDs forming the ATS route assigned.

e. Clear aircraft to climb or descend via the ATS route on which flight will be conducted.

f. Clear aircraft to climb or descend on specified radials, courses, or azimuths of NAVAIDs.

g. Provide radar monitor when transition to or from a designated or established RNAV route is made along random RNAV routes.

EN ROUTE

EXCEPTION. Radar monitoring is not required for aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within Anchorage Air Route Traffic Control Center controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available.

REFERENCE-

FAAO JO 7110.65, Para 6-5-4, Minima Along Other Than Established Airways or Routes

FAAO JO 7110.65, Para 4-1-2, Exceptions

h. Clear RNAV aircraft transitioning to or between designated or established RNAV routes direct to a named waypoint on the new route.

4-4-3. DEGREE-DISTANCE ROUTE DEFINITION FOR MILITARY OPERATIONS

EN ROUTE

a. Do not accept a military flight plan whose route or route segments do not coincide with designated airways or jet routes or with a direct course between NAVAIDs unless it is authorized in subpara b and meets the following degree-distance route definition and procedural requirements:

1. The route or route segments shall be defined in the flight plan by degree-distance fixes composed of:

(a) A location identifier;

(b) Azimuth in degrees magnetic; and

(c) Distance in miles from the NAVAID used.

EXAMPLE-

“MKE 030025.”

2. The NAVAIDs selected to define the degree-distance fixes shall be those authorized for use at the altitude being flown and at a distance within the published service volume area.

3. The distance between the fixes used to define the route shall not exceed:

(a) Below FL 180- 80 miles;

(b) FL 180 and above- 260 miles; and

(c) For celestial navigation routes, all altitudes— 260 miles.

4. Degree-distance fixes used to define a route shall be considered compulsory reporting points except that an aircraft may be authorized by ATC to omit reports when traffic conditions permit.

5. Military aircraft using degree-distance route definition procedures shall conduct operations in accordance with the following:

(a) Unless prior coordination has been effected with the appropriate air traffic control facility, flight plan the departure and the arrival phases to conform with the routine flow of traffic when operating within 75 miles of the departure and the arrival airport. Use defined routes or airways or direct courses between NAVAIDs or as otherwise required to conform to the normal flow of traffic.

(b) Flight plans must be filed at least 2 hours before the estimated time of departure.

b. The following special military operations are authorized to define routes, or portions of routes, by degree-distance fixes:

1. Airborne radar navigation, radar bomb scoring (RBS), and airborne missile programming conducted by the USAF, USN, and RAF.

2. Celestial navigation conducted by the USAF, USN, and RAF.

3. Target aircraft operating in conjunction with air defense interceptors, and air defense interceptors while en route to and from assigned airspace.

4. Missions conducted above FL 450.

5. USN fighter and attack aircraft operating in positive control airspace.

6. USN/USMC aircraft, TACAN equipped, operating within the Honolulu FIR/Hawaiian airways area.

7. USAF/USN/USMC aircraft flight planned to operate on MTRs.

8. USAF Air Mobility Command (AMC) aircraft operating on approved station-keeping equipment (SKE) routes in accordance with the conditions and limitations listed in FAA Exemption No. 4371 to 14 CFR Section 91.177(a)(2) and 14 CFR Section 91.179(b)(1).

4-4-4. ALTERNATIVE ROUTES

When any part of an airway or route is unusable because of NAVAID status, clear aircraft other than /E, /F, /G, or /R, via one of the following alternative routes:

a. A route depicted on current U.S. Government charts/publications. Use the word “substitute” immediately preceding the alternative route in issuing the clearance.

b. A route defined by specifying NAVAID radials, courses, or azimuths.

c. A route defined as direct to or between NAVAIDs.

d. Vectors.

NOTE-

Inform area navigation aircraft that will proceed to the NAVAID location of the NAVAID outage.

4-4-5. CLASS G AIRSPACE

Include routes through Class G airspace only when requested by the pilot.

NOTE-

1. *Flight plans filed for random RNAV routes through Class G airspace are considered a request by the pilot.*

2. *Flight plans containing MTR segments in/through Class G airspace are considered a request by the pilot.*

4-4-6. DIRECT CLEARANCES

a. Do not issue a routing clearance that will take an aircraft off of its flight plan route if the destination airport is included in a ground delay program (GDP), ground stop (GS), or Playbook route, when known, unless operational necessity dictates.

b. **EN ROUTE.** Do not issue revised routing clearances that will take an aircraft off its flight plan route past the last fix in your facility's airspace, unless requested by the pilot or operational necessity dictates.

NOTE-

Nothing in this paragraph shall preclude a controller from issuing a routing clearance that conforms to a letter of agreement or standard operating procedure within their own facility or between facilities, is required to maintain separation or comply with traffic flow management initiatives.

Section 5. Altitude Assignment and Verification

4-5-1. VERTICAL SEPARATION MINIMA

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

- a. Up to and including FL 410– 1,000 feet.
- b. Apply 2,000 feet at or above FL 290 between non-RVSM aircraft and all other aircraft at or above FL 290.
- c. Above FL 410– 2,000 feet, except:
 1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft– 4,000 feet.
 2. Above FL 600 between military aircraft– 5,000 feet.

NOTE-

Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

REFERENCE-

FAAO JO 7110.65, Para 5-5-5, Vertical Application.

FAAO JO 7110.65, Para 6-6-1, Application.

FAAO JO 7110.65, Para 9-2-13, Military Operations Above FL 600.

4-5-2. FLIGHT DIRECTION

Clear aircraft at altitudes according to the TBL 4-5-1.

TBL 4-5-1
Altitude Assignment

Aircraft Operating	On course degrees magnetic	Assign	Examples
Below 3,000 feet above surface	Any course	Any altitude	
At and below FL 410	0 through 179	Odd cardinal altitude or flight levels at intervals of 2,000 feet	3,000, 5,000, FL 310, FL 330
	180 through 359	Even cardinal altitude or flight levels at intervals of 2,000 feet	4,000, 6,000, FL 320, FL 340

Aircraft Operating	On course degrees magnetic	Assign	Examples
Above FL 410	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 450	FL 450, FL 490, FL 530
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 430	FL 430, FL 470, FL 510
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 410 or any odd cardinal flight level above FL 410	FL 270, FL 280, FL 290, FL 300, FL 310, FL 410, FL 430, FL 450
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL 290	FL 280, FL 290, FL 300, FL 310, FL 320, FL 330, FL 340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL 180B220, FL 280B310

REFERENCE-

FAAO JO 7110.65, Para 4-5-3, Exceptions.

FAAO JO 7110.65, Para 7-7-5, Altitude Assignments.

FAAO JO 7110.65, Para 9-3-2, Separation Minima.

4-5-3. EXCEPTIONS

When traffic, meteorological conditions, or aircraft operational limitations prevent assignment of altitudes prescribed in para 4-5-2, Flight Direction, assign any cardinal altitude or flight level below FL 410 or any odd cardinal flight level at or above FL 410 without regard to direction of flight as follows:

NOTE-

See para 2-3-10, Control Symbolology, for control abbreviations and symbols to be used in conjunction with this paragraph.

- a. For traffic conditions, take this action only if one of the following conditions exists:

1. Aircraft remain within a facility's area and prior approval is obtained from other affected positions or sectors or the operations are covered in a Facility Directive.

2. Aircraft will proceed beyond the facility's area and specific operations and procedures permitting random altitude assignment are covered in a letter of agreement between the appropriate facilities.

NOTE-

Those en route facilities using host software that provides capability for passing interim altitude shall include the specific operations and procedures for use of this procedure in a letter of agreement between the appropriate facilities.

b. Military aircraft are operating on random routes and prior approval is obtained from the facility concerned.

c. For meteorological conditions, take this action only if you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

d. For aircraft operational limitations, take this action only if the pilot informs you the available appropriate altitude exceeds the operational limitations of his/her aircraft and only after you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

e. For mission requirements, take this action only when the aircraft is operating on an MTR.

REFERENCE-

FAAO JO 7110.65, Para 7-7-5, Altitude Assignments.

FAAO JO 7110.65, Para 9-3-2, Separation Minima.

4-5-4. LOWEST USABLE FLIGHT LEVEL

If a change in atmospheric pressure affects a usable flight level in your area of jurisdiction, use TBL 4-5-2 to determine the lowest usable flight level to clear aircraft at or above 18,000 feet MSL.

TBL 4-5-2
Lowest Usable FL

Altimeter Setting	Lowest Usable FL
29.92" or higher	180
29.91" to 28.92"	190
28.91" to 27.92"	200

REFERENCE-

FAAO JO 7110.65, Para 9-3-2, Separation Minima.

4-5-5. ADJUSTED MINIMUM FLIGHT LEVEL

When the prescribed minimum altitude for IFR operations is at or above 18,000 feet MSL and the atmospheric pressure is less than 29.92", add the appropriate adjustment factor from TBL 4-5-3 to the flight level equivalent of the minimum altitude in feet to determine the adjusted minimum flight level.

TBL 4-5-3
Minimum FL Adjustment

Altimeter Setting	Adjustment Factor
29.92" or higher	None
29.91" to 29.42"	500 feet
29.41" to 28.92"	1,000 feet
28.91" to 28.42"	1,500 feet
28.41" to 27.92"	2,000 feet

4-5-6. MINIMUM EN ROUTE ALTITUDES

Except as provided in subparas a and b below, assign altitudes at or above the MEA for the route segment being flown. When a lower MEA for subsequent segments of the route is applicable, issue the lower MEA only after the aircraft is over or past the Fix/NAVAID beyond which the lower MEA applies unless a crossing restriction at or above the higher MEA is issued.

a. An aircraft may be cleared below the MEA but not below the MOCA for the route segment being flown if the altitude assigned is at least 300 feet above the floor of controlled airspace and one of the following conditions are met:

NOTE-

Controllers must be aware that in the event of radio communications failure, a pilot will climb to the MEA for the route segment being flown.

1. Nonradar procedures are used only within 22 miles of a VOR, VORTAC, or TACAN.

2. Radar procedures are used only when an operational advantage is realized and the following actions are taken:

(a) Radar navigational guidance is provided until the aircraft is within 22 miles of the NAVAID, and

(b) Lost communications instructions are issued.

b. An aircraft may be cleared to operate on jet routes below the MEA (but not below the prescribed minimum altitude for IFR operations) or above the maximum authorized altitude if, in either case, radar service is provided.

