CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Air Traffic Organization Policy

JO 7110.65U
CHG 2

Effective Date:
March 7, 2013

SUBJ: Air Traffic Control

1. Purpose of This Change. This change transmits revised pages to Federal Aviation Administration Order JO 7110.65U, Air Traffic Control, and the Briefing Guide.

2. Audience. This change applies to all Air Traffic Organization (ATO) personnel and anyone using ATO directives.

3. Where Can I Find This Change? This change is available on the FAA Web site at http://faa.gov/air_traffic/publications and https://employees.faa.gov/tools_resources/orders_notices/.

4. Explanation of Policy Change. 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.

5. Distribution. This change 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.

6. Disposition of Transmittal. Retain this transmittal until superseded by a new basic order.

7. Page Control Chart. See the page control chart attachment.

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Vice President, Mission Support Services
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Date January 11, 2013

Distribution: ZAT-710, ZAT-464

Initiated By: AJV-0
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Explanation of Changes
Change 2

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

a. 2–1–6. SAFETY ALERT

This change clarifies the intent and application of Safety Alert procedures while taking into account new technology. Minor reformatting of the paragraph was necessary, including placing the information in subparagraph 2-1-6c (which applies solely to the issuance of a traffic alert) into the correct subparagraph. Examples of the correct phraseology for traffic alert issuance were deemed beneficial for clarity.

b. 2–1–30. "BLUE LIGHTNING" EVENTS

This change adds the requirement to report possible human trafficking incidents to the front line manager. This change cancels and incorporates N JO 7110.583, Human Trafficking Reporting, effective June 18, 2012.

c. 4–5–6. MINIMUM EN ROUTE ALTITUDES

This change provides guidance to air traffic control for using GNSS MEAs on published ATS routes. This change cancels and incorporate N JO 7110.592, Global Navigation Satellite System (GNSS) Minimum En Route Instrument Flight Rules (IFR) Altitude (MEA), effective August 23, 2012.

d. 5–2–17. VALIDATION OF MODE C READOUT
9–2–7. IFR MILITARY TRAINING ROUTES

This change replaces the term "confirm" with "verify" and will avoid potential confusion between pilots and controllers.

e. 5–5–4. MINIMA

This change adds the applicable radar separation minima for an ASR-11 radar when using MSSR. This change cancels and incorporates N JO 7110.594, ASR-11 Minima, effective September 4, 2012.

f. 5–8–2. INITIAL HEADING

This change requires ATC to advise aircraft of the initial waypoint for RNAV SIDs designed to begin at the runway. The pilot is expected to acknowledge the advisory as any other ATC communication. This change cancels and incorporates N JO 7110.595, Initial Heading, effective September 17, 2012.

g. 7–2–1. VISUAL SEPARATION

This change revises the requirement for aircraft to be under control of the same facility in the terminal area when applying visual separation. That requirement is replaced by mandatory letters of agreement or a facility directive to specify local procedures for applying visual separation. The procedures for tower-applied visual separation and pilot-applied visual separation are clarified. This change cancels and incorporates N JO 7110.590, Visual Separation, effective July 20, 2012.

h. 7–4–4. APPROACHES TO MULTIPLE RUNWAYS

This change makes editorial corrections and mandates that aircraft are assigned a heading to intercept the extended runway centerline at an angle not greater than 30 degrees when conducting approaches to runways separated by 4,300 feet or more. This change cancels and incorporates N JO 7110.593, Approaches to Multiple Runways, effective September 28, 2012.

i. APPENDIX A. AIRCRAFT INFORMATION FIXED WING AIRCRAFT

APPENDIX C. AIRCRAFT INFORMATION SPECIFIC HOMEBUILT/EXPERIMENTAL AIRCRAFT

This change updates information on aircraft type designator and/or operational information. This change cancels and incorporates N JO 7110.591, Aircraft Information: Appendices A and C, effective July 2, 2012.

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

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j. Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense missions until the unknown aircraft is identified.

k. Expedite movement of Special Air Mission aircraft when SCOOT is indicated in the remarks section of the flight plan or in air/ground communications.

NOTE–
The term "SCOOT" will not be part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.

REFERENCE–
FAAO JO 7610.4, Para 12–7–1, Applications.

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

NOTE–
Priority handling may be requested by the pilot, or via telephone from CARCAH or the 53rd Weather Reconnaissance Squadron (53WRS) operations center personnel, or in the remarks section of the flight plan.

REFERENCE–
FAAO JO 7110.65, Para 9–2–19, Weather Reconnaissance Flights.

m. IFR aircraft must have priority over SVFR aircraft.

REFERENCE–
FAAO JO 7110.65, Chapter 7, Section 5, Special VFR (SVFR).

n. Providing priority and special handling to expedite the movement of OPEN SKIES observation and demonstration flights.

NOTE–
An OPEN SKIES aircraft has priority over all "regular" air traffic. "Regular" is defined as all aircraft traffic other than:

1. *Emergencies.*

2. *Aircraft directly involved in presidential movement.*

3. *Forces or activities in actual combat.*

4. *Lifeguard, MED EVAC, AIR EVAC and active SAR missions.*

REFERENCE–
FAAO JO 7110.65, Para 9–2–22, OPEN SKIES Treaty Aircraft.
FAAO JO 7210.3, Para 5–3–7, OPEN SKIES Treaty Aircraft.
Treaty on OPEN SKIES, Treaty Document, 102–37.

o. Aircraft operating under the North American Route Program (NRP) and in airspace identified in the High Altitude Redesign (HAR) program, are not subject to route limiting restrictions (e.g., published preferred IFR routes, letter of agreement requirements, standard operating procedures).

REFERENCE–
FAAO JO 7110.65, Para 2–3–2, En Route Data Entries.
FAAO JO 7110.65, Para 2–2–15, North American Route Program (NRP) Information.
FAAO JO 7110.65, Para 4–2–5, Route or Altitude Amendments.
FAAO JO 7210.3, Chapter 17, Section 16, North American Route Program.

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

REFERENCE–
FAAO JO 7210.3, Para 17–4–5, Diversion Recovery.

2–1–5. EXPEDITIOUS COMPLIANCE

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

b. Use the word "expedite" only when prompt compliance is required to avoid the development of an imminent situation. If an "expedite" climb or descent clearance is issued by ATC, and subsequently the altitude to maintain is changed or restated without an expedite instruction, the expedite instruction is canceled.

c. In either case, if time permits, include the reason for this action.

2–1–6. SAFETY ALERT

Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude that, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.

NOTE–
1. *The issuance of a safety alert is a first priority (see para 2–1–2, Duty Priority) once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.*

2. *Recognition of situations of unsafe proximity may result from MSAW/E–MSAW/LAAS, automatic altitude readouts,*

Conflict/Mode C Intruder Alert, observations on a PAR scope, or pilot reports.

3. *Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, will be taken.*

a. Terrain/Obstruction Alert. Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude that, in your judgment, places it in unsafe proximity to terrain and/or obstructions. Issue the alert as follows:

PHRASEOLOGY–
LOW ALTITUDE ALERT (call sign),

CHECK YOUR ALTITUDE IMMEDIATELY.

and, if the aircraft is not yet on final approach,

THE (as appropriate) MEA/MVA/MOCA/MIA IN YOUR AREA IS (altitude),

REFERENCE–
P/CG Term – Final Approach – IFR

b. Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action. When an alternate course of action is given, end the transmission with the word "immediately."

PHRASEOLOGY–
TRAFFIC ALERT (call sign) (position of aircraft) ADVISE YOU TURN LEFT/RIGHT (heading),

and/or

CLIMB/DESCEND (specific altitude if appropriate) IMMEDIATELY.

EXAMPLE–
"Traffic Alert, Cessna Three Four Juliet, advise you turn left immediately."

or

"Traffic Alert, Cessna Three–Four Juliet, advise you turn left and climb immediately."

REFERENCE–
FAAO JO 7110.65, Para 5–14–1, Conflict Alert (CA) and Mode C Intruder (MCI) Alert.
FAAO JO 7110.65, Para 5–14–2, En Route Minimum Safe Altitude Warning (E–MSAW).
FAAO JO 7110.65, Para 5–15–6, CA/MCI.
FAAO JO 7110.65, Para 5–2–23, Altitude Filters.

2–1–7. INFLIGHT EQUIPMENT MALFUNCTIONS

a. When a pilot reports an inflight equipment malfunction, determine the nature and extent of any special handling desired.

NOTE–
Inflight equipment malfunctions include partial or complete failure of equipment, which may affect either safety, separation standards, and/or the ability of the flight to proceed under IFR, or in Reduced Vertical Separation Minimum (RVSM) airspace, in the ATC system. Controllers may expect reports from pilots regarding VOR, TACAN, ADF, GPS, RVSM capability, or low frequency navigation receivers, impairment of air–ground communications capability, or other equipment deemed appropriate by the pilot (e.g., airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from ATC.

b. Provide the maximum assistance possible consistent with equipment, workload, and any special handling requested.

c. Relay to other controllers or facilities who will subsequently handle the aircraft, all pertinent details concerning the aircraft and any special handling required or being provided.

2–1–8. MINIMUM FUEL

If an aircraft declares a state of "minimum fuel," inform any facility to whom control jurisdiction is transferred of the minimum fuel problem and be alert for any occurrence which might delay the aircraft en route.

NOTE–
Use of the term "minimum fuel" indicates recognition by a pilot that his/her fuel supply has reached a state where, upon reaching destination, he/she cannot accept any undue delay. This is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur. A minimum fuel advisory does not imply a need for traffic priority. Common sense and good judgment will determine the extent of assistance to be given in minimum fuel situations. If, at any time, the remaining usable fuel supply suggests the need for traffic priority to ensure a safe landing, the pilot should declare an emergency and report fuel remaining in minutes.

2–1–9. REPORTING ESSENTIAL FLIGHT INFORMATION

Report as soon as possible to the appropriate FSS, airport manager's office, ARTCC, approach control

b. Non–RVSM aircraft transitioning RVSM airspace.

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

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

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

EXAMPLE–
"Point out Baxter21 climbing to FL 360, negative RVSM."

e. For the following situations, use the associated phraseology:

1. To deny clearance into RVSM airspace.

PHRASEOLOGY–
"UNABLE CLEARANCE INTO RVSM AIRSPACE."

2. To request a pilot to report when able to resume RVSM.

PHRASEOLOGY–
"REPORT ABLE TO RESUME RVSM."

f. In the event of a change to an aircraft's navigational capability amend the equipment suffix in order to properly identify non–RVSM aircraft on the controller display.

2–1–29. TERRAIN AWARENESS WARNING SYSTEM (TAWS) ALERTS

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

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

1. The responding aircraft has returned to its assigned altitude, or

2. A crew member informs you that the TAWS maneuver is completed and you observe that standard separation has been reestablished, or

3. The responding aircraft has executed an alternate clearance and you observe that standard separation has been reestablished.

2–1–30. "BLUE LIGHTNING" EVENTS

Ensure that the supervisor/controller–in–charge (CIC) is notified of reports of possible human trafficking. These may be referred to as "Blue Lightning" events.

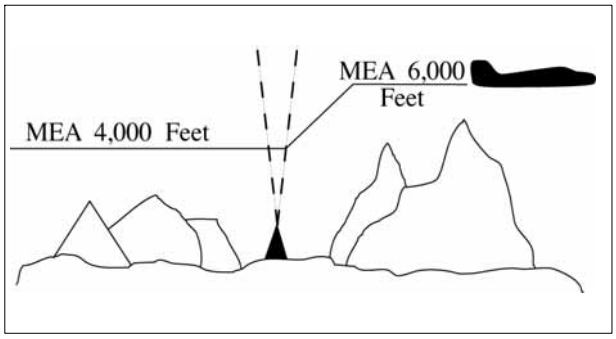
b. An aircraft may be cleared to operate on jet routes below the MEA (but not below the prescribed minimum altitude for IFR operations) or above the maximum authorized altitude if, in either case, radar service is provided.

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 must be cleared to begin climb to the higher MEA as follows:

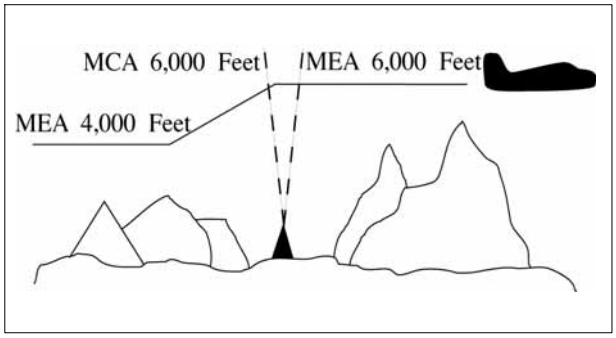
1. If no MCA is specified, prior to or immediately after passing the fix where the higher MEA is designated. (See FIG 4–5–1.)