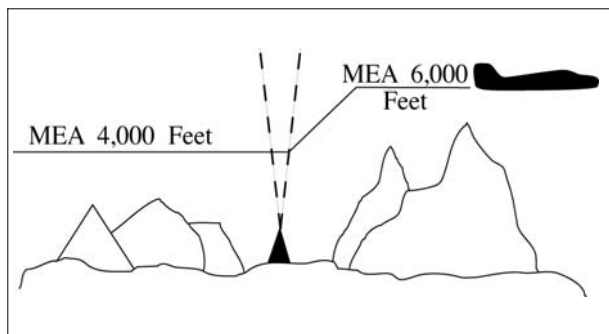
NOTE-

Minimum en route and maximum authorized altitudes for certain jet route segments have been established above the floor of the jet route structure due to limitations on navigational signal coverage.

c. Where a higher altitude is required because of an MEA, the aircraft shall be cleared to begin climb to the higher MEA as follows:

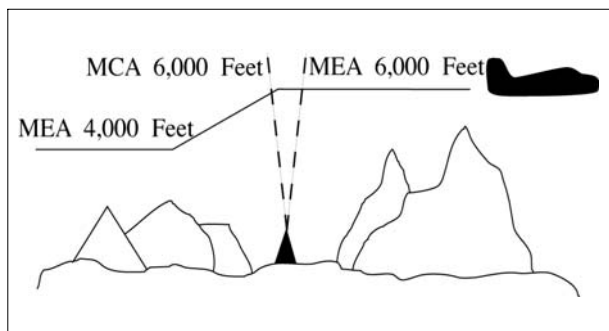
1. If no MCA is specified, prior to or immediately after passing the fix where the higher MEA is designated. (See FIG 4-5-1.)

**FIG 4-5-1
No MCA Specified**



2. If a MCA is specified, prior to the fix so as to cross the fix at or above the MCA. (See FIG 4-5-2.)

**FIG 4-5-2
MCA Specified**



d. Where MEAs have not been established, clear an aircraft at or above the minimum altitude for IFR operations prescribed by 14 CFR Section 91.177.

REFERENCE-

FAAO JO 7110.65, Para 4-2-8, IFR-VFR and VFR-IFR Flights.

FAAO JO 7110.65, Para 4-4-1, Route Use.

FAAO JO 7110.65, Chapter 5, Section 6, Para 5-6-1, Application.

FAAO JO 7110.65, Para 7-7-5, Altitude Assignments.

4-5-7. ALTITUDE INFORMATION

Issue altitude instructions as follows:

REFERENCE-

FAAO JO 7110.65, Para 4-2-1, Clearance Items.

a. Altitude to maintain or cruise. When issuing cruise in conjunction with an airport clearance limit and an unpublished route will be used, issue an appropriate crossing altitude to ensure terrain clearance until the aircraft reaches a fix, point, or route where the altitude information is available to the pilot. When issuing a cruise clearance to an airport which does not have a published instrument approach, a cruise clearance without a crossing restriction may be issued.

PHRASEOLOGY-

MAINTAIN/CRUISE (altitude). MAINTAIN (altitude)

UNTIL (time, fix, waypoint),

or

(number of miles or minutes) MILES/MINUTES PAST (fix, waypoint).

CROSS (fix, point, waypoint),

or

INTERCEPT (route) AT OR ABOVE (altitude), CRUISE (altitude).

NOTE-

1. The crossing altitude must assure IFR obstruction clearance to the point where the aircraft is established on a segment of a published route or instrument approach procedure.

2. When an aircraft is issued a cruise clearance to an airport which does not have a published instrument approach procedure, it is not possible to satisfy the requirement for a crossing altitude that will ensure terrain clearance until the aircraft reaches a fix, point, or route where altitude information is available to the pilot. Under those conditions, a cruise clearance without a crossing restriction authorizes a pilot to determine the minimum IFR altitude as prescribed in 14 CFR Section 91.177 and descend to it at pilot discretion if it is lower than the altitude specified in the cruise clearance.

b. Instructions to climb or descend including restrictions, as required. Specify a time restriction reference the UTC clock reading with a time check.

If you are relaying through an authorized communications provider, such as ARINC, FSS, etc., advise the radio operator to issue the current time to the aircraft when the clearance is relayed. The requirement to issue a time check shall be disregarded if the clearance is issued via Controller Pilot Data Link Communications (CPDLC).

EXAMPLE-

1. “United Four Seventeen, climb to reach one three thousand at two two one five.”

“Time two two one one and one-quarter.”

The pilot is expected to be level at 13,000 feet at 2215 UTC.

2. Through Relay- “Speedbird Five, climb to reach flight level three-five zero at one-two-one-five, time” (Issue a time check).

REFERENCE-

FAAO JO 7110.65, Para 1-2-1, Word Meanings.

FAAO JO 7110.65, Para 2-4-17, Numbers Usage.

PHRASEOLOGY-

CLIMB/DESCEND AND MAINTAIN (altitude).

If required,

AFTER PASSING (fix, waypoint),

or

AT (time) (time in hours, minutes, and nearest quarter minute).

CLIMB/DESCEND TO REACH (altitude)

AT (time (issue time check) or fix, waypoint),

or

AT (time). CLIMB/DESCEND AND MAINTAIN (altitude) WHEN ESTABLISHED AT LEAST (number of miles or minutes) MILES/MINUTES PAST (fix, waypoint) ON THE (NAVAID) (specified) RADIAL.

CLIMB/DESCEND TO REACH (altitude) AT (time or fix, waypoint),

or

A POINT (number of miles) MILES (direction) OF (name of DME NAVAID),

or

MAINTAIN (altitude) UNTIL (time (issue time check), fix, waypoint), THEN CLIMB/DESCEND AND MAINTAIN (altitude).

Through relay:

CLIMB TO REACH (altitude) AT (time) (issue a time check).

c. Specified altitude over a specified fix, waypoint.

PHRASEOLOGY-

CROSS (fix, waypoint) AT (altitude).

CROSS (fix, waypoint) AT OR ABOVE/BELOW (altitude).

d. A specified altitude over a specified fix for that portion of a descent clearance where descent at pilot's discretion is permissible. At any other time it is practicable, authorize climb/descent at pilot's discretion.

PHRASEOLOGY-

CLIMB/DESCEND AT PILOT'S DISCRETION.

EXAMPLE-

“United Four Seventeen, descend and maintain six thousand.”

NOTE-

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the AIM, para 4-4-10, Adherence to Clearance, until reaching the assigned altitude of 6,000 feet.

EXAMPLE-

“United Four Seventeen, descend at pilot's discretion, maintain six thousand.”

NOTE-

The pilot is authorized to conduct descent within the context of the term “at pilot's discretion” as described in the AIM.

EXAMPLE-

“United Four Seventeen cross Lakeview V-O-R at or above flight level two zero zero, descend and maintain six thousand.”

NOTE-

The pilot is authorized to conduct descent “at pilot's discretion” until reaching Lakeview VOR. The pilot must comply with the clearance provision to cross the Lakeview VOR at or above FL 200, and after passing Lakeview VOR, the pilot is expected to descend at the rates specified in the AIM until reaching the assigned altitude of 6,000 feet.

EXAMPLE-

“United Four Seventeen, cross Lakeview V-O-R at and maintain six thousand.”

NOTE-

The pilot is authorized to conduct descent “at pilot's discretion,” but must comply with the clearance provision to cross Lakeview VOR at 6,000 feet.

EXAMPLE-

“United Four Seventeen, descend now to flight level two

seven zero, cross Lakeview V-O-R at or below one zero thousand, descend and maintain six thousand.”

NOTE-

The pilot is expected to promptly execute and complete descent to FL 270 upon receipt of the clearance. After reaching FL 270, the pilot is authorized to descend “at pilot’s discretion” until reaching Lakeview VOR. The pilot must comply with the clearance provision to cross Lakeview VOR at or below 10,000 feet. After Lakeview VOR, the pilot is expected to descend at the rates specified in the AIM until reaching 6,000 feet.

NOTE-

1. A descent clearance which specifies a crossing altitude authorizes descent at pilot’s discretion for that portion of the flight to which the crossing altitude restriction applies.
2. Any other time that authorization to descend at pilot’s discretion is intended, it must be specifically stated by the controller.
3. The pilot may need to know of any future restrictions that might affect the descent, including those that may be issued in another sector, in order to properly plan a descent at pilot’s discretion.
4. Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

REFERENCE-

P/CG Term- Pilot’s Discretion.

- e. When a portion of a climb/descent may be authorized at the pilot’s discretion, specify the altitude the aircraft must climb/descent to followed by the altitude to maintain at the pilot’s discretion.

PHRASEOLOGY-

CLIMB/DESCEND NOW TO (altitude), THEN CLIMB/DESCEND AT PILOT’S DISCRETION MAINTAIN (altitude).

EXAMPLE-

“United Three Ten, descend now to flight level two eight zero, then descend at pilot’s discretion maintain flight level two four zero.”

NOTE-

1. The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in the AIM, para 4-4-10, Adherence to Clearance, until reaching FL 280. At that point, the pilot is authorized to continue descent to FL 240 within the context of the term “at pilot’s discretion” as described in the AIM.
2. Controllers need to be aware that the descent rates in the AIM are only suggested and aircraft will not always descend at those rates.

- f. When the “pilot’s discretion” portion of a climb/descent clearance is being canceled by assigning a new altitude, inform the pilot that the new altitude is an “amended altitude.”

EXAMPLE-

“American Eighty Three, amend altitude, descend and maintain Flight Level two six zero.”

NOTE-

American Eighty Three, at FL 280, has been cleared to descend at pilot’s discretion to FL 240. Subsequently, the altitude assignment is changed to FL 260. Therefore, pilot’s discretion is no longer authorized.

- g. Altitude assignments involving more than one altitude.

PHRASEOLOGY-

MAINTAIN BLOCK (altitude) THROUGH (altitude).

- h. Instructions to vertically navigate on a STAR/RNAV STAR/FMSP with published restrictions.

PHRASEOLOGY-

DESCEND VIA (STAR/RNAV STAR/FMSP name and number)

TERMINAL: DESCEND VIA (STAR/RNAV STAR/FMSP name and number and runway number).

EXAMPLE-

“Descend via the Mudde One Arrival.”

“Cross JCT at flight level two four zero, then descend via the Coast Two Arrival.”

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

NOTE-

Clearance to “descend via” authorizes pilots:

1. To vertically and laterally navigate on a STAR/RNAV STAR/FMSP.
2. When cleared to a waypoint depicted on a STAR/RNAV STAR/FMSP, to descend from a previously assigned altitude at pilot’s discretion to the altitude depicted for that waypoint, and once established on the depicted arrival, to navigate laterally and vertically to meet all published restrictions. ATC is responsible for obstacle clearance when issuing a “descend via” clearance from a previously assigned altitude.

REFERENCE-

FAAO JO 7110.65, Para 4-5-6, Minimum En Route Altitudes.

FAAO JO 7110.65, Para 5-5-9, Separation From Obstructions.

NOTE-

3. Pilots navigating on a STAR/RNAV STAR/FMSP shall maintain last assigned altitude until receiving clearance to “descend via.”
4. Pilots cleared for vertical navigation using the phraseology “descend via” shall inform ATC upon initial contact.

EXAMPLE-

“Delta One Twenty One leaving FL 240, descending via the Civit One arrival.”

REFERENCE-

AIM, Para 5-4-1, Standard Terminal Arrival (STAR), Area Navigation (RNAV) STAR, and Flight Management System Procedures (FMSP) for Arrivals.

1. Assign an altitude to cross the waypoint/fix, if no altitude is depicted at the waypoint/fix, for aircraft on a direct routing to a STAR/RNAV STAR/FMSP.

EXAMPLE-

“Proceed direct Luxor, cross Luxor at or above flight level two zero zero, then descend via the Ksino One Arrival.”

2. A descend via clearance shall not be used where procedures contain published “expect” altitude restrictions.

NOTE-

Pilots are not expected to comply with published “expect” restrictions in the event of lost communications, unless ATC has specifically advised the pilot to expect these restrictions as part of a further clearance.

3. If it is necessary to assign a crossing altitude which differs from the STAR/RNAV STAR/FMSP altitude, emphasize the change to the pilot.

PHRASEOLOGY-

DESCEND VIA THE (STAR/FMSP) ARRIVAL EXCEPT CROSS (fix, point, waypoint) (revised altitude information).

EXAMPLE-

“United 454 descend via the Haris One Arrival, except cross Haris at or above one six thousand.”

NOTE-

The aircraft should track laterally and vertically on the Haris One Arrival and should descend so as to cross Haris at or above 16,000; remainder of the arrival shall be flown as published.

4. If it is necessary to assign an interim altitude, or assign a final altitude not contained on a STAR/RNAV STAR/FMSP, the provisions of subpara 4-5-7h may be used in conjunction with subpara 4-5-7a.

PHRASEOLOGY-

DESCEND VIA THE (STAR/RNAV STAR/FMSP) ARRIVAL EXCEPT AFTER (fix) MAINTAIN (revised altitude information).

EXAMPLE-

“United 454 descend via the Haris One Arrival, except after Bruno, maintain one zero thousand.”

NOTE-

The aircraft should track laterally and vertically on the Haris One Arrival and should descend so as to comply with all speed and altitude restrictions until reaching Bruno and then maintain 10,000. Upon reaching 10,000, aircraft should maintain 10,000 until cleared by ATC to continue to descend.

REFERENCE-

FAAO JO 7110.65, Para 4-7-1, Clearance Information. AIM, Para 5-4-1, Standard Terminal Arrival (STAR), Area Navigation (RNAV) STAR, and Flight Management System Procedures (FMSP) for Arrivals.

i. When a pilot is unable to accept a clearance, issue revised instructions to ensure positive control and standard separation.

NOTE-

1. 14 CFR Section 91.123 states that a pilot is not allowed to deviate from an ATC clearance “that has been obtained...unless an amended clearance is obtained” (except when an emergency exists).

2. A pilot is therefore expected to advise the controller if a clearance cannot be accepted when the clearance is issued. “We will try” and other such acknowledgements do not constitute pilot acceptance of an ATC clearance.

3. Controllers are expected to issue ATC clearances which conform with normal aircraft operational capabilities and do not require “last minute” amendments to ensure standard separation.

4. “Expedite” is not to be used in lieu of appropriate restrictions to ensure separation.

REFERENCE-

FAAO JO 7110.65, Para 10-1-3, Providing Assistance.

4-5-8. ANTICIPATED ALTITUDE CHANGES

If practicable, inform an aircraft when to expect climb or descent clearance or to request altitude change from another facility.

PHRASEOLOGY-

EXPECT HIGHER/LOWER IN (number of miles or minutes) MILES/MINUTES,

or

AT (fix). REQUEST ALTITUDE/FLIGHT LEVEL CHANGE FROM (name of facility).

If required,

AT (time, fix, or altitude).

REFERENCE-

FAAO JO 7110.65, Para 2-2-6, IFR Flight Progress Data.

4-5-9. ALTITUDE CONFIRMATION- NONRADAR

a. Request a pilot to confirm assigned altitude on initial contact and when position reports are received 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 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),

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

VERIFY ASSIGNED ALTITUDE (altitude).

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

VERIFY ASSIGNED FLIGHT LEVEL (flight level).

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

PHRASEOLOGY-

(If altitude read back is correct),

AFFIRMATIVE (altitude).

(If altitude read back is not correct),

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (altitude),

or

NEGATIVE. MAINTAIN (altitude).

Section 5. Radar Separation

5-5-1. APPLICATION

a. Radar separation shall be applied to all RNAV aircraft operating on a random (impromptu) route at or below FL 450 and to all published Q routes in the conterminous United States.

EN ROUTE

EXCEPTION. Aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available, may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, *Procedural Preference*
FAAO JO 7110.65, Para 4-1-2, *Exceptions*
FAAO JO 7110.65, Para 6-5-4, *Minima Along Other Than Established Airways or Routes*

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-

FAAO JO 7110.65, Para 4-1-2, *Exceptions*.
FAAO JO 7110.65, Para 4-4-1, *Route Use*.
FAAO JO 7110.65, Para 5-3-1, *Application*.
FAAO JO 7110.65, Para 5-5-8, *Additional Separation for Formation Flights*.
FAAO JO 7110.65, Para 5-9-5, *Approach Separation Responsibility*.

5-5-2. TARGET SEPARATION

a. Apply radar separation:

1. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.

2. Between the ends of beacon control slashes.

NOTE-

At TPX-42 sites, the bracket video feature must be activated to display the beacon control slash.

3. Between the end of a beacon control slash and the center of a primary target.

4. All-digital displays. Between the centers of digitized targets. Do not allow digitized targets to touch.

REFERENCE-

FAAO JO 7110.65, Para 5-9-7, *Simultaneous Independent ILS/MLS 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 shall be issued when this procedure is used.

NOTE-

This procedure shall not be provided utilizing mosaic radar systems.

c. Target resolution shall 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. Broadband Radar System or Digital Terminal Automation System (DTAS):

NOTE-

Includes single sensor long range radar mode.

- 1.** When less than 40 miles from the antenna- 3 miles.
- 2.** When 40 miles or more from the antenna- 5 miles.
- 3. TERMINAL.** For single sensor ASR-9 with Mode S, 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.

b. Stage A/DARC, MEARTS Mosaic Mode, Terminal Mosaic/Multi-Sensor Mode:

NOTE-

Mosaic/Multi-Sensor Mode combines radar input from 2 to 16 sites into a single picture utilizing a mosaic grid composed of radar sort boxes.

- 1.** Below FL 600- 5 miles.
- 2.** At or above FL 600- 10 miles.
- 3.** For areas meeting all of the following conditions:
 - (a)** Radar site adaptation is set to single sensor.
 - (b)** Significant operational advantages can be obtained.

(c) Within 40 miles of the antenna.

(d) Below FL 180.

(e) Facility directives specifically define the area where the separation can be applied. Facility directives may specify 3 miles.

REFERENCE-

FAAO JO 7210.3, Para 8-2-1, Single Site Coverage Stage A Operations.

FAAO JO 7210.3, Para 11-8-15, Single Site Coverage ATTS Operations.

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.

c. MEARTS Mosaic Mode:

NOTE-

1. *Sensor Mode displays information from the radar input of a single site.*

2. *Procedures to convert MEARTS Mosaic Mode to MEARTS Sensor Mode at each PVD/MDM will be established by facility directive.*

1. When less than 40 miles from the antenna- 3 miles.

2. When 40 miles or more from the antenna- 5 miles.

d. STARS Multi-Sensor Mode:

NOTE-

1. *In Multi-Sensor Mode, STARS displays targets as filled and unfilled boxes, depending upon the target's distance from the radar site providing the data. Since there is presently no way to identify which specific site is providing data for any given target, utilize separation standards for targets 40 or more miles from the antenna.*

2. *When operating in STARS Single Sensor Mode, if TRK appears in the data block, handle in accordance with para 5-3-7, Identification Status, subpara b, and take appropriate steps to establish nonradar separation.*

3. *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 shall be provided in accordance with para 2-1-6, *Safety Alert*.

WAKE TURBULENCE APPLICATION

e. Separate aircraft operating directly behind, or directly behind and less than 1,000 feet below, or following an aircraft conducting an instrument approach by:

NOTE-

1. When applying wake turbulence separation criteria, directly behind means an aircraft is operating within 2500 feet of the flight path of the leading aircraft over the surface of the earth.

2. Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

1. Heavy behind heavy- 4 miles.
2. Large/heavy behind B757- 4 miles.
3. Small behind B757- 5 miles.
4. Small/large behind heavy - 5 miles.

WAKE TURBULENCE APPLICATION

f. *TERMINAL*. In addition to subpara e, 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 B757- 5 miles.
3. Small behind heavy- 6 miles.

g. *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 single sensor slant range

mode and 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. Heavy aircraft and the Boeing 757 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-

FAAO JO 7110.65, Para 3-1-9, *Use of Tower Radar Displays*.

5. Turnoff points are visible from the control tower.

REFERENCE-

FAAO JO 7110.65, Para 2-1-19, *Wake Turbulence*.

FAAO JO 7110.65, Para 3-9-6, *Same Runway Separation*.

FAAO JO 7110.65, Para 5-5-7, *Passing or Diverging*.

FAAO JO 7110.65, Para 5-5-9, *Separation from Obstructions*.

FAAO JO 7110.65, Para 5-8-3, *Successive or Simultaneous Departures*.

FAAO JO 7110.65, Para 5-9-5, *Approach Separation Responsibility*.

FAAO JO 7110.65, Para 7-6-7, *Sequencing*.

FAAO JO 7110.65, Para 7-7-3, *Separation*.

FAAO JO 7110.65 Para 7-8-3, *Separation*.

FAAO JO 7210.3, Para 10-4-8, *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-

FAAO JO 7110.65, Para 4-5-1, *Vertical Separation Minima*.

FAAO JO 7110.65, Para 5-2-17, *Validation of Mode C Readout*.

FAAO JO 7110.65, Para 7-7-3, *Separation*.

FAAO JO 7110.65, Para 7-8-3, *Separation*.

FAAO 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 para 4-5-1, *Vertical Separation Minima*, para 7-7-3,

Separation, para 7-8-3, Separation, or para 7-9-4, Separation, might not always be maintained using subpara 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-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference.
FAAO JO 7110.65, Para 4-5-1, Vertical Separation Minima.
FAAO JO 7110.65, Para 5-2-17, Validation of Mode C Readout.
FAAO 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 para 5-15-4, System Requirements, subpara e3.

REFERENCE-

FAAO JO 7110.65, Para 6-6-2, Exceptions.
FAAO JO 7110.65, Para 7-4-6, 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-

FAAO JO 7110.65, Para 9-2-12, Military Aerial Refueling.

3. The aircraft previously at that altitude has been issued a climb/descent at pilot's discretion.

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. Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses and one aircraft has crossed the projected course of the other and the angular difference between their courses is at least 15 degrees.
2. The tracks are monitored to ensure that the primary targets, beacon control slashes, or full digital terminal system primary and/or beacon target symbols will not touch.