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. GNSS MEAs may be approved on published ATS routes. Air traffic may assign GNSS MEAs to GNSS–equipped aircraft where established.

NOTE–
On high altitude ATS routes, the GNSS MEA is FL180 unless published higher.

e. 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 must 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 for crossing a specified fix or waypoint; or, specified altitude for crossing a distance (in miles) and direction from a specified fix or waypoint.

PHRASEOLOGY–
CROSS (fix, waypoint) AT (altitude).
CROSS (fix, waypoint) AT OR ABOVE/BELOW (altitude).
CROSS (number of miles) MILES (direction) OF (name of fix, waypoint) AT (altitude).
CROSS (number of miles) MILES (direction) OF (name of 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/descend 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 as prescribed in the AIM, para 4–4–10, Adherence to Clearance, until FL 280. At that point, the pilot is authorized to continue descent to FL 240 within context of the term "at pilot's discretion" as described in the AIM.*

2. *Controllers need to be aware that the descent rates 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 must maintain last assigned altitude until receiving clearance to "descend via."*
4. *Pilots cleared for vertical navigation using the phraseology "descend via" must 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 must 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 must 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).

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

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

PHRASEOLOGY–
VERIFY USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING.

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

VERIFY FLIGHT LEVEL.

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

(a) Instruct the pilot to turn off the altitude-reporting part of his/her transponder and include the reason; and

(b) Notify the operational supervisor-in-charge of the aircraft call sign.

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

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

5–2–18. ALTITUDE CONFIRMATION–MODE C

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

NOTE–
For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

a. The pilot states the assigned altitude, or

b. You assign a new altitude to a climbing or a descending aircraft, or

c. The Mode C readout is valid and indicates that the aircraft is established at the assigned altitude, or

d. *TERMINAL.* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

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

(In climbing/descending situations),

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

VERIFY ASSIGNED ALTITUDE (altitude).

or

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

VERIFY ASSIGNED FLIGHT LEVEL (flight level).

REFERENCE–
FAAO JO 7110.65, Para 5–3–3, Beacon Identification Methods.

5–2–19. ALTITUDE CONFIRMATION–NON–MODE C

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

NOTE–
For the purpose of this paragraph, "initial contact" means a pilot's first radio contact with each sector/position.

1. The pilot states the assigned altitude, or

2. You assign a new altitude to a climbing or a descending aircraft, or

3. *TERMINAL.* The aircraft was transferred to you from another sector/position within your facility (intrafacility).

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

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

b. USA. Reconfirm all pilot altitude read backs.

PHRASEOLOGY–
(If the altitude read back is correct),

AFFIRMATIVE (altitude).

(If the altitude read back is not correct),

NEGATIVE. CLIMB/DESCEND AND MAINTAIN (altitude),

or

NEGATIVE. MAINTAIN (altitude).

REFERENCE–
FAAO JO 7110.65, Para 5–3–3, Beacon Identification Methods.

5–2–20. AUTOMATIC ALTITUDE REPORTING

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

PHRASEOLOGY–
SQUAWK ALTITUDE,

or

STOP ALTITUDE SQUAWK.

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

REFERENCE–
FAAO JO 7110.65, Para 5–2–17, Validation of Mode C Readout.
FAAO JO 7110.65, Para 5–3–3, Beacon Identification Methods.
P/CG Term– Automatic Altitude Report.

5–2–21. INFLIGHT DEVIATIONS FROM TRANSPONDER/MODE C REQUIREMENTS BETWEEN 10,000 FEET AND 18,000 FEET

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

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

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

REFERENCE–
FAAO JO 7210.3, Chapter 19 , Temporary Flight Restrictions.

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

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

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

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

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

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

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

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

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

REFERENCE–
FAAO JO 7110.65, Para 5–3–3, Beacon Identification Methods.

5–2–22. BEACON TERMINATION

Inform an aircraft when you want it to turn off its transponder.

PHRASEOLOGY–

STOP SQUAWK.

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

STOP SQUAWK (mode in use).

REFERENCE–
FAAO JO 7110.65, Para 5–3–3, Beacon Identification Methods.

Section 5. Radar Separation

5–5–1. APPLICATION

a. Radar separation must 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 must be issued when this procedure is used.

NOTE–
This procedure must not be provided utilizing mosaic radar systems.

c. Target resolution must be applied as follows:

1. Between the edges of two primary targets or the edges of primary digitized targets.

2. Between the end of the beacon control slash and the edge of a primary target or primary digitized target.

3. Between the ends of two beacon control slashes.

5–5–4. MINIMA

Separate aircraft by the following minima:

a. *TERMINAL*. Single Sensor ASR or Digital Terminal Automation System (DTAS):

NOTE–
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. For single sensor ASR–9 with Mode S, when less than 60 miles from the antenna– *3 miles*.

4. For single sensor ASR–11 MSSR Beacon, when less than 60 miles from the antenna– *3 miles*.

NOTE–
Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

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 must 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 2,500 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 9−2−13, 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*. When displaying a single site adapted short range or long range radar, and 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/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 15 degrees.

NOTE−
Two aircraft, both assigned radar vectors with an angular difference of at least 15 degrees, is considered a correct application of this paragraph.

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−
1. *Apply en route separation rules when using multisensory radar.*

2. *Although all other approved separation may be discontinued, the requirements of para 5-5-4, Minima, subparas e and f must 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 9–2–13, 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 ½ miles.*

2. When 40 miles or more from the antenna– *2 ½ miles.*

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

(a) Below Flight Level 600– *2 ½ 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 $^1/_2$ 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.*

Section 8. Radar Departures

5–8–1. PROCEDURES

Use standard departure routes and channelized altitudes whenever practical to reduce coordination. Do not, however, assign these routes solely to provide for possible radar or communication failure.

5–8–2. INITIAL HEADING

a. Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.

PHRASEOLOGY–
FLY RUNWAY HEADING.
TURN LEFT/RIGHT, HEADING (degrees).

NOTE–
TERMINAL. A purpose for the heading is not necessary, since pilots operating in a radar environment associate assigned headings with vectors to their planned route of flight.

REFERENCE–
FAAO JO 7110.65, Para 4–3–2 Departure Clearances.
FAAO JO 7110.65, Para 5–6–3 Vectors Below Minimum Altitude.

b. When conducting simultaneous parallel runway departures utilizing RNAV SIDs, advise aircraft of the initial fix/waypoint on the RNAV route.

PHRASEOLOGY–
RNAV to (fix/waypoint), RUNWAY (number), CLEARED FOR TAKEOFF.

EXAMPLE–
"RNAV to MPASS, Runway Two–Six Left, cleared for takeoff."

NOTE–
1. *TERMINAL. A purpose for an initial waypoint advisory is not necessary since pilots associate this advisory with the flight path to their planned route of flight. Pilots must immediately advise ATC if a different RNAV SID is entered in the aircraft FMS.*

2. *The SID transition is not restated as it is contained in the ATC clearance.*

3. *Aircraft cleared via RNAV SIDs designed to begin with a vector to the initial waypoint are assigned a heading before departure.*

REFERENCE–
FAAO JO 7110.65, Para 3-9-9, Takeoff Clearance
FAAO JO 7110.65, Para 4-3-2, Departure Clearances
AIM, Para 5–2–7. Departure Control

5–8–3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

TERMINAL

Separate aircraft departing from the same airport/heliport or adjacent airports/heliports in accordance with the following minima provided radar identification with the aircraft will be established within 1 mile of the takeoff runway end/helipad and courses will diverge by 15 degrees or more.

NOTE–
1. *FAAO 8260.19, Flight Procedures and Airspace, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet above the airport elevation before a turn is commenced. FAAO 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), the ILS missed approach criteria, requires a straight climb of 400 feet be specified where turns greater than 15 degrees are required.*

2. *Consider known aircraft performance characteristics when applying initial separation to successive departing aircraft.*

3. *When one or both of the departure surfaces is a helipad, use the takeoff course of the helicopter as a reference, comparable to the centerline of a runway and the helipad center as the threshold.*

a. Between aircraft departing the same runway/helipad or parallel runways/helicopter takeoff courses separated by less than 2,500 feet– *1 mile* if courses diverge immediately after departure.
(See FIG 5–8–1, FIG 5–8–2, and FIG 5–8–3.)

FIG 5–8–1
Successive Departures

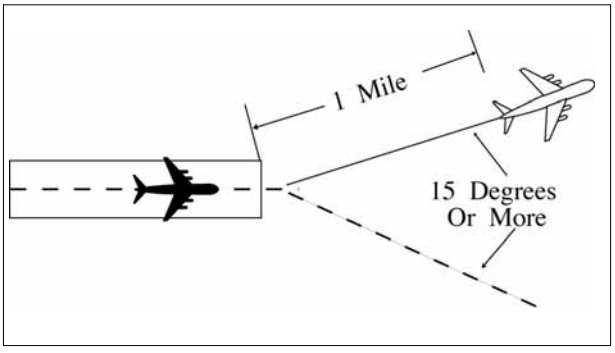


FIG 5–8–2
Simultaneous Departures

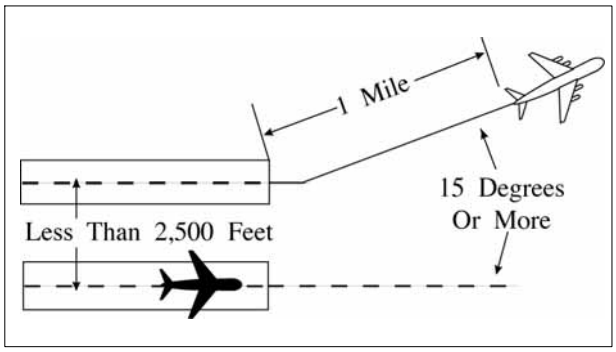
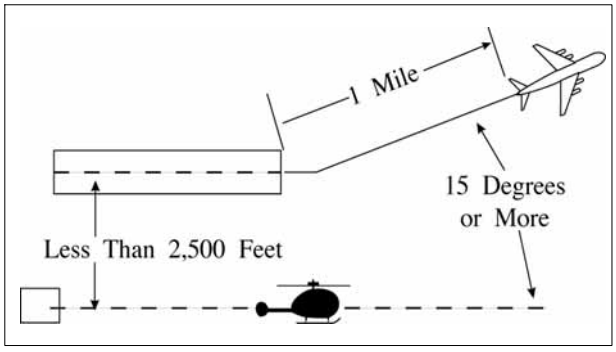


FIG 5–8–3
Simultaneous Departures



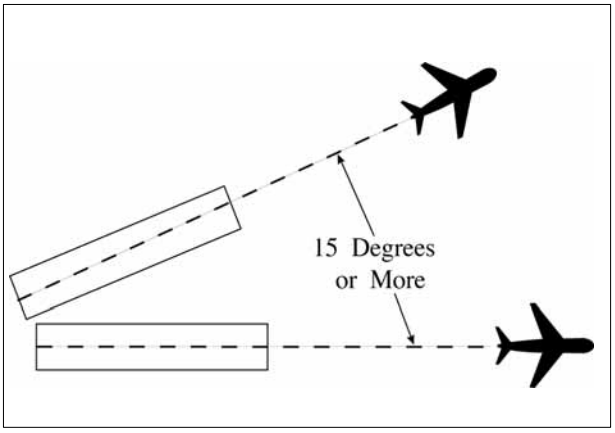
NOTE–
This procedure does not apply when a small aircraft is taking off from an intersection on the same runway behind a large aircraft or when an aircraft is departing behind a heavy jet/B757.

REFERENCE–
FAAO JO 7110.65, Para 3–9–7, Wake Turbulence Separation for Intersection Departures.
FAAO JO 7110.65, Para 3–9–8, Intersecting Runway Separation.
FAAO JO 7110.65, Para 5–5–4, Minima.

b. Between aircraft departing from diverging runways:

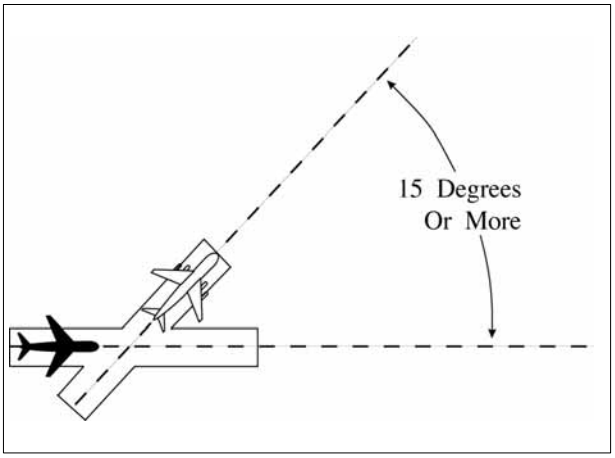
1. Nonintersecting runways. Authorize simultaneous takeoffs if runways diverge by 15 degrees or more. (See FIG 5–8–4.)