REFERENCE-

FAAO JO 7110.65, Para 1-2-2, Course Definitions.

NOTE-

Although all other approved separation may be discontinued, the requirements of para 5-5-4, Minima, subparas e and f shall apply when operating behind a heavy jet/B757.

b. EN ROUTE. Vertical separation between aircraft may be discontinued when they are on opposite courses as defined in para 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 heavy jet/B757 aircraft.
6. Although vertical separation may be discontinued, the requirements of para 5-5-4, Minima, subparas e and f must be applied when operating behind a heavy jet/B757.

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-

FAAO JO 7110.65, Para 2-1-13, Formation Flights.

FAAO JO 7110.65, Para 5-5-1, Application.
FAAO 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 para 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-

FAAO JO 7110.65, Para 9-2-12, Military Aerial Refueling.

5-5-9. SEPARATION FROM OBSTRUCTIONS

a. Except in En Route Stage A/DARC or Stage A/EDARC, separate aircraft from 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.

b. Except in En Route Stage A/DARC or Stage A/EDARC, vertical separation of aircraft above an obstruction depicted on the radar display may be discontinued after the aircraft has passed it.

c. En Route Stage A/DARC or Stage A/EDARC, apply the radar separation minima specified in para 5-5-4, Minima, subpara b1.

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:

REFERENCE-

FAAO JO 7110.65, Para 2-1-14, Coordinate Use of Airspace.

1. When less than 40 miles from the antenna- 1 1/2 miles.

2. When 40 miles or more from the antenna- 2 1/2 miles.

3. En route Stage A/DARC or Stage A/EDARC:

(a) Below Flight Level 600- 2 1/2 miles.

(b) Flight Level 600 and above- 5 miles.

b. Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used 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. En route Stage A/DARC or Stage A/EDARC:

(a) Below Flight Level 600- 5 miles.

(b) Flight Level 600 and above- 10 miles.

c. The provisions of subparas a and b do not apply to VFR aircraft being provided Class B, Class C, or TRSA services. Ensure that the targets of these aircraft do not touch the boundary of adjacent airspace.

d. VFR aircraft approaching Class B, Class C, Class D, or TRSA airspace which is under the control jurisdiction of another air traffic control facility should either be provided with a radar handoff or be advised that radar service is terminated, given their position in relation to the Class B, Class C, Class D, or TRSA airspace, and the ATC frequency, if known, for the airspace to be entered. These actions should be accomplished in sufficient time for the pilot to obtain the required ATC approval prior to entering the airspace involved, or to avoid the airspace.

5-5-11. EDGE OF SCOPE

Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope/display by the following minima until nonradar separation has been established:

a. When less than 40 miles from the antenna- 3 miles from edge of scope.

- b. When 40 miles or more from the antenna- *5 miles* from edge of scope.
- c. En route Stage A/DARC or Stage A/EDARC:
 - 1. Below Flight Level 600- *5 miles*.
 - 2. Flight Level 600 and above- *10 miles*.

5-5-12. BEACON TARGET DISPLACEMENT

When using a radar target display with a previously specified beacon target displacement to separate a beacon target from a primary target, adjacent airspace, obstructions, or terrain, add a 1 mile correction factor to the applicable minima. The maximum allowable beacon target displacement

which may be specified by the facility air traffic manager is $\frac{1}{2}$ mile.

REFERENCE-
FAAO JO 7210.3, Para 3-7-4, *Monitoring of Mode 3/A Radar Beacon Codes*.

5-5-13. GPA 102/103 CORRECTION FACTOR

When using a radar display whose primary radar video is processed by the GPA 102/103 modification to a joint-use radar system, apply the following correction factors to the applicable minima:

- a. If less than 40 miles from the antenna- add *1 mile*.
- b. If 40 miles or more but not over 200 miles from the antenna- add *3 miles*.

(b) FL 180 to FL 600 inclusive- 10 miles on each side of the route.

3. Via degree-distance fixes for RNAV flights above FL 450- 10 miles on each side of the route.

NOTE-

1. Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

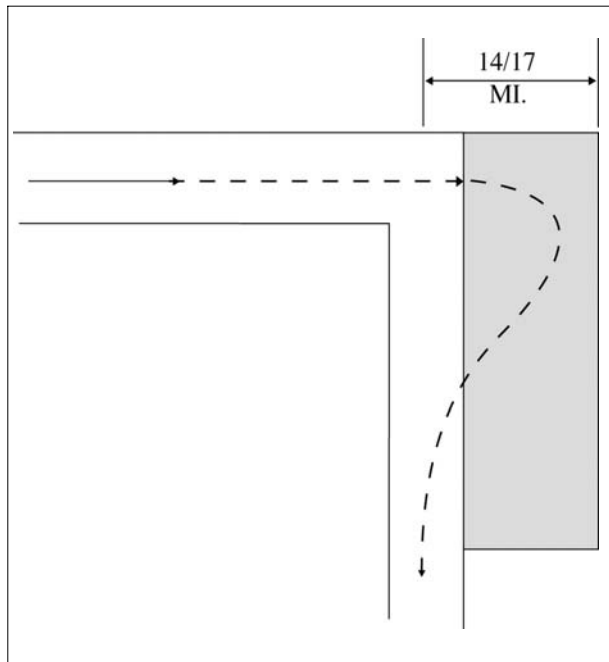
2. **EN ROUTE.** Aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace), where ATC surveillance coverage is not available, may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference
FAAO JO 7110.65, Para 4-4-2, Route Structure Transitions
FAAO JO 7110.65, Para 5-5-1, Application

b. When course change is 16 degrees through 90 degrees, protect the airspace on the overflow side beginning at the point where the course changes as follows: (See FIG 6-5-5.)

FIG 6-5-5
Overflow Side Minima
16 to 90 Degrees



1. Below FL 180- same as subparas a1 or 2.

2. FL 180 to FL 230 inclusive- 14 miles.

3. Above FL 230 to FL 600 inclusive- 17 miles.

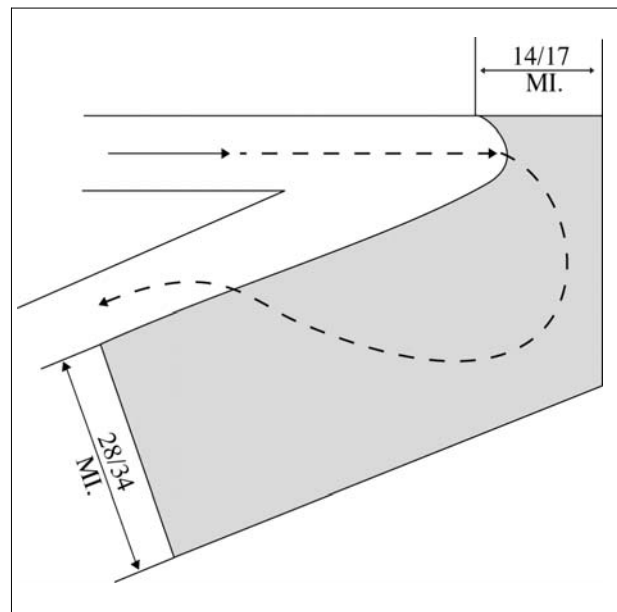
c. When course change is 91 degrees through 180 degrees, protect the airspace on the overflow side beginning at the point where the course changes as follows: (See FIG 6-5-6.)

1. Below FL 180- same as subparas a1 or 2.

2. FL 180 to FL 230 inclusive- 28 miles.

3. Above FL 230 to FL 600 inclusive- 34 miles.

FIG 6-5-6
Overflow Side Minima
91 to 180 Degrees



d. After the course changes specified in subparas b or c have been completed and the aircraft is back on course, the appropriate minima in subpara a may be used.

REFERENCE-

FAAO JO 7110.65, Para 9-2-13, Military Operations Above FL 600.

EN ROUTE

e. For aircraft equipped with IFR-certified GPS systems operating within Anchorage Air Route Traffic Control Center controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available:

1. Aircraft shall be cleared via point-to-point route segments. Points are defined as: NAVAIDS, intersections, airports, and waypoints.

2. Lateral protected airspace shall be 4 nautical miles (NM) either side of the projected centerline between the points.

3. Points used for navigation shall be named and depicted on the controller video map, and/or on the controller chart(s) located at the position.

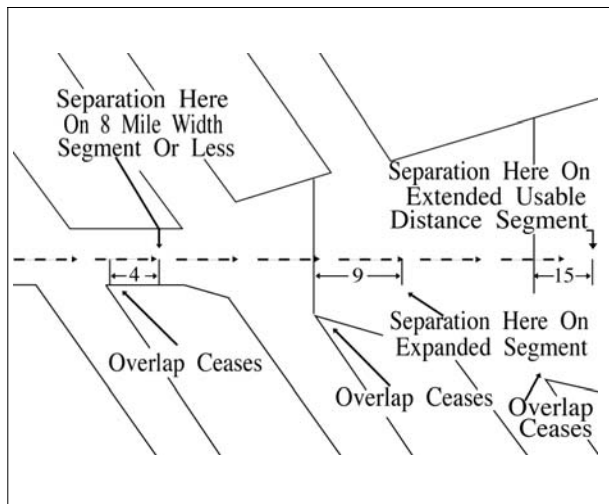
4. The maximum distance between successive fixes/waypoints shall not exceed 512 miles.

5. Assigned altitudes shall be at or above the highest minimum IFR altitude (MIA) along the projected route, including the protected airspace of that route, for the route segment being flown.

6-5-5. RNAV MINIMA- DIVERGING/ CROSSING COURSES

Consider lateral separation to exist when an RNAV aircraft is beyond the point where the lateral protected airspace of that aircraft has ceased to overlap the lateral protected airspace of another by at least: (See FIG 6-5-7 and FIG 6-5-8.)

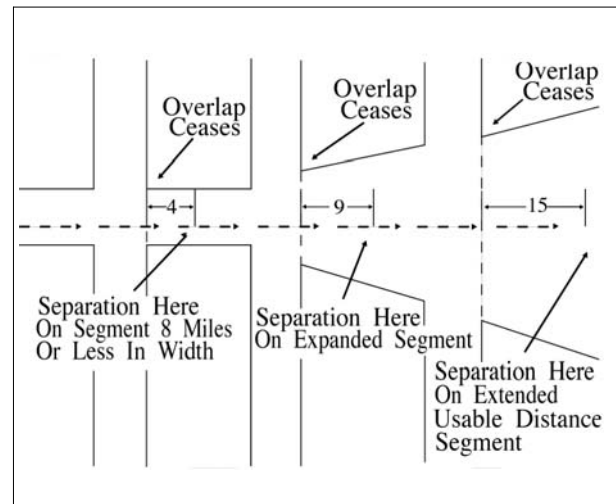
FIG 6-5-7
RNAV Minima



a. When operating along a route that is 8 miles or less in width- *4 miles*.

b. When operating along an expanded route- *9 miles*, except that *15 miles* shall be applied along that portion of any route segment requiring extended usable distance limitation beyond 130 miles of the reference facility.

FIG 6-5-8
RNAV Minima



Chapter 8. Offshore/Oceanic Procedures

Section 1. General

8-1-1. ATC SERVICE

Provide air traffic control service in oceanic controlled airspace in accordance with the procedures in this chapter except when other procedures/minima are prescribed in a directive or a letter of agreement.

REFERENCE-

FAAO JO 7110.65, *Procedural Letters of Agreement, Para 1-1-9.*

8-1-2. OPERATIONS IN OFFSHORE AIRSPACE AREAS

Provide air traffic control service in offshore airspace areas in accordance with procedures and minima in this chapter. For those situations not covered by this chapter, the provisions in this Order shall apply.

8-1-3. VFR FLIGHT PLANS

VFR flights in Oceanic FIRs may be conducted in meteorological conditions equal to or greater than those specified in 14 CFR Section 91.155, Basic VFR weather minimums. Operations on a VFR flight plan are permitted only between sunrise and sunset and only within:

a. Miami, Houston, and San Juan Oceanic Control Areas (CTAs) below FL 180.

b. Within the Oakland FIR when operating less than 100 NM seaward from the shoreline within controlled airspace.

c. All Oceanic FIR airspace below the Oceanic CTAs.

8-1-4. TYPES OF SEPARATION

Separation shall consist of at least one of the following:

- a. Vertical separation;
- b. Horizontal separation, either;
 - 1. Longitudinal; or
 - 2. Lateral;
- c. Composite separation;

d. Radar separation, as specified in Chapter 5, Radar, where radar coverage is adequate.

8-1-5. ALTIMETER SETTING

Within oceanic control areas, unless directed and/or charted otherwise, altitude assignment shall be based on flight levels and a standard altimeter setting of 29.92 inches Hg.

8-1-6. RECEIPT OF POSITION REPORTS

When a position report affecting separation is not received, take action to obtain the report no later than *10 minutes* after the control estimate, unless otherwise specified.

8-1-7. OCEANIC NAVIGATIONAL ERROR REPORTING (ONER) PROCEDURES

FAAO 7110.82, Monitoring of Navigation, Longitudinal Separation, and Altitude Keeping Performance in Oceanic Airspace, contains procedures for reporting and processing navigational errors observed by ATC radar for aircraft exiting oceanic airspace.

NOTE-

FAAO 7110.82 establishes procedures for processing ONER procedures, Oceanic Altitude Deviation Reports, Erosion of Longitudinal Separation Reports, Letter of Authorization Verification Reports, and for collecting system data for analysis. This data is needed for risk modeling activities to support separation standard reductions.

8-1-8. USE OF CONTROL ESTIMATES

Control estimates are the estimated position of aircraft, with reference to time as determined by the ATC automation system in use or calculated by the controller using known wind patterns, previous aircraft transit times, pilot progress reports, and pilot estimates. These estimates may be updated through the receipt of automated position reports and/or manually updated by the controller. Control estimates shall be used when applying time-based separation minima.

Section 3. Special Use and ATC Assigned Airspace

9-3-1. APPLICATION

Apply the procedures in this section to aircraft operating in proximity to special use or ATC assigned airspace (ATCAA) unless the airspace is designated an Alert Area/Controlled Firing Area or one of the following conditions exist:

NOTE-

These procedures are not applicable to Alert Areas or Controlled Firing Areas.

REFERENCE-

P/CG Term- Special Use Airspace.

a. The pilot informs you that permission has been obtained from the using agency to operate in the airspace.

b. The using agency informs you they have given permission for the aircraft to operate in the airspace.

NOTE-

Using agency permission may be relayed to the pilot.

c. The Restricted/Warning Area, MOA, or ATCAA has been released to the controlling agency.

d. The aircraft is on an approved ALTRV, unless the airspace area in question is an ATCAA.

NOTE-

Mission project officers are responsible for obtaining approval for ALTRV operations within Prohibited/Restricted/Warning Areas and MOAs.

REFERENCE-

FAAO JO 7110.65, Para 9-3-4, Transiting Active SUA/ATCAA.

e. Operations in special use airspace located in offshore/oceanic airspace will be conducted in accordance with the procedures in Chapter 8, Offshore/Oceanic Procedures.

9-3-2. SEPARATION MINIMA

Unless clearance of nonparticipating aircraft in/through/adjacent to a Prohibited/Restricted/Warning Area/MOA/ATCAA is provided for in a Letter of Agreement (LOA) or Letter of Procedure (LOP), separate nonparticipating aircraft from active special use airspace by the following minima:

a. Assign an altitude consistent with para 4-5-2, Flight Direction, and 4-5-3, Exceptions, which is at

least 500 feet (above FL 290-1000 feet) above/below the upper/lower limit of the Prohibited/Restricted/Warning Area/MOA/ATCAA.

REFERENCE-

FAAO JO 7210.3, Para 2-1-17, Prohibited/Restricted Areas.

b. Provide radar separation of 3 miles (En route Stage A/DARC, FL 600 and above - 6 miles) from the special use airspace peripheral boundary.

c. Clear aircraft on airways or routes whose widths or protected airspace do not overlap the peripheral boundary.

d. Exception. Some Prohibited/Restricted/Warning Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. Where facility management has identified these areas as outlined in FAAO JO 7210.3, Facility Operation and Administration, vector aircraft to remain clear of the peripheral boundary.

NOTE-

Nonparticipating aircraft refers to those aircraft for which you have separation responsibility and which have not been authorized by the using agency to operate in/through the special use airspace or ATCAA in question.

9-3-3. VFR-ON-TOP

If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:

a. Inform the pilot to conduct flight "VFR-on-top" at least 500 feet above the upper limit or below the lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or

PHRASEOLOGY-

MAINTAIN VFR-ON-TOP AT LEAST 500 FEET ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix);

and if the airspace is an ATCAA,

(name of ATCAA) IS ATC ASSIGNED AIRSPACE.

REFERENCE-

FAAO JO 7110.65, Para 7-1-1, Class A Airspace Restrictions.

b. Clear the aircraft via a routing which provides approved separation from the airspace.

c. Exception: Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The addition of 500 (or 1,000) feet to the upper/lower limit of these Prohibited/Restricted Areas is not required if the areas have been identified by facility management.

REFERENCE-

FAAO JO 7210.3, Para 2-1-17, Prohibited/Restricted Areas.

9-3-4. TRANSITING ACTIVE SUA/ATCAA

If a LOA/LOP has been coordinated with the Using Agency and permission has been granted to transit the area:

a. Comply with the instruction/clearances issued by the Using Agency and provide the applicable separation minima between aircraft when two or more aircraft are transiting the area; or

NOTE-

Some Using Agencies are also air traffic control facilities.

b. If unable to comply with instructions/clearances, clear the aircraft in accordance with para 9-3-2, Separation Minima.

NOTE-

The FAA has no jurisdictional authority over the use of nonjoint use prohibited/restricted/warning area airspace; therefore, clearance cannot be issued for flight therein without the appropriate approval.

PILOT/CONTROLLER GLOSSARY

PURPOSE

a. This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in ***bold italics***. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

b. Because of the international nature of flying, terms used in the Lexicon, published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are followed by "[ICAO]." For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Code of Federal Regulations (CFR) and the Aeronautical Information Manual (AIM).

c. This Glossary will be revised, as necessary, to maintain a common understanding of the system.

EXPLANATION OF CHANGES

a. Terms Added:

FLY VISUAL TO AIRPORT

PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT

VISUAL SEGMENT

b. Terms Modified:

AIRPORT RESERVATION OFFICE

ILS CATEGORIES

c. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes.

a. Reduced separation between aircraft which is based on time or distance. Standard arrival separation applies between participants including multiple flights until the DRAG point. The DRAG point is a published location on an ASLAR approach where aircraft landing second in a formation slows to a predetermined airspeed. The DRAG point is the reference point at which MARSAs apply as expanding elements effect separation within a flight or between subsequent participating flights.

b. ASLAR procedures shall be covered in a Letter of Agreement between the responsible USAF military ATC facility and the concerned Federal Aviation Administration facility. Initial Approach Fix spacing requirements are normally addressed as a minimum.

AIRMEN'S METEOROLOGICAL INFORMATION-

(See AIRMET.)

AIRMET- In-flight weather advisories issued only to amend the area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMETs concern weather of less severity than that covered by SIGMETs or Convective SIGMETs. AIRMETs cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement.

(See AWW.)

(See CONVECTIVE SIGMET.)

(See CWA.)

(See SIGMET.)

(Refer to AIM.)

AIRPORT- An area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

AIRPORT ADVISORY AREA- The area within ten miles of an airport without a control tower or where the tower is not in operation, and on which a Flight Service Station is located.

(See LOCAL AIRPORT ADVISORY.)

(Refer to AIM.)

AIRPORT ARRIVAL RATE (AAR)- A dynamic input parameter specifying the number of arriving aircraft which an airport or airspace can accept from the ARTCC per hour. The AAR is used to calculate the desired interval between successive arrival aircraft.

AIRPORT DEPARTURE RATE (ADR)- A dynamic parameter specifying the number of aircraft which can depart an airport and the airspace can accept per hour.

AIRPORT ELEVATION- The highest point of an airport's usable runways measured in feet from mean sea level.

(See TOUCHDOWN ZONE ELEVATION.)

(See ICAO term AERODROME ELEVATION.)

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

AIRPORT LIGHTING- Various lighting aids that may be installed on an airport. Types of airport lighting include:

a. **Approach Light System (ALS)-** An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his/her final approach for landing. Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with the ALS at some airports. Types of Approach Light Systems are:

1. **ALSF-1-** Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.

2. **ALSF-2-** Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration. The ALSF-2 may operate as an SSALR when weather conditions permit.

3. **SSALF-** Simplified Short Approach Light System with Sequenced Flashing Lights.

4. **SSALR-** Simplified Short Approach Light System with Runway Alignment Indicator Lights.

5. **MALSF-** Medium Intensity Approach Light System with Sequenced Flashing Lights.

6. MALSR- Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

7. LDIN- Lead-in-light system- Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

8. RAIL- Runway Alignment Indicator Lights- Sequenced Flashing Lights which are installed only in combination with other light systems.

9. ODALS- Omnidirectional Approach Lighting System consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge, or 75 feet from the runway edge when installed on a runway equipped with a VASI.