FIG 5–8–4
Nonintersecting Runway Departures



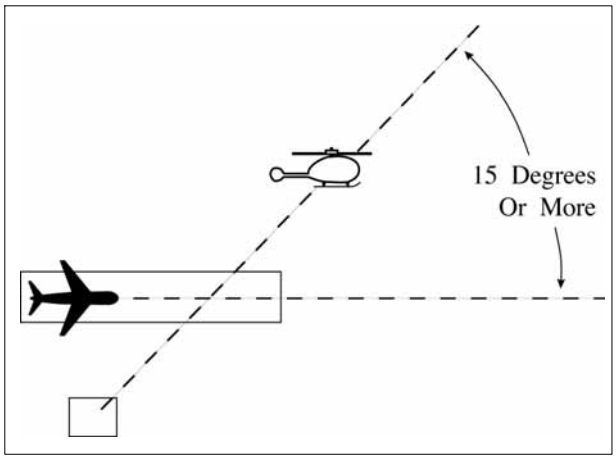
2. Intersecting runways and/or helicopter takeoff courses which diverge by 15 degrees or more. Authorize takeoff of a succeeding aircraft when the preceding aircraft has passed the point of runway and/or takeoff course intersection. When applicable, apply the procedure in para 3–9–5, Anticipating Separation. (See FIG 5–8–5 and FIG 5–8–6.)

FIG 5–8–5
Intersecting Runway Departures



NOTE–
This procedure does not apply when aircraft are departing behind a heavy jet/B757.

FIG 5–8–6
Intersecting Helicopter Course Departures



c. Between aircraft departing in the same direction from parallel runways/helicopter takeoff courses. Authorize simultaneous takeoffs if the centerlines/takeoff courses are separated by at least 2,500 feet and courses diverge by 15 degrees or more immediately after departure. (See FIG 5–8–7 and FIG 5–8–8.)

FIG 5–8–7
Parallel Runway Departures

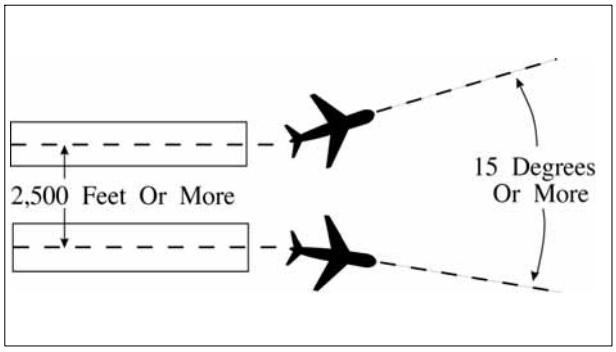
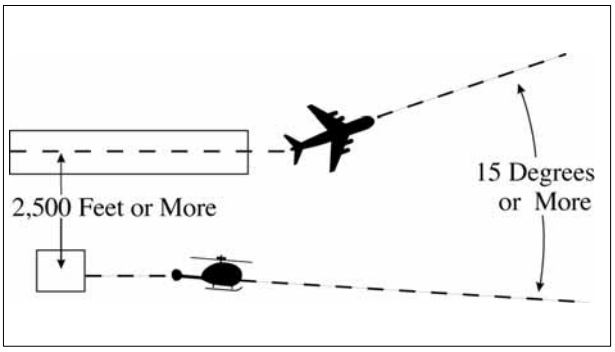


FIG 5–8–8
Parallel Helicopter Course Departures



5–8–4. DEPARTURE AND ARRIVAL

TERMINAL. Except as provided in para 5–8–5, Departures and Arrivals on Parallel or Nonintersecting Diverging Runways, separate a departing aircraft from an arriving aircraft on final approach by a minimum of *2 miles* if separation will increase to a minimum of 3 miles (5 miles when 40 miles or more from the antenna) within 1 minute after takeoff.

NOTE–

1. *This procedure permits a departing aircraft to be released so long as an arriving aircraft is no closer than 2 miles from the runway at the time. This separation is determined at the time the departing aircraft commences takeoff roll.*

2. *Consider the effect surface conditions, such as ice, snow, and other precipitation, may have on known aircraft performance characteristics, and the influence these conditions may have on the pilot's ability to commence takeoff roll in a timely manner.*

5–8–5. DEPARTURES AND ARRIVALS ON PARALLEL OR NONINTERSECTING DIVERGING RUNWAYS

TERMINAL. Authorize simultaneous operations between an aircraft departing on a runway and an aircraft on final approach to another parallel or nonintersecting diverging runway if the departure course diverges immediately by at least 30 degrees from the missed approach course until separation is applied and provided one of the following conditions are met:

NOTE–
When one or both of the takeoff/landing surfaces is a helipad, consider the helicopter takeoff course as the runway centerline and the helipad center as the threshold.

a. When parallel runway thresholds are even, the runway centerlines are at least 2,500 feet apart. (See FIG 5–8–9 and FIG 5–8–10.)

FIG 5–8–9
Parallel Thresholds are Even

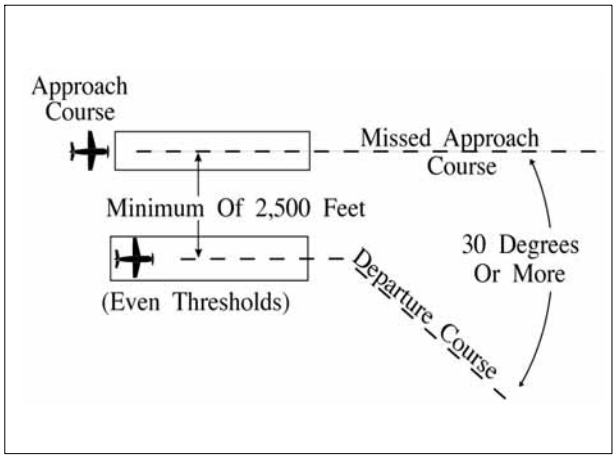
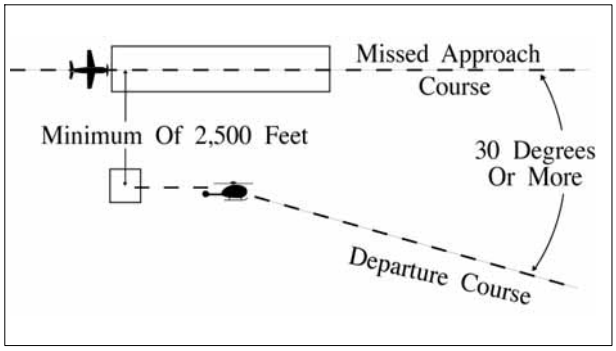


FIG 5–8–10
Parallel Thresholds are Even



b. When parallel runway thresholds are staggered and:

1. The arriving aircraft is approaching the nearer runway: the centerlines are at least 1,000 feet apart and the landing thresholds are staggered at least 500 feet for each 100 feet less than 2,500 the centerlines are separated. (See FIG 5–8–11 and FIG 5–8–12.)

FIG 5–8–11
Parallel Thresholds are Staggered

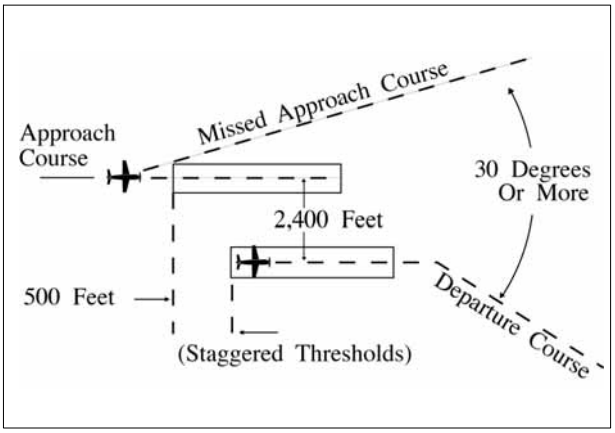
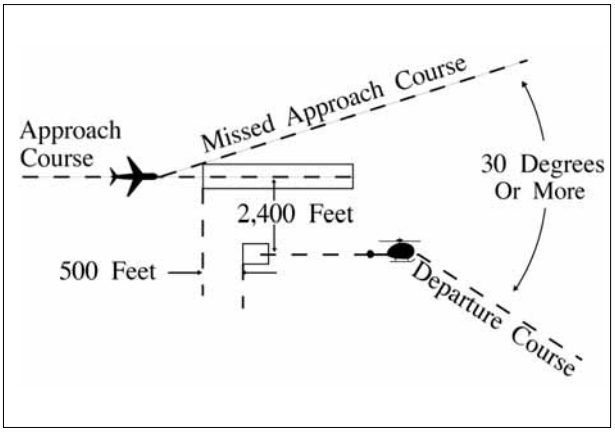


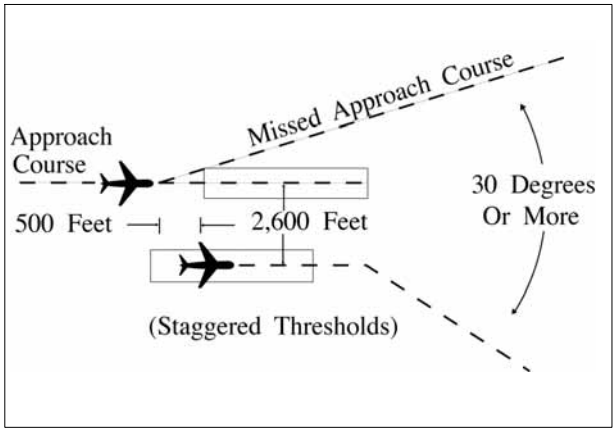
FIG 5–8–12
Parallel Thresholds are Staggered



NOTE–
In the event of a missed approach by a heavy jet/B757, apply the procedures in para 3–9–6, Same Runway Separation, or para 3–9–8, Intersecting Runway Separation, ensure that the heavy jet does not overtake or cross in front of an aircraft departing from the adjacent parallel runway.

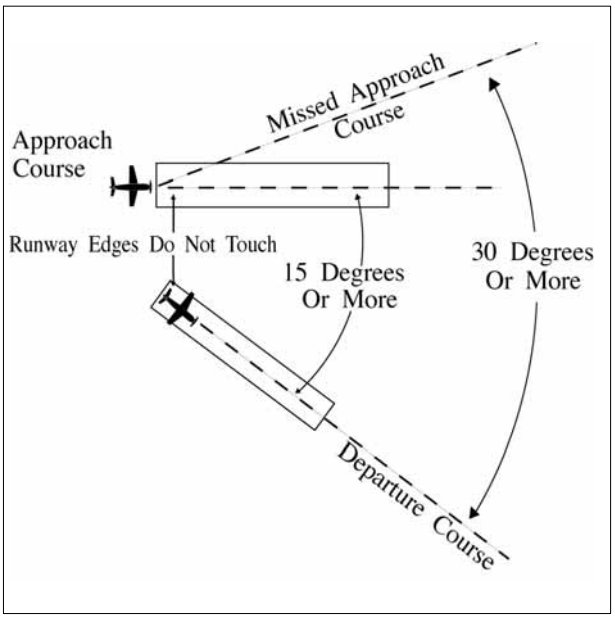
2. The arriving aircraft is approaching the farther runway: the runway centerlines separation exceeds 2,500 feet by at least 100 feet for each 500 feet the landing thresholds are staggered. (See FIG 5–8–13.)

FIG 5–8–13
Parallel Thresholds are Staggered



c. When nonintersecting runways diverge by 15 degrees or more and runway edges do not touch. (See FIG 5–8–14.)

FIG 5–8–14
Diverging Nonintersecting Runways



d. When the aircraft on takeoff is a helicopter, hold the helicopter until visual separation is possible or apply the separation criteria in subparas a, b, or c.

REFERENCE–
FAAO JO 7110.65, Para 5–8–4 Departure and Arrival.