(Refer to FAAO JO 6850.2, VISUAL GUIDANCE LIGHTING SYSTEMS.)

b. Runway Lights/Runway Edge Lights- Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.

c. Touchdown Zone Lighting- Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. The basic system extends 3,000 feet along the runway.

d. Runway Centerline Lighting- Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

e. Threshold Lights- Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold.

f. Runway End Identifier Lights (REIL)- Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

g. Visual Approach Slope Indicator (VASI)- An airport lighting facility providing vertical visual

approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he/she is “on path” if he/she sees red/white, “above path” if white/white, and “below path” if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

h. Precision Approach Path Indicator (PAPI)- An airport lighting facility, similar to VASI, providing vertical approach slope guidance to aircraft during approach to landing. PAPIs consist of a single row of either two or four lights, normally installed on the left side of the runway, and have an effective visual range of about 5 miles during the day and up to 20 miles at night. PAPIs radiate a directional pattern of high intensity red and white focused light beams which indicate that the pilot is “on path” if the pilot sees an equal number of white lights and red lights, with white to the left of the red; “above path” if the pilot sees more white than red lights; and “below path” if the pilot sees more red than white lights.

i. Boundary Lights- Lights defining the perimeter of an airport or landing area.

(Refer to AIM.)

AIRPORT MARKING AIDS- Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as:

a. Visual.

b. Nonprecision instrument.

c. Precision instrument.

(Refer to AIM.)

AIRPORT REFERENCE POINT (ARP)- The approximate geometric center of all usable runway surfaces.

AIRPORT RESERVATION OFFICE- Office responsible for monitoring the operation of slot controlled airports. It receives and processes requests for unscheduled operations at slot controlled airports.

AIRPORT ROTATING BEACON- A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are

power or control. The standard overhead approach starts at a relatively high altitude over a runway (“high key”) followed by a continuous 180 degree turn to a high, wide position (“low key”) followed by a continuous 180 degree turn final. The standard straight-in pattern starts at a point that results in a straight-in approach with a high rate of descent to the runway. Flameout approaches terminate in the type approach requested by the pilot (normally fullstop).

FLIGHT CHECK- A call-sign prefix used by FAA aircraft engaged in flight inspection/certification of navigational aids and flight procedures. The word “recorded” may be added as a suffix; e.g., “Flight Check 320 recorded” to indicate that an automated flight inspection is in progress in terminal areas.

(See FLIGHT INSPECTION.)

(Refer to AIM.)

FLIGHT FOLLOWING-

(See TRAFFIC ADVISORIES.)

FLIGHT INFORMATION REGION- An airspace of defined dimensions within which Flight Information Service and Alerting Service are provided.

a. Flight Information Service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

b. Alerting Service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

FLIGHT INFORMATION SERVICE- A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

FLIGHT 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 insures that the most appropriate aids are automatically selected during the information update cycle.

FLIGHT MANAGEMENT SYSTEM PROCEDURE- An arrival, departure, or approach procedure developed for use by aircraft with a slant (/) E or slant (/) F equipment suffix.

FLIGHT PATH- A line, course, or track along which an aircraft is flying or intended to be flown.

(See COURSE.)

(See TRACK.)

FLIGHT PLAN- Specified information relating to the intended flight of an aircraft that is filed orally or in writing with an FSS or an ATC facility.

(See FAST FILE.)

(See FILED.)

(Refer to AIM.)

FLIGHT PLAN AREA- The geographical area assigned by regional air traffic divisions to a flight service station for the purpose of search and rescue for VFR aircraft, issuance of NOTAMs, pilot briefing, in-flight services, broadcast, emergency services, flight data processing, international operations, and aviation weather services. Three letter

identifiers are assigned to every flight service station and are annotated in AFDs and FAAO JO 7350.8, LOCATION IDENTIFIERS, as tie-in facilities.

(See FAST FILE.)

(See FILED.)

(Refer to AIM.)

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 radio communications, search and rescue services, and assistance to lost aircraft and aircraft in emergency situations. FSSs also relay ATC clearances, process Notices to Airmen, broadcast aviation weather and aeronautical information, and notify Customs and Border Protection of transborder flights. In addition, at selected locations, FSSs provide En Route Flight Advisory Service (Flight Watch) and Airport Advisory Service (AAS). In Alaska, designated FSSs also provide TWEB recordings and take weather observations.

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 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.)

FLIGHT WATCH– A shortened term for use in air-ground contacts to identify the flight service station providing En Route Flight Advisory Service; e.g., “Oakland Flight Watch.”

(See EN ROUTE FLIGHT ADVISORY SERVICE.)

FLIP–

(See DOD FLIP.)

FLY HEADING (DEGREES)– Informs the pilot of the heading he/she should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

FLY-BY WAYPOINT– A fly-by waypoint requires the use of turn anticipation to avoid overshoot of the next flight segment.

FLY-OVER WAYPOINT– A fly-over waypoint precludes any turn until the waypoint is overflown and is followed by an intercept maneuver of the next flight segment.

FLY VISUAL TO AIRPORT–

(See PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT.)

FMA–

(See FINAL MONITOR AID.)

FMS–

(See FLIGHT MANAGEMENT SYSTEM.)

FMSP–

(See FLIGHT MANAGEMENT SYSTEM PROCEDURE.)

FORMATION FLIGHT– More than one aircraft which, by prior arrangement between the pilots, operate as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight. This includes transition periods when aircraft within the formation are maneuvering to attain separation from each other to effect individual control and during join-up and breakaway.

- a. A standard formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman.

b. Nonstandard formations are those operating under any of the following conditions:

1. When the flight leader has requested and ATC has approved other than standard formation dimensions.

2. When operating within an authorized altitude reservation (ALTRV) or under the provisions of a letter of agreement.

3. When the operations are conducted in airspace specifically designed for a special activity.

(See ALTITUDE RESERVATION.)

(Refer to 14 CFR Part 91.)

FRC-

(See REQUEST FULL ROUTE CLEARANCE.)

FREEZE/FROZEN- Terms used in referring to arrivals which have been assigned ACLTs and to the lists in which they are displayed.

FREEZE CALCULATED LANDING TIME- A dynamic parameter number of minutes prior to the meter fix calculated time of arrival for each aircraft when the TCLT is frozen and becomes an ACLT (i.e., the VTA is updated and consequently the TCLT is modified as appropriate until FCLT minutes prior to meter fix calculated time of arrival, at which time updating is suspended and an ACLT and a frozen meter fix crossing time (MFT) is assigned).

FREEZE HORIZON- The time or point at which an aircraft's STA becomes fixed and no longer fluctuates with each radar update. This setting insures 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.

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.)

I

I SAY AGAIN- The message will be repeated.

IAF-

(See INITIAL APPROACH FIX.)

IAP-

(See INSTRUMENT APPROACH PROCEDURE.)

IAWP- Initial Approach Waypoint

ICAO-

(See ICAO Term INTERNATIONAL CIVIL AVIATION ORGANIZATION.)

ICING- The accumulation of airframe ice.

Types of icing are:

a. Rime Ice- Rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets.

b. Clear Ice- A glossy, clear, or translucent ice formed by the relatively slow freezing or large supercooled water droplets.

c. Mixed- A mixture of clear ice and rime ice.

Intensity of icing:

a. Trace- Ice becomes perceptible. Rate of accumulation is slightly greater than the rate of sublimation. Deicing/anti-icing equipment is not utilized unless encountered for an extended period of time (over 1 hour).

b. Light- The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.

c. Moderate- The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or flight diversion is necessary.

d. Severe- The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate flight diversion is necessary.

IDENT- A request for a pilot to activate the aircraft transponder identification feature. This will help the

controller to confirm an aircraft identity or to identify an aircraft.

(Refer to AIM.)

IDENT FEATURE- The special feature in the Air Traffic Control Radar Beacon System (ATCRBS) equipment. It is used to immediately distinguish one displayed beacon target from other beacon targets.

(See IDENT.)

IF-

(See INTERMEDIATE FIX.)

IFIM-

(See INTERNATIONAL FLIGHT INFORMATION MANUAL.)

IF NO TRANSMISSION RECEIVED FOR (TIME)- Used by ATC in radar approaches to prefix procedures which should be followed by the pilot in event of lost communications.

(See LOST COMMUNICATIONS.)

IFR-

(See INSTRUMENT FLIGHT RULES.)

IFR AIRCRAFT- An aircraft conducting flight in accordance with instrument flight rules.

IFR CONDITIONS- Weather conditions below the minimum for flight under visual flight rules.

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

IFR DEPARTURE PROCEDURE-

(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)

(Refer to AIM.)

IFR FLIGHT-

(See IFR AIRCRAFT.)

IFR LANDING MINIMUMS-

(See LANDING MINIMUMS.)

IFR MILITARY TRAINING ROUTES (IR)- Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES- Title 14 Code of Federal

Regulations Part 91, prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both to assist pilots in avoiding obstacles during climb to the minimum en route altitude. Those airports are listed in FAA/DOD Instrument Approach Procedures (IAPs) Charts under a section entitled "IFR Takeoff Minimums and Departure Procedures." The FAA/DOD IAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports or from any airports where there are no departure procedures, DPs, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

IF/IAWP- Intermediate Fix/Initial Approach Waypoint. The waypoint where the final approach course of a T approach meets the crossbar of the T. When designated (in conjunction with a TAA) this waypoint will be used as an IAWP when approaching the airport from certain directions, and as an IFWP when beginning the approach from another IAWP.

IFWP- Intermediate Fix Waypoint

ILS-

(See INSTRUMENT LANDING SYSTEM.)

ILS CATEGORIES- 1. ILS 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. ILS Category I Lower Than Standard. 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 1,400 feet, HUD to DA and special authorization. 3. ILS 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. ILS Category II 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. ILS Category III:

a. IIIA.-An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 700 feet.

b. IIIB.-An ILS approach procedure which provides for approach without a decision height minimum and with runway visual range of not less than 150 feet.

c. IIIC.-An ILS approach procedure which provides for approach without a decision height minimum and without runway visual range minimum.

ILS PRM APPROACH- An instrument landing system (ILS) approach conducted to parallel runways whose extended centerlines are separated by less than 4,300 feet and the parallel runways have a Precision Runway Monitoring (PRM) system that permits simultaneous independent ILS approaches.

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.

INCREASE SPEED TO (SPEED)-

(See SPEED ADJUSTMENT.)

INERTIAL NAVIGATION SYSTEM- An RNAV system which is a form of self-contained navigation.

(See Area Navigation/RNAV.)

INFLIGHT REFUELING-

(See AERIAL REFUELING.)

INFLIGHT WEATHER ADVISORY-

(See WEATHER ADVISORY.)

INFORMATION REQUEST- A request originated by an FSS for information concerning an overdue VFR aircraft.

INITIAL APPROACH FIX- 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 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.

INSTRUMENT APPROACH PROCEDURES 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– 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– 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– Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

(See INSTRUMENT FLIGHT RULES.)

(See VISUAL FLIGHT RULES.)

(See VISUAL METEOROLOGICAL CONDITIONS.)

INSTRUMENT RUNWAY– A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.

(See ICAO term INSTRUMENT RUNWAY.)

INSTRUMENT RUNWAY [ICAO]– One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a. Nonprecision Approach Runway–An instrument runway served by visual aids and a nonvisual aid providing at least directional guidance adequate for a straight-in approach.

b. Precision Approach Runway, Category I–An instrument runway served by ILS and visual aids intended for operations down to 60 m (200 feet) decision height and down to an RVR of the order of 800 m.

c. Precision Approach Runway, Category II–An instrument runway served by ILS and visual aids intended for operations down to 30 m (100 feet) decision height and down to an RVR of the order of 400 m.

d. Precision Approach Runway, Category III–An instrument runway served by ILS to and along the surface of the runway and:

1. Intended for operations down to an RVR of the order of 200 m (no decision height being applicable) using visual aids during the final phase of landing;

2. Intended for operations down to an RVR of the order of 50 m (no decision height being applicable) using visual aids for taxiing;

3. Intended for operations without reliance on visual reference for landing or taxiing.

Note 1: See Annex 10 Volume I, Part I, Chapter 3, for related ILS specifications.

Note 2: Visual aids need not necessarily be matched to the scale of nonvisual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

INTEGRITY– The ability of a system to provide timely warnings to users when the system should not be used for navigation.

INTERMEDIATE APPROACH SEGMENT–
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INTERMEDIATE APPROACH SEGMENT [ICAO]– That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, race track or dead reckoning track

procedure and the final approach fix or point, as appropriate.

INTERMEDIATE FIX– The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).

(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

INTERMEDIATE LANDING– On the rare occasion that this option is requested, it should be approved. The departure center, however, must advise the ATCSCC so that the appropriate delay is carried over and assigned at the intermediate airport. An intermediate landing airport within the arrival center will not be accepted without coordination with and the approval of the ATCSCC.

INTERNATIONAL AIRPORT– Relating to international flight, it means:

a. An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.

b. A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.

c. Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation.

(See ICAO term INTERNATIONAL AIRPORT.)

(Refer to AIRPORT/FACILITY DIRECTORY.)

(Refer to IFIM.)

INTERNATIONAL AIRPORT [ICAO]– Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

INTERNATIONAL CIVIL AVIATION ORGANIZATION [ICAO]– A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air

navigation and to foster planning and development of international civil air transport.

a. Regions include:

1. African-Indian Ocean Region
2. Caribbean Region
3. European Region
4. Middle East/Asia Region
5. North American Region
6. North Atlantic Region
7. Pacific Region
8. South American Region

INTERNATIONAL FLIGHT INFORMATION MANUAL– A publication designed primarily as a pilot's preflight planning guide for flights into foreign airspace and for flights returning to the U.S. from foreign locations.

INTERROGATOR– The ground-based surveillance radar beacon transmitter-receiver, which normally scans in synchronism with a primary radar, transmitting discrete radio signals which repetitiously request all transponders on the mode being used to reply. The replies received are mixed with the primary radar returns and displayed on the same plan position indicator (radar scope). Also, applied to the airborne element of the TACAN/DME system.

(See TRANSPONDER.)

(Refer to AIM.)

INTERSECTING RUNWAYS– Two or more runways which cross or meet within their lengths.

(See INTERSECTION.)

INTERSECTION–

a. A point defined by any combination of courses, radials, or bearings of two or more navigational aids.

b. Used to describe the point where two runways, a runway and a taxiway, or two taxiways cross or meet.

INTERSECTION DEPARTURE– A departure from any runway intersection except the end of the runway.

(See INTERSECTION.)

INTERSECTION TAKEOFF–

(See INTERSECTION DEPARTURE.)

IR–

(See IFR MILITARY TRAINING ROUTES.)

PTS-

(See POLAR TRACK STRUCTURE.)

PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT- A segment on an IAP chart annotated as “Fly Visual to Airport” or “Fly Visual.” A dashed arrow will indicate the visual flight path on the profile and plan view with an

associated note on the approximate heading and distance. The visual segment should be flown as a dead reckoning course while maintaining visual conditions.

PUBLISHED ROUTE- A route for which an IFR altitude has been established and published; e.g., Federal Airways, Jet Routes, Area Navigation Routes, Specified Direct Routes.

2. **Mid-RVR**- The RVR readout values obtained from RVR equipment located midfield of the runway.

3. **Rollout RVR**- The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

(See ICAO term FLIGHT VISIBILITY.)

(See ICAO term GROUND VISIBILITY.)

(See ICAO term RUNWAY VISUAL RANGE.)

(See ICAO term VISIBILITY.)

VISIBILITY [ICAO]- The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night.

a. **Flight Visibility**-The visibility forward from the cockpit of an aircraft in flight.

b. **Ground Visibility**-The visibility at an aerodrome as reported by an accredited observer.

c. **Runway Visual Range [RVR]**-The range over which the pilot of an aircraft on the centerline of a runway can see the runway surface markings or the lights delineating the runway or identifying its centerline.

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

(See ICAO term VISUAL APPROACH.)

VISUAL APPROACH [ICAO]- An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

VISUAL APPROACH SLOPE INDICATOR-

(See AIRPORT LIGHTING.)

VISUAL CLIMB OVER AIRPORT (VCOA)- A departure option for an IFR aircraft, operating in visual meteorological conditions equal to or greater than the specified visibility and ceiling, to visually conduct climbing turns over the airport to the published "climb-to" altitude from which to proceed

with the instrument portion of the departure. VCOA procedures are developed to avoid obstacles greater than 3 statute miles from the departure end of the runway as an alternative to complying with climb gradients greater than 200 feet per nautical mile. These procedures are published in the 'Take-Off Minimums and (Obstacle) Departure Procedures' section of the Terminal Procedures Publications.

(See AIM.)

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

VISUAL FLIGHT RULES- Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

(See INSTRUMENT FLIGHT RULES.)

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

(See VISUAL METEOROLOGICAL CONDITIONS.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

VISUAL HOLDING- The holding of aircraft at selected, prominent geographical fixes which can be easily recognized from the air.

(See HOLDING FIX.)

VISUAL METEOROLOGICAL CONDITIONS- Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

(See INSTRUMENT FLIGHT RULES.)

(See INSTRUMENT METEOROLOGICAL CONDITIONS.)

(See VISUAL FLIGHT RULES.)

VISUAL SEGMENT-

(See PUBLISHED INSTRUMENT APPROACH PROCEDURE VISUAL SEGMENT.)

VISUAL SEPARATION- A means employed by ATC to separate aircraft in terminal areas and en route airspace in the NAS. There are two ways to effect this separation:

a. The tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other.

b. A pilot sees the other aircraft involved and upon instructions from the controller provides his/her own separation by maneuvering his/her aircraft as necessary to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor.

(See SEE AND AVOID.)

(Refer to 14 CFR Part 91.)

VLF-

(See VERY LOW FREQUENCY.)

VMC-

(See VISUAL METEOROLOGICAL CONDITIONS.)

VOICE SWITCHING AND CONTROL SYSTEM-

The VSCS is a computer controlled switching system that provides air traffic controllers with all voice circuits (air to ground and ground to ground) necessary for air traffic control.

(See VOICE SWITCHING AND CONTROL SYSTEM.)

(Refer to AIM.)

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

(See NAVIGATIONAL AID.)

(Refer to AIM.)

VOR TEST SIGNAL-

(See VOT.)

VORTAC- A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

(See DISTANCE MEASURING EQUIPMENT.)

(See NAVIGATIONAL AID.)

(See TACAN.)

(See VOR.)

(Refer to AIM.)

VORTICES- Circular patterns of air created by the movement of an airfoil through the air when generating lift. As an airfoil moves through the atmosphere in sustained flight, an area of low pressure is created above it. The air flowing from the high pressure area to the low pressure area around and about the tips of the airfoil tends to roll up into two rapidly rotating vortices, cylindrical in shape. These vortices are the most predominant parts of aircraft wake turbulence and their rotational force is dependent upon the wing loading, gross weight, and speed of the generating aircraft. The vortices from medium to heavy aircraft can be of extremely high velocity and hazardous to smaller aircraft.

(See AIRCRAFT CLASSES.)

(See WAKE TURBULENCE.)

(Refer to AIM.)

VOT- A ground facility which emits a test signal to check VOR receiver accuracy. Some VOTs are available to the user while airborne, and others are limited to ground use only.

(See AIRPORT/FACILITY DIRECTORY.)

(Refer to 14 CFR Part 91.)

(Refer to AIM.)

VR-

(See VFR MILITARY TRAINING ROUTES.)

VSCS-

(See VOICE SWITCHING AND CONTROL SYSTEM.)

VTA-

(See VERTEX TIME OF ARRIVAL.)

VTOL AIRCRAFT-

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT.)

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U.S. Department
of Transportation
**Federal Aviation
Administration**

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8/27/09

BRIEFING GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Initiated By: AJR-0
Vice President, System Operations Services

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1. PARAGRAPH NUMBER AND TITLE: 2-3-5. AIRCRAFT IDENTITY

2. BACKGROUND: VC-25 flight management system upgrades and subsequent implementation of future air navigation procedures (FANS) have driven the need to reevaluate the Air Force One, Air Force Two, Army One, and Army Two call signs. Within FANS, the VC-25 now has the capability (operationally approved and certified) to obtain digital oceanic clearances and to utilize ATS datalink services to include automatic dependent surveillance waypoint position reporting and controller pilot datalink communications. To utilize these services, the aircraft must register and file a call sign with at least three characters.

3. CHANGE:**OLD****2-3-5. AIRCRAFT IDENTITY**

Title through b4(b)

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	<u>AF</u> 1F
Marine	VM1	<u>VM</u> 1F
Navy	VV1	<u>VV</u> 1F
Army	RR1	<u>R</u> 1F
Coast Guard	C1	<u>C</u> 1F
Guard	G1	<u>G</u> 1F
Commercial	EXEC1	EXEC1F

NEW**2-3-5. AIRCRAFT IDENTITY**

No Change

No Change

TBL 2-3-8
President and Family

Service	President	Family
Air Force	AF1	<u>EXEC</u> 1F
Marine	VM1	<u>EXEC</u> 1F
Navy	VV1	<u>EXEC</u> 1F
Army	RR1	<u>EXEC</u> 1F
Coast Guard	C1	<u>EXEC</u> 1F
Guard	G1	<u>EXEC</u> 1F
Commercial	EXEC1	EXEC1F

TBL 2-3-9
Vice President and Family

Service	Vice President	Family
Air Force	AF2	<u>AF</u> 2F
Marine	VM2	<u>VM</u> 2F
Navy	VV2	<u>VV</u> 2F
Army	RR2	<u>R</u> 2F
Coast Guard	C2	<u>C</u> 2F
Guard	G2	<u>G</u> 2F
Commercial	EXEC2	EXEC2F

TBL 2-3-9
Vice President and Family

Service	Vice President	Family
Air Force	AF2	<u>EXEC</u> 2F
Marine	VM2	<u>EXEC</u> 2F
Navy	VV2	<u>EXEC</u> 2F
Army	RR2	<u>EXEC</u> 2F
Coast Guard	C2	<u>EXEC</u> 2F
Guard	G2	<u>EXEC</u> 2F
Commercial	EXEC2	EXEC2F

1. PARAGRAPH NUMBER AND TITLE: 3-6-5. RADAR-ONLY MODE

2. BACKGROUND: Airport Surface Detection Equipment System – Model X (ASDE-X) was originally designed with surface movement radar (SMR) and Multilateration (MLAT) for airports with no surface surveillance. SMR radar was not intended to provide total coverage of the entire airport. ASDE-X uses fusion as a way of creating “seamless coverage” from all sensors (MLAT, SMR, and ASR). The original design was to critically fault and go offline when MLAT or the SMR radar was unavailable. Radar-only mode allows the ASDE-X system to remain operational if the MLAT sub-system incurs a critical fault and is offline. Radar-only mode is equivalent to the present ASDE3/AMASS operation at legacy airports.