Section 2. Visual Separation

7–2–1. VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist, consider aircraft performance, wake turbulence, closure rate, routes of flight, and known weather conditions. Reported weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

REFERENCE–
FAAO JO 7110.65, Para 2–1–20, Wake Turbulence Cautionary Advisories.
FAAO JO 7110.65, Para 2–1–21, Traffic Advisories.
FAAO JO 7110.65, Para 3–1–9, Use of Tower Radar Displays.
FAAO JO 7110.65, Para 5–9–5, Approach Separation Responsibility.
FAAO JO 7110.65, Para 7–4–1, Visual Approach.
FAAO JO 7110.65, Para 7–4–2, Vectors for Visual Approach.
FAAO JO 7110.65, Para 7–4–4, Approaches to Multiple Runways.
P/CG Term– Visual Approach.
P/CG Term– Visual Separation.

a. TERMINAL. Visual separation may be applied between aircraft up to but not including FL180 under the following conditions:

1. Tower-applied visual separation.

(a) Maintain communication with at least one of the aircraft involved or ensure there is an ability to communicate immediately as prescribed in paragraph 3-9-3, Departure Control Instructions, subparagraph a2.

(b) The tower visually observes the aircraft, issues timely traffic advisories, and maintains visual separation between the aircraft. The use of tower-applied visual separation is not authorized when wake turbulence separation is required.

(c) Issue subsequent control instructions as necessary to ensure continued separation between the applicable aircraft.

NOTE–
Adjacent airports with operating ATCTs are not authorized to apply visual separation between their traffic and the other ATCT's traffic.

2. Pilot-applied visual separation.

(a) Maintain communication with at least one of the aircraft involved and ensure there is an ability to communicate with the other aircraft.

(b) The pilot sees another aircraft and is instructed to maintain visual separation from the aircraft as follows:

(1) Tell the pilot about the other aircraft. Include position, direction, and, unless it is obvious, the other aircraft's intention.

(2) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(3) Instruct the pilot to maintain visual separation from that aircraft.

PHRASEOLOGY–
TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), (intentions and other relevant information).

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION.

(c) If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (the pilot must use that entire phrase), the controller need only "approve" the operation instead of restating the instructions.

PHRASEOLOGY–
APPROVED.

NOTE–
Pilot-applied visual separation between aircraft is achieved when the controller has instructed the pilot to maintain visual separation and the pilot acknowledges or when the controller has approved pilot-initiated visual separation.

REFERENCE–
FAAO JO 7110.65, Para 5-4-5, Transferring Controller Handoff

(d) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

PHRASEOLOGY–
TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

(e) Advise the pilots if the radar targets appear likely to merge.

NOTE–
Issue this advisory in conjunction with the instruction to maintain visual separation, the advisory to the other aircraft of the converging course, or thereafter if the controller subsequently becomes aware that the targets are merging.

EXAMPLE–
"Radar targets appear likely to merge."

b. *TERMINAL*. Control of aircraft maintaining visual separation may be transferred to an adjacent position/sector/facility. Coordination procedures must be specified in an LOA or facility directive.

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

c. *EN ROUTE*. Visual separation may be used up to but not including FL 180 when the following conditions are met:

1. Direct communication is maintained with one of the aircraft involved and there is an ability to communicate with the other.

2. A pilot sees another aircraft and is instructed to maintain visual separation from it as follows:

(a) Tell the pilot about the other aircraft including position, direction and unless it is obvious, the other aircraft's intentions.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

(f) Advise the pilots if either aircraft is a heavy.

(g) Traffic advisories and wake turbulence cautionary advisories must be issued in accordance with para 2–1–20, Wake Turbulence Cautionary Advisories, and para 2–1–21, Traffic Advisories.

(h) If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (the pilot must use that entire phrase), the controller need only "approve" the operation instead of restating the instructions.

PHRASEOLOGY–
TRAFFIC, (clock position and distance), (direction)–BOUND, (type of aircraft), (intentions and other relevant information).

If applicable,

ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION.

If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (pilot must use that entire phrase):

(Call Sign) APPROVED.

If aircraft are on converging courses, advise the other aircraft:

TRAFFIC, (clock position and distance), (direction)–BOUND, (type of aircraft), HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

REFERENCE–
FAAO JO 7110.65, Para 7–4–1 Visual Approach.
FAAO JO 7110.65, Para 7–4–2 Vectors for Visual Approach.

d. Nonapproach control towers may be authorized to provide visual separation between aircraft within surface areas or designated areas provided other separation is assured before and after the application of visual separation. This may be applied by the nonapproach control tower providing the separation or by a pilot visually observing another aircraft and being instructed to maintain visual separation with that aircraft.

PHRASEOLOGY–
VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification),

and for departing aircraft,

(departing/succeeding aircraft) RELEASED YOUR DISCRETION.

NOTE–
Separation of IFR aircraft before and after application of visual separation is an IFR control function (Approach/Departure/En Route). A nonapproach control tower by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation

requirements also apply to VFR aircraft when IFR, Class B, Class C or TRSA separation is prescribed.

REFERENCE–
FAAO JO 7110.65, Para 4–8–1, Practice Approaches.
FAAO JO 7110.65, Para 5–6–1 Application.
FAAO JO 7110.65, Para 7–4–2 Vectors for Visual Approach.
FAAO JO 7110.65, Para 7–6–1 Application.
FAAO JO 7110.65, Para 7–7–1 Application.
FAAO JO 7110.65, Para 7–7–2 Issuance of EFC.
FAAO JO 7110.65, Para 7–7–3 Separation.
FAAO JO 7110.65, Para 7–7–4 Helicopter Traffic.
FAAO JO 7110.65, Para 7–7–5 Altitude Assignments.
FAAO JO 7110.65, Para 7–7–6 Approach Interval.
FAAO JO 7110.65, Para 7–7–7 TRSA Departure Information.
FAAO JO 7110.65, Para 7–8–2 Class C Services.
FAAO JO 7110.65, Para 7–8–3 Separation.
FAAO JO 7110.65, Para 7–8–4 Establishing Two–Way Communications.
FAAO JO 7110.65, Para 7–8–5 Altitude Assignments.
FAAO JO 7110.65, Para 7–8–6 Exceptions.
FAAO JO 7110.65, Para 7–9–1 Application.
FAAO JO 7110.65, Para 7–9–3 Methods.
FAAO JO 7110.65, Para 7–9–4 Separation.
FAAO JO 7110.65, Para 7–9–6 Helicopter Traffic.
FAAO JO 7110.65, Para 7–9–7 Altitude Assignments.

Section 4. Approaches

7–4–1. VISUAL APPROACH

A visual approach is an ATC authorization for an aircraft on an IFR flight plan to proceed visually to the airport of intended landing; it is not an instrument approach procedure. Also, there is no missed approach segment. An aircraft unable to complete a visual approach must be handled as any go-around and appropriate separation must be provided.

REFERENCE–
FAAO JO 7110.65, Para 2–1–20, Wake Turbulence Cautionary Advisories.
FAAO JO 7110.65, Para 3–10–2, Forwarding Approach Information by Nonapproach Control Facilities.
FAAO JO 7110.65, Para 7–2–1, Visual Separation.
FAAO JO 7110.65, Para 7–4–4, Approaches to Multiple Runways.

7–4–2. VECTORS FOR VISUAL APPROACH

A vector for a visual approach may be initiated if the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA and the visibility is 3 miles or greater. At airports without weather reporting service there must be reasonable assurance (e.g. area weather reports, PIREPs, etc.) that descent and flight to the airport can be made visually, and the pilot must be informed that weather information is not available.

PHRASEOLOGY–
(Ident) FLY HEADING OR TURN RIGHT/LEFT HEADING (degrees) VECTOR FOR VISUAL APPROACH TO (airport name).

(If appropriate)

WEATHER NOT AVAILABLE.

NOTE–
At airports where weather information is not available, a pilot request for a visual approach indicates that descent and flight to the airport can be made visually and clear of clouds.

REFERENCE–
FAAO JO 7110.65, Para 5–9–1, Vectors to Final Approach Course.
FAAO JO 7110.65, Para 7–2–1, Visual Separation.
FAAO JO 7110.65, Para 7–4–3, Clearance for Visual Approach.
FAAO JO 7110.65, Para 7–4–4, Approaches to Multiple Runways.
FAAO JO 7110.65, Para 7–6–7, Sequencing.
FAAO JO 7110.65, Para 7–7–3, Separation.

7–4–3. CLEARANCE FOR VISUAL APPROACH

ARTCCs and approach controls may clear aircraft for visual approaches using the following procedures:

NOTE–
Towers may exercise this authority when authorized by a LOA with the facility that provides the IFR service, or by a facility directive at collocated facilities.

a. Controllers may initiate, or pilots may request, a visual approach even when an aircraft is being vectored for an instrument approach and the pilot subsequently reports:

1. The airport or the runway in sight at airports with operating control towers.

2. The airport in sight at airports without a control tower.

b. Resolve potential conflicts with all other aircraft, advise an overtaking aircraft of the distance to the preceding aircraft and speed difference, and ensure that weather conditions at the airport are VFR or that the pilot has been informed that weather is not available for the destination airport. Upon pilot request, advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.

PHRASEOLOGY–
(Call sign) (control instructions as required) CLEARED VISUAL APPROACH RUNWAY (number);

or

(Call sign) (control instructions as required) CLEARED VISUAL APPROACH TO (airport name)

(and if appropriate)

WEATHER NOT AVAILABLE OR VERIFY THAT YOU HAVE THE (airport) WEATHER.

REFERENCE–
FAAO JO 7110.65, Para 7–2–1, Visual Separation.

c. Clear an aircraft for a visual approach when:

1. The aircraft is number one in the approach sequence, or

2. The aircraft is to follow a preceding aircraft and the pilot reports the preceding aircraft in sight and is instructed to follow it, or

NOTE–
The pilot need not report the airport/runway in sight.

3. The pilot reports the airport or runway in sight but not the preceding aircraft. Radar separation must be maintained until visual separation is provided.

d. All aircraft following a heavy jet/B757 must be informed of the airplane manufacturer and/or model.

EXAMPLE–
"Cessna Three Four Juliet, following a Boeing 757, 12 o'clock, six miles."

or

"Cessna Three Four Juliet, following a Seven fifty seven, 12 o'clock, six miles."

REFERENCE–
FAAO JO 7110.65, Para.2–4–21, Description of Aircraft Types.

e. Inform the tower of the aircraft's position prior to communications transfer at controlled airports. ARTS/STARS functions may be used provided a facility directive or LOA specifies control and communication transfer points.

f. In addition to the requirements of para 7–4–2, Vectors for Visual Approach, and subparas a, b, c, d, and e, ensure that the location of the destination airport is provided when the pilot is asked to report the destination airport in sight.

g. In those instances where airports are located in close proximity, also provide the location of the airport that may cause the confusion.

EXAMPLE–
"Cessna Five Six November, Cleveland Burke Lakefront Airport is at 12 o'clock, 5 miles. Cleveland Hopkins Airport is at 1 o'clock 12 miles. Report Cleveland Hopkins in sight."

REFERENCE–
FAAO JO 7110.65, Para 7–4–4 Approaches to Multiple Runways.

7–4–4. APPROACHES TO MULTIPLE RUNWAYS

a. All aircraft must be informed that approaches are being conducted to parallel, intersecting, or converging runways. This may be accomplished through use of the ATIS.

b. When conducting visual approaches to multiple runways ensure the following:

1. Do not permit the respective aircrafts' primary radar targets to touch unless visual separation is being applied.

2. When the aircraft flight paths intersect, ensure standard separation is maintained until visual separation is provided.

c. In addition to the requirements in para 7–2–1, Visual Separation, para 7–4–1, Visual Approach, para 7–4–2, Vectors for Visual Approach, and para 7–4–3, Clearance for Visual Approach, the following conditions apply to visual approaches being conducted simultaneously to parallel, intersecting, and converging runways, as appropriate:

1. Parallel runways separated by less than 2,500 feet. Unless standard separation is provided by ATC, an aircraft must report sighting a preceding aircraft making an approach (instrument or visual) to the adjacent parallel runway. When an aircraft reports another aircraft in sight on the adjacent final approach course and visual separation is applied, controllers must advise the succeeding aircraft to maintain visual separation. However, do not permit a heavy/B757 aircraft to overtake another aircraft. Do not permit a large aircraft to overtake a small aircraft.

2. Parallel runways separated by at least 2,500 feet, but less than 4,300 feet.

(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and one pilot has acknowledged receipt of the visual approach clearance, and the other pilot has acknowledged receipt of the visual or instrument approach clearance.