3. CHANGE:**OLD**

Add

Add

NEW**3-6-5. RADAR-ONLY MODE**

Radar-only mode is an enhancement of the ASDE-X system which allows the system to stay operational with safety logic processing, despite a critical fault in the Multilateration (MLAT) subsystem. The system stays in full core alert status under radar-only mode without data block capability.

1. PARAGRAPH NUMBER AND TITLE:

4-1-2. EXCEPTIONS;

4-4-2. ROUTE STRUCTURE TRANSITIONS;

5-5-1. APPLICATION; and

6-5-4. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES

2. BACKGROUND: Due to the limited availability of air traffic control (ATC) surveillance service within the Anchorage ARTCC domestic controlled airspace, the FAA promulgated special flight regulations in support of the implementation of a statewide RNAV/GPS route structure as reflected in the FAA Flight Plan. Those special flight regulations include aircraft equipage and pilot training requirements to provide additional safety mitigations for the expanded use of RNAV/GPS procedures in areas with limited or no ATC surveillance coverage. Initially, a waiver was authorized for Anchorage ARTCC to support GPS equipped aircraft transitioning from the en route structure to airports with GPS instrument approaches. Based on the experience gained through the application of the subject waiver, this change supports the use of RNAV/GPS routes for properly-equipped aircraft operating on point-to-point RNAV routes within Anchorage ARTCC controlled airspace, excluding oceanic airspace, regardless of ATC surveillance coverage.

3. CHANGE:**OLD****4-1-2. EXCEPTIONS**

Title through a2

NEW**4-1-2. EXCEPTIONS**

No Change

NOTE-

1. Para 5-5-1, Application, requires radar separation be provided to RNAV aircraft on random (impromptu) routes at FL 450 and below.

2. When a clearance is issued beyond the altitude and/or distance limitations of a NAVAID, in addition to being responsible for maintaining separation from other aircraft and airspace, the controller is responsible for providing aircraft with information and advice related to significant deviations from the expected flight path.

REFERENCE-

P/CG Term- Radar Monitoring.

OLD**4-4-2. ROUTE STRUCTURE TRANSITIONS**

Title through f

g. Provide radar monitor when transition to or from a designated or established RNAV route is made along random RNAV routes.

Add

Add

NOTE-

1. Para 5-5-1, Application, requires radar separation be provided to RNAV aircraft on random (impromptu) routes at FL 450 and below.

2. EN ROUTE. Radar monitoring is not required for aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace), where ATC surveillance coverage is not available. Additionally, in accordance with para 5-5-1, Application; such aircraft described herein may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

3. When a clearance is issued beyond the altitude and/or distance limitations of a NAVAID, in addition to being responsible for maintaining separation from other aircraft and airspace, the controller is responsible for providing aircraft with information and advice related to significant deviations from the expected flight path.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference.
FAAO JO 7110.65, Para 4-4-2, Route Structure Transitions.
FAAO JO 7110.65, Para 6-5-4, Minima Along Other Than Established Airways or Routes.
P/CG Term- Radar Monitoring.

NEW**4-4-2. ROUTE STRUCTURE TRANSITIONS**

No Change

No Change

EN ROUTE

EXCEPTION. Radar monitoring is not required for aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within Anchorage Air Route Traffic Control Center controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available.

REFERENCE-

FAAO JO 7110.65, Para 6-5-4, Minima Along Other Than Established Airways or Routes
FAAO JO 7110.65, Para 4-1-2, Exceptions

OLD**5-5-1. APPLICATION**

Title through a

Add

OLD**6-5-4. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES**

Title through a3

NOTE-

Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

Add

NEW**5-5-1. APPLICATION**

No Change

EN ROUTE

EXCEPTION. Aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available, may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference

FAAO JO 7110.65, Para 4-1-2, Exceptions

FAAO JO 7110.65, Para 6-5-4, Minima Along Other Than Established Airways or Routes

NEW**6-5-4. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES**

No Change

NOTE-

1. Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

2. EN ROUTE. Aircraft equipped with IFR-certified GPS systems operating on point-to-point RNAV routes within the Anchorage Air Route Traffic Control Center (ARTCC) controlled airspace (excluding oceanic airspace), where ATC surveillance coverage is not available, may be provided nonradar separation, in lieu of radar separation, when an operational advantage will be gained.

REFERENCE-

FAAO JO 7110.65, Para 2-1-3, Procedural Preference

FAAO JO 7110.65, Para 4-4-2, Route Structure Transitions

FAAO JO 7110.65, Para 5-5-1, Application

b through dREFERENCE-

Add

No Change

EN ROUTE

e. For aircraft equipped with IFR-certified GPS systems operating within Anchorage Air Route Traffic Control Center controlled airspace (excluding oceanic airspace) where ATC surveillance coverage is not available:

1. Aircraft shall be cleared via point-to-point route segments. Points are defined as: NAVAIDS, intersections, airports, and waypoints.

2. Lateral protected airspace shall be 4 nautical miles (NM) either side of the projected centerline between the points.

3. Points used for navigation shall be named and depicted on the controller video map, and/or on the controller chart(s) located at the position.

4. The maximum distance between successive fixes/waypoints shall not exceed 512 miles.

5. Assigned altitudes shall be at or above the highest minimum IFR altitude (MIA) along the projected route, including the protected airspace of that route, for the route segment being flown.

1. PARAGRAPH NUMBER AND TITLE: 4-5-2. FLIGHT DIRECTION

2. BACKGROUND: When Reduced Vertical Separation Minima (RVSM) was established in Oceanic airspace Table 4-5-1, Altitude Assignment, was modified to include a section for aircraft operating within Oceanic RVSM or RVSM transition airspace. This section specified any designated cardinal altitude could be assigned regardless of course of flight. With the implementation of domestic RVSM, application of RVSM within both domestic and oceanic airspace is based on direction of flight. This adheres to International Civil Aviation Organization (ICAO) Annex 2, Appendix 3, Tables of Cruising Levels, which specifies assignment of a vertical separation minimum of 1,000 feet between Flight Level (FL) 290 and FL 410 inclusive based on direction of flight.

3. CHANGE:**OLD****4-5-2. FLIGHT DIRECTION**

Clear aircraft at altitudes according to the TBL 4-5-1.

TBL 4-5-1
Altitude Assignment

Aircraft Operating	On course degrees magnetic	Assign	Examples
Below 3,000 feet above surface	Any course	Any altitude	
At and below FL 410	0 through 179	Odd cardinal altitude or flight levels at intervals of 2,000 feet	3,000, 5,000, FL 310, FL 330

NEW**4-5-2. FLIGHT DIRECTION**

No Change

TBL 4-5-1
Altitude Assignment

Aircraft Operating	On course degrees magnetic	Assign	Examples
Below 3,000 feet above surface	Any course	Any altitude	
At and below FL 410	0 through 179	Odd cardinal altitude or flight levels at intervals of 2,000 feet	3,000, 5,000, FL 310, FL 330

	180 through 359	Even cardinal altitude or flight levels at intervals of 2,000 feet	4,000, 6,000, FL 320, FL 340
Above FL 410	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 450	FL 450, FL 490, FL 530
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 430	FL 430, FL 470, FL 510
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 410 or any odd cardinal flight level above FL 410	FL 270, FL 280, FL 290, FL 300, FL 310, FL 410, FL 430, FL 450
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL 290	FL 280, FL 290, FL 300, FL 310, FL 320, FL 330, FL 340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL 180B220, FL 280B310
<u>Aircraft within Oceanic RVSM or RVSM transition airspace</u>	<u>Any course</u>	<u>Any designated cardinal altitude</u>	<u>FL 330, FL 340, FL 350, FL 360</u>

	180 through 359	Even cardinal altitude or flight levels at intervals of 2,000 feet	4,000, 6,000, FL 320, FL 340
Above FL 410	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 450	FL 450, FL 490, FL 530
	180 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 430	FL 430, FL 470, FL 510
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 410 or any odd cardinal flight level above FL 410	FL 270, FL 280, FL 290, FL 300, FL 310, FL 410, FL 430, FL 450
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL 290	FL 280, FL 290, FL 300, FL 310, FL 320, FL 330, FL 340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL 180B220, FL 280B310

Delete

NOTE-

Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9 , and Section 10.

Delete

1. PARAGRAPH NUMBER AND TITLE: 8-1-3. VFR FLIGHT PLANS

2. BACKGROUND: VFR Flight Plans, include procedures for Visual Flight Rules (VFR) flight in oceanic airspace. Deletion of extraneous verbiage is called for to define the limitation for operations on a VFR flight within the Miami, Houston, and San Juan Oceanic Control Areas (CTA).

3. CHANGE:**OLD****8-1-3. VFR FLIGHT PLANS**

VFR flights in Oceanic FIRs may be conducted in meteorological conditions equal to or greater than those specified in 14 CFR Section 91.155, Basic VFR weather minimums. Operations on a VFR flight plan are permitted only between sunrise and sunset and only within:

a. Miami, Houston, and San Juan Oceanic Control Areas (CTAs) at or below FL 180.

NEW**8-1-3. VFR FLIGHT**

No Change

a. Miami, Houston, and San Juan Oceanic Control Areas (CTAs) below FL 180.

1. PARAGRAPH NUMBER AND TITLE: 9-3-3. VFR-ON-TOP

2. BACKGROUND: The subject paragraph contains language that does not clearly state the intent.

3. CHANGE:**OLD****9-3-3. VFR-ON-TOP**

If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:

a. Inform the pilot to conduct flight "VFR-on-top" at least 500 feet above the upper limit or lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or

NEW**9-3-3. VFR-ON-TOP**

No Change

a. Inform the pilot to conduct flight "VFR-on-top" at least 500 feet above the upper limit or **below the** lower limit of the airspace (subject to para 7-3-1, VFR-on-top); or