NOTE–
1. *The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the extended centerline of the runway and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn are factors to be considered when vectoring aircraft to parallel runways.*

2. *Variances between heading assigned to intercept the extended centerline of the runway and aircraft ground track are expected due to the effect of wind and course corrections after completion of the turn and pilot acknowledgment of a visual approach clearance.*

REFERENCE–
FAA Publication, Pilot's Handbook of Aeronautical Knowledge, Chapter 15 "Effect of Wind."

(b) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to other runways, provided the conditions of subpara (a) are met.

(c) Provided aircraft flight paths do not intersect, and when the provisions of subparas (a) and (b) are met, it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

d. Each aircraft must be assigned headings which will allow the aircraft to intercept the extended centerline of the runway at an angle not greater than 30 degrees.

NOTE–
1. *The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the extended centerline of the runway and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn are factors to be considered when vectoring aircraft to parallel runways.*

2. *Variances between heading assigned to intercept the extended centerline of the runway and aircraft ground track are expected due to the effect of wind and course corrections after completion of the turn and pilot acknowledgment of a visual approach clearance.*

REFERENCE–
FAA Publication, Pilot's Handbook of Aeronautical Knowledge, Chapter 15 "Effect of Wind."

1. Parallel runways separated by 4,300 feet or more.

(a) When aircraft flight paths do not intersect, visual approaches may be conducted simultaneously, provided standard separation is maintained until one of the aircraft has been issued and the pilot has acknowledged receipt of the visual approach clearance.

(b) Visual approaches may be conducted to one runway while visual or instrument approaches are conducted simultaneously to other runways, provided the conditions of subpara (a) are met.

(c) Provided the aircraft flight paths do not intersect, when the provisions of subparas (a) and (b) are met, it is not necessary to apply any other type of separation with aircraft on the adjacent final approach course.

2. Intersecting and converging runways. Visual approaches may be conducted simultaneously with visual or instrument approaches to other runways, provided:

(a) Standard separation is maintained until the aircraft conducting the visual approach has been issued and the pilot has acknowledged receipt of the visual approach clearance.

(b) When aircraft flight paths intersect, radar separation must be maintained until visual separation is provided.

NOTE–
Although simultaneous approaches may be conducted to intersecting runways, staggered approaches may be necessary to meet the airport separation requirements specified in para 3–10–4 Intersecting Runway Separation.

REFERENCE–
FAAO 7110.79, Charted Visual Flight Procedures.
FAAO JO 7110.65, Para 7–4–5 Charted Visual Flight Procedures (CVFP). USA/USN Not Applicable.
FAAO JO 7110.65, Para 7–7–3 Separation.

7–4–5. CHARTED VISUAL FLIGHT PROCEDURES (CVFP). USA/USN NOT APPLICABLE

Clear an aircraft for a CVFP only when the following conditions are met:

a. There is an operating control tower.

b. The published name of the CVFP and the landing runway are specified in the approach clearance, the reported ceiling at the airport of intended landing is at least 500 feet above the MVA/MIA, and the visibility is 3 miles or more, unless higher minimums are published for the particular CVFP.

c. When using parallel or intersecting/converging runways, the criteria specified in para 7–4–4, Approaches to Multiple Runways, are applied.

d. An aircraft not following another aircraft on the approach reports sighting a charted visual landmark, or reports sighting a preceding aircraft landing on the same runway and has been instructed to follow that aircraft.

PHRASEOLOGY–
(Ident) CLEARED (name of CVFP) APPROACH.

7–4–6. CONTACT APPROACH

Clear an aircraft for a contact approach only if the following conditions are met:

a. The pilot has requested it.

NOTE–
When executing a contact approach, the pilot is responsible for maintaining the required flight visibility, cloud clearance, and terrain/obstruction clearance. Unless otherwise restricted, the pilot may find it necessary to descend, climb, and/or fly a circuitous route to the airport to maintain cloud clearance and/or terrain/obstruction clearance. It is not in any way intended that controllers will initiate or suggest a contact approach to a pilot.

b. The reported ground visibility is at least 1 statute mile.

c. A standard or special instrument approach procedure has been published and is functioning for the airport of intended landing.

d. Approved separation is applied between aircraft so cleared and other IFR or SVFR aircraft. When applying vertical separation, do not assign a fixed altitude but clear the aircraft at or below an altitude which is at least 1,000 feet below any IFR traffic but not below the minimum safe altitude prescribed in 14 CFR Section 91.119.

NOTE–
14 CFR Section 91.119 specifies the minimum safe altitude to be flown:
(a) Anywhere.
(b) Over congested areas.
(c) Other than congested areas. To provide for an emergency landing in the event of power failure and without undue hazard to persons or property on the surface.
(d) Helicopters. May be operated at less than the minimums prescribed in paras (b) and (c) above if the operation is conducted without hazard to persons or property on the surface.

e. An alternative clearance is issued when weather conditions are such that a contact approach may be impracticable.

PHRASEOLOGY–
CLEARED CONTACT APPROACH,

And if required,
AT OR BELOW (altitude) (routing).

IF NOT POSSIBLE, (alternative procedures), AND ADVISE.

c. If the provisions of subpara a above cannot be accomplished, MTRs may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes must be covered in a letter of agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

NOTE–
For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.

d. The lateral airspace to be protected along an MTR is the designated width of the route.

e. Prior to an aircraft entering an MTR, request the pilot's estimate for the route's exit/alternate exit fix, the pilot's requested altitude after exiting and, if applicable, the number of reentries on a Strategic Training Range (STR).

PHRASEOLOGY–
(Call sign) VERIFY YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,

and if applicable,

THE NUMBER OF REENTRIES.

f. Forward estimates for exit/alternate exit fixes, requested altitude after exit, and, if applicable, the number of reentries on the STR.

g. Apply the procedures of para 6–1–2, Nonreceipt of Position Report, based upon the pilot's estimate for the route exit fix.

h. Clearance may be issued to amend or restrict operations on a route for ATC considerations. Where a route has been designated MARSA in accordance with subpara c, ATC must not amend or restrict operations in such a manner as to compromise MARSA provisions.

NOTE–
When MARSA is provided through route scheduling and circumstances prevent the pilot from entering the route within established time limits, it must be the responsibility of the pilot to inform the ATC facility and advise his/her intentions.

i. If an aircraft on an IR experiences a two-way radio communications failure and you are unable to determine if the aircraft is proceeding VFR in accordance with 14 CFR Section 91.185(b) or the aircraft has not been positively radar identified:

1. Provide separation to the destination airport based on the aircraft complying with the following:

(a) Maintain to the exit/alternate exit fix the higher of the following altitudes:

(1) The minimum IFR altitude for each of the remaining route segment(s) remaining on the route.

(2) The highest altitude assigned in the last ATC clearance.

(b) Depart the exit/alternate exit fix at the appropriate altitude specified in subpara (a) above, then climb/descend to the altitude filed in the flight plan for the remainder of the flight, or

NOTE–
In the event of a two-way communications failure, ATC will be based on the following anticipated pilot action at the exit fix. Unless otherwise covered in a letter of agreement, and if the pilot is unable to comply with the VFR provisions of 14 CFR Section 91.185/FLIP IFR Supplement, the pilot will exercise his/her emergency authority, squawk transponder ***Code 7700****, depart the exit/alternate exit fix and climb/descend (continuing to squawk 7700) to the altitude filed in the flight plan. Subsequent transponder operations will be in accordance with para 10–4–4, Communications Failure. Air traffic controller action from the exit fix is as prescribed in para 10–1–1, Emergency Determinations.*

(c) Proceed in accordance with the lost communication procedure contained in letters of agreement.

2. Continue to monitor the last ATC assigned discrete code.

NOTE–
Pilots who experience a two-way radio failure will adjust their transponder to ***Code 7700*** *during climb/descent to altitude filed for the next leg of the flight plan; then change to* ***Code 7600*** *for a period of 15 minutes. At the end of each 15–minute period, he/she will squawk 7700 for a period of 1 minute; all other times he/she will squawk 7600.*

j. Impose delays, if needed, to eliminate conflict with nonparticipating IFR aircraft when necessary to preclude denial of IR usage. Advise the pilot of the expected length and reason for delay.

9–2–8. INTERCEPTOR OPERATIONS

Provide maximum assistance to expedite the movement of interceptor aircraft on active air defense (scrambles) missions until the unknown aircraft is identified in accordance with the policies and procedures published in FAAO JO 7610.4, Special Operations.

NOTE–
The FAA and the military have mutually agreed to the implementation of policies and procedures for control of air defense interceptor operations. Effective coordination and cooperation between FAA and the military at all levels are essential if policy objectives are to be met.

a. The ADCF initiating the SCRAMBLE must identify the mission as an active air defense mission.

b. ATC services must be used for active air defense missions insofar as the circumstances and situation permits.

c. Upon request, the ATC facility must expedite transfer of the control jurisdiction of the interceptors to the requesting ADCF.

9–2–9. SPECIAL INTEREST SITES

a. Relay immediately to supervisory/CIC personnel any reports or information regarding unusual aircraft activities in the vicinity of special interest sites such as nuclear power plants, power plants, dams, refineries, etc. Supervisory/CIC personnel may also receive reports/information from the Nuclear Regulatory Commission or other sources.

b. Supervisory/CIC personnel must immediately notify local law enforcement authorities of these reports/information as well as notifying the overlying air traffic facility of any of these reports and the action taken.

c. ARTCCs must promptly advise the Domestic Events Network (DEN) of any actions taken in accordance with this paragraph.

9–2–10. WASHINGTON, DC, SPECIAL FLIGHT RULES AREA (DC SFRA)/ATC SECURITY SERVICES

Provide ATC security services at locations where procedures are required for tracking aircraft in security services airspace. ATC security services are designed to support the national security mission of the FAA and other agencies. Two–way radio communications, flight planning, and an operational transponder on an assigned code are required for operations in the designated area.

a. When the assigned code is observed, advise the aircraft to proceed on course/as requested but to remain outside of Class B, C, and/or D airspace as appropriate.

PHRASEOLOGY–
(ACID) TRANSPONDER OBSERVED PROCEED ON COURSE/AS REQUESTED; REMAIN OUTSIDE (class) AIRSPACE.

1. Maintain continuous security tracking of VFR aircraft operating in the designated area to assist security forces in situational awareness. Immediately report all instances of loss of radio communication or the inability to conduct security tracking of an aircraft to the front line manager (FLM)/CIC and wait for instructions.

2. Basic separation services to aircraft, for example, IFR, SVFR, Class B, Class C, TRSA, do not apply to ATC security tracking.

3. Aircraft with operating transponders, but without operating Mode C (altitude), require specific authorization from ATC to operate in the SFRA. ATC must coordinate with the Domestic Events Network (DEN) before approval.

4. Aircraft flying too low for radar coverage must be instructed to report landing or exiting the SFRA. Keep flight progress strips on these aircraft until pilot reports landing or exiting the SFRA. If a flight progress strip does not exist for the aircraft, record the call sign, transponder code, entry point (for example, north, northeast, east), and time of entry into the SFRA.

PHRASEOLOGY–
(Call sign), REPORT LANDING OR LEAVING THE SFRA.

5. United States military, law enforcement, and aeromedical flights are exempt from filing flight plans.

b. Establishing two–way Communications.

1. Pilots must establish two–way radio communications with ATC prior to entering the security service area. Responding to a radio call with, "(a/c call sign) standby," establishes radio communications and the pilot may enter the area, provided all other security requirements have been satisfied.

ADAM AIRCRAFT (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−500, CarbonAero	A500	2P/S			II	

AERMACCHI SpA (Italy)

(Also AGUSTA, SIAI−MARCHETTI)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
AMX	AMX*	1J/S+			III	
FN−333 Riviera***	FN33	1P/S			I	
MB−290TP Redigo	L90	1T/S			I	
MB−326	M326	1J/S			III	
MB−339	M339*	1J/S			III	
SF−205−18F/20F	S05F	1P/S			I	
SF−205−18R/20R/22R	S05R	1P/S			I	
S−208	S208	1P/S			I	
S−211	S211	1J/S			III	
SF−260 A/B/C/D/E/F/M/W, Warrior	F260	1P/S			I	
SF−260TP	F26T	1T/S	1,800	1,100	I	3
SF−600A, SF−600TP Canguero	F600	2T/S	2,100		II	4

AERONCA *(USA− see Bellanca)*

AERO SPACELINES (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Super Guppy, Super Turbine Guppy	SGUP	4T/L	1,500	1,500	III	10

AEROSPATIALE (France)

(Also AEROSPATIALE/AERITALIA, ATR, ALENIA MORANE−SAULNIER, PZL−OKECIE, SOCATA, SUD, SUD−EST, TBM)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
ATR−42−200/300/320	AT43	2T/L	2,000	2,000	III	5
ATR−42−400	AT44	2T/L	2,000	2,000	III	5
ATR−42−500	AT45	2T/L	2,000	2,000	III	5
ATR−72	AT72	2T/L	2,000	2,000	III	6

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Rallye, Rallye Club, Super Rallye, Rallye Commodore, Minerva (MS−880 to 894)	RALL	1P/S	750	750	I	3
SE−210 Caravelle	S210	2J/L	2,300	2,000	III	8
SN−601 Corvette	S601	2J/S+	2,500	2,000	III	5
Tampico TB−9	TAMP	1P/S	600	700	I	2
TBM TB−700	TBM7	1T/S	1,700	1,500	I	5
Tabago TB10C/200	TOBA	1P/S	700	700	I	2
Trinidad TB−20/21	TRIN	1P/S	850	700	I	3

AIRBUS INDUSTRIES (International)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−300B2/4−1/2/100/200, A−300C4−200	A30B	2J/H	3,500	3,500	III	8
A−300B4 – 600	A306	2J/H	3,500	3,500	III	7
A−310 (CC−150 Polaris)	A310	2J/H	3,500	3,500	III	7
A−318	A318	2J/L	3,500	3,500	III	
A−319, ACJ	A319	2J/L	3,500	3,500	III	7
A−320	A320	2J/L	3,500	3,500	III	7
A−321	A321	2J/L	3,500	3,500	III	
A−300ST Super Transporter, Beluga	A3ST	2J/H			III	
A−330−200	A332	2J/H	3,500	3,500	III	8
A−330−300	A333	2J/H			III	8
A−340−200	A342	4J/H	3,500	3,500	III	9
A−340−300	A343	4J/H			III	9
A−340−500	A345	4J/H			III	9
A−340−600	A346	4J/H			III	9
A−380−800	A388	4J/H			III	10

AIRCRAFT HYDRO−FORMING (USA)

(Also BUSHMASTER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Bushmaster 2000	BU20	3P/S+	2,000	2,000	III	2

AIR TRACTOR, INC. (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
AT−300/301/401	AT3P	1P/S	1,000		I	1
AT−302/400/402	AT3T	1T/S			I	
AT−501	AT5P	1P/S			I	
AT−502/503	AT5T	1T/S			I	
AT−602	AT6T	1T/S			I	
AT−802	AT8T	1T/S+			III	

ANTONOV (Russia)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
An−2	AN2	1P/S			I	
An−8	AN8	2T/L			III	
An−12	AN12	4T/L			III	
An−22	AN22	4T/H			III	
An−70	AN70	4T/H			III	
An−74−100/200	AN72	2J/L			III	
An−124 Ruslan	A124	4J/H			III	
An−140	A140	2T/L			III	
An−225 Mriya	A225	6J/H			III	

AVIATION DEVELOPMENT (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Alaskan Bushmaster	ALBU	1P/S			I	

BEAGLE AIRCRAFT (UK)

(Also BEAGLE−AUSTER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−109 Airedale	AIRD	1P/S			I	
B−121 Pup	PUP	1P/S	575	750	I	2
B−125 Bulldog	BDOG	1P/S			I	
B−206 Basset	BASS	2P/S	1,200	1,300	II	8

BEECH AIRCRAFT COMPANY (USA)

(Also CCF, COLEMILL, DINFIA, EXCALIBUR, FUJI, HAMILTON, JETCRAFTERS, RAYTHEON, SWEARINGEN, VOLPAR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
1900 (C−12J)	B190	2T/S+	2,400	2,400	III	7
B300 Super King Air 350	B350	2T/S+	3,000	3,000	III	7
100 King Air (U−21F Ute)	BE10	2T/S	2,250	2,250	II	7
17 Stagger Wing (UC−43 Traveler, YC−43 Traveler)	BE17	1P/S	1,375	1,375	I	2
Twin Beech 18/Super H18	BE18	2P/S	1,400	1,000	II	4
18 (turbine)	B18T	2T/S	2,000	2,000	II	1
19 Musketeer Sport, Sport	BE19	1P/S	680	680	I	1
200, 1300 Super King Air, Commuter (C−12A to F, C−12L/R, UC−12, RC−12, Tp101, Huron)	BE20	2T/S+	2,450	2,500	III	7
23 Musketeer, Sundowner	BE23	1P/S	740	800	I	2
24 Musketeer Super, Sierra	BE24	1P/S	1,000	1,000	I	3
300 Super King Air	BE30	2T/S+	3,000	3,000	III	6
33 Debonair, Bonanza (E−24)	BE33	1P/S	1,000	1,000	I	4
35 Bonanza	BE35	1P/S	1,200	1,200	I	3
36 Bonanza (piston)	BE36	1P/S	1,100	1,100	I	2
36 Bonanza (turbine)	B36T	1/T/S			I	
400 Beechjet, Hawker 400 (T−1 Jayhawk, T−400)	BE40	2J/S+	3,300	2,200	III	8
50 Twin Bonanza (U−8D/E/G, RU−8 Seminole)	BE50	2P/S	1,600	1,600	II	4
55 Baron (T−42 Chochise, C−55, E−20	BE55	2P/S	1,700	1,700	II	6
56 Turbo Baron	BE56	2P/S			II	
58 Baron	BE58	2P/S	1,730	1,730	II	6
60 Duke	BE60	2P/S	1,600	1,600	II	8
65 Queen Air (U−8F Seminole)	BE65	2P/S	1,300	1,300	II	5
70 Queen Air	BE70	2P/S			II	
76 Duchess	BE76	2P/S	1,500	1,500	II	4
77 Skipper	BE77	1P/S	750	750	I	1
80 Queen Air (Zamir)	BE80	2P/S	1,275	1,275	II	
88 Queen Air	BE88	2P/S			II	
95 Travel Air	BE95	2P/S	1,250	1,250	II	5
99 Airliner	BE99	2T/S	1,750	1,750	II	5
90, A90 to E90 King Air (T−44 V−C6)	BE9L	2T/S	2,000	2,000	II	5
F90 King Air	BE9T	2T/S	2,600	2,600	II	7
2000 Starship	STAR	2T/S+	2,650	2,650	III	7
Premier 1, 390	PRM1	2J/S+	3,000	3,000	III	
T34A/B, E−17 Mentor (45)	T34P	1P/S	1,150	1,150	I	1
T−34C Turbo Mentor	T34T	1T/S	1,100	1,000	I	
T−6A Texan II	TEX2*	1T/S			I	
U−21A/G, EU−21, JU−21, RU−21, Ute (A90−1 to 4)	U21	2T/S	2,000	2,000	II	
QU−22 (1074/1079)	U22	1P/S			I	

BELLANCA AIRCRAFT (USA)

(Also AERONCA, CHAMPION, DOWNER, HINDUSTAN, NORTHERN)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Aeronca Chief/Super Chief, Pushpak	AR11	1P/S	500	500	I	1
Aeronca Sedan	AR15	1P/S	500	500	I	2
14 Junior, Cruiseair, Cruiseair Senior Cruisemaster	B14A	1P/S	1,030	1,030	I	1
14 Bellanca 260/A/B/C	B14C	1P/S	1,500		I	
17 Viking, Super Viking, Turbo Viking	BL17	1P/S	1,100	1,100	I	1
19 Skyrocket	BL19	1P/S			I	
8 Decathlon, Scout	BL8	1P/S	1,000	1,000	I	2
Champion Lancer 402	CH40	2P/S	650	1,000	II	
7 ACA/ECA Champ, Citabria,	CH7A	1P/S	750	750	I	1
7 GCBC/KCAB Citabria	CH7B	1P/S	1,100	1,100	I	1
T−250 Aries	T250	1P/S			I	

BOEING COMPANY (USA)

(Also GRUMMAN, IAI, LOCKHEED−BOEING, MCDONNELL DOUGLAS, NORTHROP−GRUMMAN, ROHR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
B−52 Stratofortress	B52	8J/H	3,000	3,000	III	
B747−8	B748	4J/H			III	
707−100 (C−137B)	B701	4J/L	3,500	3,500	III	9
707−300(C−18, C−137C, E−8J−Stars, EC−18, EC−137, KC−137, T−17)	B703	4J/H	3,500	3,500	III	9
717−200	B712	2J/L			III	7
720	B720	4J/L	3,000	3,000	III	9
727−100 (C−22)	B721	3J/L	4,500	4,500	III	7
727−200	B722	3J/L	4,500	4,500	III	7
727−100RE Super 27	R721	3J/L	4,300	4,300	III	
727−200RE Super 27	R722	3J/L	4,300	4,300	III	
737−100	B731	2J/L	3,000	3,000	III	7
737−200 (Surveiller, CT−43, VC−96)	B732	2J/L	3,000	3,000	III	7
737−300	B733	2J/L	5,500	3,500	III	7
737−400	B734	2J/L	6,500	3,500	III	8
737−500	B735	2J/L	5,500	3,500	III	7
737−600	B736	2J/L	4,000	4,000	III	7
737−700, BBJ, C−40	B737	2J/L	4,000	4,000	III	8
737−800, BBJ2	B738	2J/L	4,000	4,000	III	9
737−900	B739	2J/L	4,000	4,000	III	9
747−100	B741	4J/H	3,000	3,000	III	10
747−200 (E−4, VC−25)	B742	4J/H	3,000	3,000	III	10
747−300	B743	4J/H	3,000	3,000	III	10
747−400 (Domestic, no winglets)	B74D	4J/H	3,000	3,000	III	
747−400 (International, winglets)	B744	4J/H	3,000	3,000	III	10

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
747−400LCF Dreamlifter	BLCF	4J/H			III	
747SCA Shuttle Carrier	BSCA	4J/H			III	
747SR	B74R	4J/H	3,000	3,000	III	10
747SP	B74S	4J/H	3,000	3,000	III	9
757−200 (C−32)	B752	2J/L	3,500	2,500	III	7
757−300	B753	2J/L	3,500	2,500	III	8
767−200	B762	2J/H	3,500	3,500	III	9
767−300	B763	2J/H	3,500	3,500	III	9
767−400	B764	2J/H	3,500	3,500	III	9
777−200, 777−200ER	B772	2J/H	2,500	2,500	III	9
777−200LRF, B777−F	B77L	2J.H			III	9
777−300	B773	2J/H	2,500	2,500	III	9
777−300ER	B77W	2J/H			III	
787−3 Dreamliner, Dreamliner (Srs. 3)	B783	2J/H			III	
787−8 Dreamliner, Dreamliner (Srs. 8)	B788	2J/H			III	
787−9 Dreamliner, Dreamliner (Srs. 9)	B789	2J/H			III	
C−135B/C/E/K Stratolifter (EC−135, NKC−135, OC−135, TC−135, WC−135)	C135	4J/H	2,000	2,000	III	
C−17 Globemaster 3	C17	4J/H			III	
C−97 Stratofreighter	C97	4P/L	2,500	3,000	III	
KC 135D/E Stratotanker (TF33 engines)	K35E	4J/H	5,000	3,000	III	
KC 135R/T, C−135FR, Stratotanker (CFM56 engines)	K35R	4J/H	5,000	3,000	III	
KE−3	KE3	4J/H	3,500	3,500	III	
RC−135	R135	4J/H	3,000	3,000	III	
E−3A (TF33), E−B/C, JE−3, Sentry	E3TF	4J/H	3,500	4,000	III	
E−3A (CFM56), E−3D/F, Sentry	E3CF	4J/H			III	
E6 Mercury	E6	4J/H	3,500	3,500	III	
E−767	E767	2J/H	2,500	2,500	III	
75 Kaydet (PT−13, PT−17, PT−18, PT−27, N2S)	ST75	1P/S	840	840	I	

BOMBARDIER (Canada)

(Also CANADAIR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
BD−100 Challenger 300	CL30	2J/S+	3,500	3,500	III	7
BD−700 Global 5000	GL5T	2J/L	3,500	3,500	III	7
BD−700 Global Express, Sentinel	GLEX	2J/L			III	7

BRITISH AEROSPACE (BAe) (UK)

(Also AIL, AVRO, BAC, BUCURESTI, DE HAVILLAND, HANDLEY–PAGE, HAWKER–SIDDELEY, JETSTREAM, KANPUR, MCDONNELL–DOUGLAS, RAYTHEON, SCOTTISH–AVIATION, VOLPAR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
BAe 748 (Andover, C–91)	A748	2T/L	2,500	2,000	III	5
ATP Advance Turboprop (ATP)	ATP	2T/L	3,000	3,000	III	6
BAC–111 One–Eleven	BA11	2J/L	2,400	2,400	III	7
BAC–167 Strikemaster	JPRO	1J/S			III	
BAe HS 125 Series 1/2/3/400/600	H25A	2J/S+	2,500	2,000	III	6
BAe–125–700/800 (C–29, U–125)	H25B	2J/S+	3,000	4,000	III	7
BAe–125–1000	H25C	2J/S+	3,000	4,000	III	7
BAe–146–100 Statesman	B461	4J/L	3,500	3,500	III	7
BAe–146–200 Quiet Trader, Statesman	B462	4J/L	3,500	3,500	III	7
BAe–146–300	B463	4J/L			III	7
BAe–3100 Jetstream 31 (T.Mk.3)	JS31	2T/S+	2200	2200	III	5
BAe–3200 Jetstream Super 31	JS32	2T/S+	2600	2600	III	5
BAe–4100 Jetstream 41	JS41	2T/S+	2200		III	7
Harrier, Sea Harrier	HAR*	1J/L	5,000	8,000	III	
Hawk, T–45 Goshawk, CT–155 Hawk	HAWK	1J/S+			III	
Jetstream 1	JS1	2T/S+	2,200	2,200	III	
Jetstream 3	JS3	2T/S+	2,200	2,300	III	
Jetstream 200	JS20	2T/S+	2,200	2,200	III	
Nimrod	NIM	4J/L			III	
RJ–70	RJ70	4J/L			III	7
RJ–85	RJ85	4J/L			III	7
RJ–100	RJ1H	4J/L			III	7
Tornado	TOR	2J/L			III	

BRITTEN NORMAN LTD. (A subsidiary of Pilatus Aircraft LTD.) (UK)

(Also AVIONS FAIREY, BAC, BUCURESTI, DE HAVILLAND, HAWKER–SIDDELEY, IRMA, PADC, ROMAERO, VICKERS)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
BN–2, BN–2A/B Islander, Defender, Maritime Defender	BN2P	2P/S	1,250	1,250	II	1
BN–2T Turbine Islander, Turbine Defender	BN2T	2T/S	1,500	1,500	II	1
BN–2A Mk3 Trislander	TRIS	3P/S	1,200	1,000	III	2
VC–10	VC10	4J/H	1,900	2,000	III	
Viscount	VISC	4T/L	1,200	1,500	III	10

BUSHMASTER AIRCRAFT CORP. (USA—*see Aircraft Hydro Forming*)

CAMAIR AIRCRAFT CORP. (USA)

(Also RILEY, TEMCO)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
480 Twin Navion 480	TNAV	2P/S	1,800	2,000	II	

CANADAIR BOMBARDIER LTD. (Canada)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
CL−41 Tutor (CT−114)	CL41	1J/S			III	
CL−44 Forty Four	CL44	4T/L			III	
CL−44−O Guppy	CL4G	4T/L			III	
CL−66, CV−580 (CC−109 Cosmopolitan)	CVLT	2T/L	1,500	1,500	III	7
CL−600/Challenger 699/601/604 (CC−144, CE−144)	CL60	2J/L	2,250	3,000	III	8
CL−600 Regional Jet CRJ−100, RJ−100	CRJ1	2J/L			III	7
CL−600, Regional Jet CRJ−200, RJ−200	CRJ2	2J/L			III	7
CL−600 Regional Jet CRJ−700	CRJ7	2J/L			III	7
CL−600 Regional Jet CRJ−900	CRJ9	2J/L			III	8
T−33, CT−133 Silver Star (CL−30)	T33	1J/L	2,000	2,000	III	

CESSNA AIRCRAFT COMPANY (USA)

(Also AVIONES−COLOMBIA, COLEMILL, DINFIA, ECTOR, FMA, FUJI, REIMS, RILEY, SUMMIT, WREN)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−37 Dragonfly (318D/E), OA−37	A37*	2J/S	3,370	3,000	III	
120	C120	1P/S	640	640	I	1
140	C140	1P/S	640	640	I	3
150, A150, Commuter, Aerobat	C150	1P/S	670	1,000	I	1
152, A152, Aerobat	C152	1P/S	750	1,000	I	1
170	C170	1P/S	690	1,000	I	4
172, P172, R172, Skyhawk, Hawk XP, Cutlass (T−41, Mescalero)	C172	1P/S	650	1,000	I	1
172RG, Cutlass RG	C72R	1P/S	650	1,000	I	1
175, Skylark	C175	1P/S	850	1,000	I	2
177, Cardinal	C177	1P/S	850	1,000	I	2
177, Cardinal RG	C77R	1P/S	850	1,000	I	2
180, Skywagon 180 (U−17C)	C180	1P/S	1,130	1,130	I	2
182, Skylane	C182	1P/S	890	1,000	I	2
R182, TR182 (Turbo) Skylane RG	C82R	1P/S	890	1,000	I	2
185, A185 Skywagon, Skywagon 185, AgCarryall (U−17A/B)	C185	1P/S	1,000	1,000	I	2

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
188, A188, T188 AgWagon, AgPickup AgTruck, AgHusky	C188	1P/S	1,000	1,000	I	1
190	C190	1P/S	1,090	1,090	I	2
195 (LC−126)	C195	1P/S	1,200	1,200	I	
205	C205	1P/S	965	1,000	I	3
206, P206m T206m TP206, U206, TU206, (Turbo) Super Skywagon, (Turbo) Super Skyland, (Turbo) Skywagon 206, (Turbo) Stationair, Turbo Stationair 6	C206	1P/S	975	1,000	I	2
206 (turbine)	C06T	1/T/S			I	
207 (Turbo) Skywagon 207, (Turbo) Stationair 7/8	C207	1P/S	810	1,000	I	2
207 (turbine)	C07T	1T/S			I	
208 Caravan 1, (Super) Cargomaster, Grand Caravan (C−98, U27)	C208	1T/S	1,400	1,400	I	3
210, T210, (Turbo) Centurion	C210	1P/S	900	1,000	I	2
P210 Pressurized Centurion	P210	1P/S	1,000	1,000	I	
P210 (turbine)	C10T	1T/S			I	
T303 Crusader	C303	2P/S	3,500	3,000	II	2
310, T310 (U−3, L−27)	C310	2P/S	2,800	2,000	II	4
320 (Executive) Skyknight	C320	2P/S	2,900	2,000	II	5
335	C335	2P/S	2,200	2,000	II	4
336 Skymaster	C336	2P/S	1,340	1,340	II	
337, M337, MC337, T337B/C/D/E/F/H (Turbo) Super Skymaster (O−2)	C337	2P/S	1,250	1,500	II	3
T337G, P337 Pressurized Skymaster	P337	2P/S	1,250	1,500	II	3
340	C340	2P/S	2,900	2,000	II	4
350, Corvalis, Columbia 300/350, LC40/42	COL3	1P/S			I	
400, Corvalis TT, Columbia 400, LC 41	COL4	1P/S			I	
401, 402, Utililiner, Businessliner	C402	2P/S	2,500	2,000	II	3
402 (turbine)	C02T	2T/S			II	
404 Titan	C404	2P/S	2,600	2,000	II	5
404 (turbine)	C04T	2T/S			II	
F406 Caravan 2, Vigilant	F406	2T/S	1,850		II	6
411	C411	2P/S	2,800	2,000	II	4
414, Chancellor 414	C414	2P/S	2,300	2,000	II	6
414 (turbine)	C14T	2T/S			II	
421, Golden Eagle, Executive Commuter	C421	2P/S			II	6
421 (turbine)	C21T	2T/S			II	
425, Corsair, Conquest 1	C425	2T/S	3,500	2,500	II	5
441 Conquest, Conquest 2	C441	2T/S	4,200	3,000	II	6
5000 Citation, Citation 1	C500	2J/S	3,100	3,500	III	6
501 Citation 1SP	C501	2J/S	4,300	3,000	III	6
525 Citationjet Citation CJ1	C525	2J/S	3,000		III	7

525A Citation CJ2	C25A	2J/S	3,870		III	
525B Citation CJ3	C25B	2J/S+			III	
526 Citationjet	C526	2J/S	3,000		III	

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
550, S550, 552 Citation 2/S2/Bravo (T−47, U−20)	C550	2J/S+	5,300	3,000	III	7
551 Citation 2SP	C551	2J/S	5,300	3,000	III	5
560 Citation 5/5 Ultra/5Ultra Encore (UC−35, OT−47, TR−20)	C560	2J/S+	6,000	3,500	III	8
650 Citation 3/6/7	C650	2J/S+	3,900	4,000	III	8
680 Citation Sovereign	C680	2J/S+			III	
750 Citation 10	C750	2J/S+	3,500	3,500	III	9
AW	CAW	1P/S			I	
O−1, TO−1, OE, L−19, TL−19 Bird Dog (305,321)	O1	1P/S	1,150	1,150	I	
T37 (318A/B/C)	T37*	2J/S	3,000	3,000	III	
T−50 Bobcat (AT−8, AT−17, UC−78, Crane)	T50	2P/S			II	
DC−6	CDC6	1P/S			I	
C−34/37/38/145/165, Airmaster	CMAS	1P/S			I	

CHAMPION *(USA−see Bellanca Aircraft)*

CHRISTEN INDUSTRIES, INC. (USA)

(Also AVIAT)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−1 Huskey	HUSK	1P/S	1,500	1,500	I	

CIRRUS (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
SR−20, SR−20 SRV, SRV	SR20	1P/S			I	1
SR−22	SR22	1P/S			I	1
VK−30 Cirrus	VK3P	1P/S			I	

COLEMILL (USA) *(See BEECH, PIPER, CESSNA)*

CONSTRUCCIONES AERONAUTICAS (CASA) (Spain)

(Also NURTANIO, NUSANTARA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
C−212 Aviocar (T−12, TE−12, TR−12, D−3, Tp89)	C212	2T/S+	900	900	III	5

CURTISS–WRIGHT CORP. (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
C–46 Commando (CW–20)	C46	2P/L	600	700	III	

DASSAULT–BREGUET (France)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
1150 Atlantic, Altantique 2	ATLA	2T/L			III	
Alpha Jet	AJET	2J/S+			III	
Falcon 7X	FA7X	3J/L			III	
Falcon 10/100, Mystere 10/100	FA10	2J/S+	2,300	1,600	III	8
Falcon 20/100, Mystere 20/200, Gardian (HU–25, (T–11, TM–11)	FA20	2J/S+	2,000	2,200	III	7
Falcon 50, Mystere 50 (T–16)	FA50	3J/S+	1,800	1,600	III	8
Falcon 900, Mystere 900 (T–18)	F900	3J/L	2,000	1,700	III	8
Falcon 2000	F2TH	2J/S+	2,500	1,500	III	8
Jaguar	JAGR	2J/S+			III	
Mirage 2000, Vajara	MIR2	1J/S+			III	
Mirage 3/5/50 (F–103)	MIRA	1J/S+			III	
Mirage F1 (C–14, CE–14)	MRF1	1J/S+			III	
Super Etendard	ETAR	1J/S+			III	

DEHAVILLAND (Canada/UK)

(Also AIRTECH, HAWKER–SIDDELEY, OGMA, RILEY, SCENIC)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
DHC–1	DHC1	1P/S	900	1,000	I	1
DHC–2 Mk1 Beaver (U–6, L–20)	DHC2	1P/S	840	1,000	I	2
DHC–2 Mk3 Turbo Beaver	DH2T	1T/S	1,220	1,000	I	2
DHC–3 Otter (U–1, NU–1, UC)	DHC3	1P/S	750	1,000	I	1
DHC–3 Turbo Otter	DH3T	1T/S			I	
DHC–4 Caribou (C–7, CV–2)	DHC4	2P/S+	1,350	1,000	III	5
DHC–5 (C–8, CV–7, CC–115, C–115)	DHC5	2T/L	2,000	1,500	III	1
DHC–6 Twin Otter (UV–18, CC–138)	DHC6	2T/S	1,600	1,800	II	4
DHC–7 Dash 7 (O–5, EO–5)	DHC7	4T/L	4,000	4,000	III	2
DHC8 – 100 Dash 8 (E–9, CT–142, CC–142)	DH8A	2T/L	1,500	1,500	III	4
DHC8 – 200 Dash 8	DH8B	2T/L	1,500	1,500	III	4
DHC8 – 300 Dash 8	DH8C	2T/L	1,500	1,500	III	5
DHC8 – 400 Dash 8	DH8D	2T/L	2,500	2,500	III	6
DH–104 Dove, Sea Devon	DOVE	2P/S	1,420	1,420	II	4
DH–114 Heron	HERN	4P/S+	1,075	1,075	III	8

DIAMOND (Canada)

(Also HOAC)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
DA−20/22, DV−20 Katana, Speed Katana	DV20	1P/S	525	500	I	2
DA−42 TwinStar	DA42	2P/S	1,100	500	II	2

DORNIER GmbH (FRG)

(Also CASA, HINDUSTAN. Also see FAIRCHILD−DORNIER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
228	D228	2T/S+	2,000	2,000	III	2
328	D328	2T/S+	2,000	2,000	III	7
27	DO27	1P/S	700	800	I	1
Do 28 A/B (Agur)	DO28	2P/S	1,500	1,500	II	
Do 28D/D−1/D−2, 128−2 Skyservant	D28D	2P/S	1,000	–	II	1
Do−28D−6, 128−6 Turbo Skyservant	D28T	2T/S	1,500	–	II	1

ECLIPSE AVIATION (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Eclipse 500	EA50	2J/S	1,725	3,000	III	4

EMBRAER (Brazil)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
CBA−123 Vector	VECT	2T/S+			III	
EMB−110/111 Bandeirante (C−95, EC−95, P−95, R−95, SC−95)	E110	2T/S+	1,500	1,500	III	7
EMB−120 Brasilia (VC−97)	E120	2T/S+	2,300	2,300	III	7
EMB−121 Xingu (VU−9, EC−9)	E121	2T/S+			III	
EMB−135, ERJ−135/140	E135	2J/L	2,410	2,030	III	7
EMB−145, ERJ−145 (R−99)	E145	2J/L	2,350	2,190	III	7
EMB−145XR	E45X	2J/L			III	7
EMB−170/175	E170	2J/L			III	7
EMB−190/195	E190	2J/L			III	7
EMB−500, Phenom 100	E50P	2J/S			III	
EMB−505, Phenom 300	E55P	2J/S+			III	

EXTRA (FRG)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
200	E200	1P/S	1,000	1,000	I	
230	E230	1P/S	1,500	1,500	I	
300, 350	E300	1P/S	2,500	1,500	I	
400	E400	1P/S	1,500	1,500	I	
500	E500	1T/S	1,800	1,800	I	

FAIRCHILD DORNIER (USA/FRG)

(Also CONAIR, FAIRCHILD–HILLER, FLEET, FOKKER, KAISER, PILATUS, SWEARINGEN)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
228	D228	2T/S+	2,000	2,000	III	
328	D328	2T/S+	2,000	2,000	III	7
328JET, Envoy 3	J328	2J/S+			III	6
728JET, Envoy 7	J728	2J/L			III	

FAIRCHILD INDUSTRIES (USA)

(Also CONAIR, FAIRCHILD–HILLER, FLEET, FOKKER, KAISER, PILATUS, SWEARINGEN)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A–10, OA–10 Thunderbolt 2	A10*	2J/L	6,000	5,000	III	
C–119, R4Q Flying Box Car (F–78)	C119	2P/L	750	750	III	5
C–123 Provider	C123	2P/L	890	1,000	III	
F–27, FH–227	F27	2T/L	3,000	3,000	III	5
M–62 (PT–19/23/26, T–19 Cornell)	FA62	1P/S	650	650	I	
Pilatus/Peacemaker/Porter	PC6P	1P/S	580	600	I	
PC–6 Heli–Porter	PC6T	1T/S	580	600	I	
Merlin 2	SW2	2T/S	2,350	2,500	II	6
SA–226TB, SA–227TT Merlin 3, Fairchild 300	SW3	2T/S+	2,350	2,500	III	5
SA–226AC, SA–227AC/AT Metro, Merlin 4, Expediter	SW4	2T/S+	2,400	2,500	III	5

FOKKER BV (Netherlands)

(Also FAIRCHILD, FAIRCHILD–HILLER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
F–27 Friendship, Troopship, Maritime (C–31, D–2)	F27	2T/L	3,000	3,000	III	
F–28, Fellowship	F28	2J/L	4,650	2,000	III	7
50, Maritime Enforcer	F50	2T/L	3,500	3,500	III	3
60	F60	2T/L	3,500	3,500	III	
70	F70	2J/L	4,500	3,000	III	
100	F100	2J/L	3,500	3,500	III	7

GAF (Australia)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
N2/22/24 Nomad, Floatmaster, Missionmaster, Searchmaster	NOMA	2T/S	1,300	1,100	II	2

GATES LEARJET CORP. (USA)

(Also LEAR JET, LEARJET, SHIN MEIWA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
23	LJ23	2J/S	4,500	4,000	III	8
24	LJ24	2J/S+	4,500	4,000	III	7
25	LJ25	2J/S+	4,500	4,000	III	9
28, 29	LJ28	2J/S+	4,500	4,000	III	7
31	LJ31	2J/S+	4,500	4,000	III	7
35, 36 (C−21, RC−35, RC−36, U−36)	LJ35	2J/S+	4,500	4,000	III	9
40	LJ40	2J/S+			III	
45	LJ45	2J/S+			III	
55	LJ55	2J/S+	5,000	4,000	III	8
60	LJ60	2J/S+	5,000	4,000	III	10

GENERAL DYNAMICS CORP. (USA)

(Also BOEING CANADA, CANADAIR, CANADIAN VICKERS, CONSOLIDATED, CONVAIR, FOKKER, GRUMMAN, KELOWNA, LOCKHEED, LOCKHEED MARTIN, MITSUBISHI, SABCA, SAMSUNG, TUSAS)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Canso/Catalina***	CAT	2P/S+	600	600	III	7
Convair 240/340/440, Liner, HC−131	CVLP	2P/L	1,000	800	III	7
Convair 540/580/600/640	CVLT	2T/L	1,500	1,500	III	7
F−111, EF−111, (RF−111 Aardvark, Raven	F111*	2J/L	5,000	5,000	III	
F−16 A/B/C/D/N, NF−16, TF−16 Fighting Falcon, Netz, Barak, Brakeet	F16*	1J/L	8,000	5,000	III	
F−16XL Fighting Falcon	F16X*	1J/L			III	
Valiant	VALI	1P/S	600	750	I	

GREAT LAKES (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
2T−1 Sport Trainer, Sport	G2T1	1P/S	1,000	800	I	

GROB (FRG)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
G109 Ranger (Vigilant)	G109	1P/S	600	600	I	2
G115 A/B/C/D/E, Bavarian (Heron), Tutoa	G115	1P/S	1,200	1,100	I	
G–120	G120	1P/S	1,280		I	

GRUMMAN AEROSPACE CORP. (USA)

(Also AERO MOD, AMERICAN GENERAL, GRUMMAN AMERICAN, GULFSTREAM AMERICAN MID–CONTINENT, NORTHROP GRUMMAN, SERV–AERO)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A–6, EA–6, KA–6 Intruder, Prowler (G–128)	A6*	2J/L	7,500	5,000	III	
AA1 Trainer,Tr2, T–Cat, Lynx	AA1	1P/S	850	1,250	I	1
AA–5, Traveller, Cheetah Tiger	AA5	1P/S	660	1,000	I	1
C–1, TF Trader (G–96)	G96	2P/S+			III	
C–2 Greyhound	C2	2T/L	1,000	2,200	III	
E–2, TE–2, Hawkeye, Daya	E2	2T/L	2,690	3,000	III	
F–3F (G–11/32), Replica	F3F	1P/S			I	
F–6F Hellcat (G–50)	HCAT	1P/S+			III	
F–7F Tigercat (G–51)	TCAT	2P/S+			III	
F–9F Panther (G–79)	F9F	1JS+			III	
F–14 Tomcat	F14*	2J/L	6,000	4,000	III	
G–164 Ag–Cat, Super Ag–Cat	G164	1P/S	1,500	1,500	I	1
G164 Turbo Ag–Cat	G64T	1T/S	1,500	1,500	I	1
G–21 A/38/39 Goose (JRF)***	G21	2P/S	1,000	1,000	II	
G–44 Widgeon (J4F)***	G44	2P/S	1,000	1,500	II	5
G–73 Mallard***	G73	2P/S+	1,600	1,600	III	6
G–73T Turbo Mallard***	G73T	2T/S+			III	
G–1159, G–1159B Gulfstream 2/2B/2SP (C–20J, VC–111)	GLF2	2J/L	5,000	4,000	III	8
GA–7 Cougar	GA7	2P/S	1,600	1,500	II	1
HU–16, SA–16, UF Albatross (G–64/111)***	U16	2P/S+	1,500	1,500	III	4
OV–1, RV–1, AO–1 Mohawk (G–134)	V1	2T/S+	2,100	1,300	III	
S–2, S2F, P–16 Tracker (G–89)	S2P	2P/S+			III	
S–2 Turbo Tracker	S2T	2T/S+			III	
X–29 (712)	X29	1J/S+			III	

GULFSTREAM AEROSPACE CORP. (USA)

(Also GRUMMAN, GRUMMAN AMERICAN, GULFSTREAM, GULFSTREAM AMERICAN, IAI)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
690 Jetprop Commander 840/900	AC90	2T/S	2,500	2,500	II	
695 Jetprop Commander 980/1000	AC95	2T/S	2,500	2,500	II	6
AA–1 T–Cat, Lynx	AA1	1P/S	850	1,250	I	

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
AA−5 Traveler, Cheetah, Tiger	AA5	1P/S	660	1,000	I	
GA−7 Cougar	GA7	2P/S	1,600	1,500	II	
GAC 159−C, Gulfstream 1	G159	2T/S+	2,000	2,000	III	7
G−1159, G−1159B/TT, Gulfstream 2/2B/2SP/2TT	GLF2	2J/L	5,000	4,000	III	8
G−1159A Gulfstream 3/SRA−1, SMA−3 (C20A/B/C/D/E)	GLF3	2J/L	5,000	4,000	III	8
G−1159C Gulfstream 300/4/4SP/ 400/SRA−4 (C−20F/G/H, S102, Tp102, U−4)	GLF4	2J/L	5,000	4,000	III	8
G−1159D Gulfstream 5/500/550 (C−37)	GLF5	2J/L	5,000	4,000	III	7

HAMILTON AVIATION (USA)

(Also VOLPAR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Westwind 2/3	B18T	2T/S	2,000	2,000	II	1
Little Liner	BE18	2P/S	1,400	1,000	II	4
T−28 Nomair	T28	1P/S	2,500	2,500	III	

HANDLEY PAGE (UK)

(Also BRITISH AEROSPACE, JETSTREAM, SCOTTISH AVIATION, VOLPAR)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
HP−137 Jetstream 1	JS1	2T/S+	2,200	2,200	III	
HP−137 Jetstream 200 (T.Mk1/2)	JS20	2T/S+	2,200	2,200	III	

HELIO AIRCRAFT COMPANY (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
H−391/392/395/250/295/700/800, HT−295 Courier, Strato−Courier, Super Courier (U−10)	COUR	1P/S	850	1,000	I	1
HST−550 Stallion (AU−24)	STLN	1T/S	2,200	2,200	I	1
H−500 Twin Courier (U−5)	TCOU	2P/S	1,250	1,500	II	1

HFB (FRG)

(Also MBB)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
HFB−320 Hansa	HF20	2J/S+	4,500	4,500	III	7

HOWARD (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
250, 350	L18	2P/L	1,800	2,000	III	8
DGA−15 (GH Nightingale, NH)	DG15	1P/S	1,000	1,000	I	

IAI (Israel)

(Also ISRAEL AIRCRAFT INDUSTRIES, ASTRA, GULFSTREAM)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
101 Avara, 102, 201, 202	ARVA	2T/S+	1,300	1,000	III	5
1123 Westwind	WW23	2J/S+	4,000	3,500	III	7
1124 Westwind	WW24	2J/S+	4,000	3,500	III	7
1125 Gulfstream 100, (C−38)	ASTR	2J/S+	4,000	3,500	III	7
1126 Gulfstream 200	GALX	2J/S+			III	
Gulfstream 150	G150	2J/S+			III	

ILYUSHIN (Russia)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−50, Be−976	A50	4J/H			III	
Il−14	IL14	2P/S+			III	
Il−18/20/22/24, Bizon, Zebra	IL18	4T/L			III	
Il−28	IL28	2J/L			III	
Il−38	IL38	4T/L			III	
IL−62	IL62	4J/H	3,500	2,500	III	
IL−76/78/82, Gajaraj	IL76	4J/H	3,000	2,500	III	
Il−86/87	IL86	4J/H			III	
Il−96	IL96	4J/H			III	
Il−103	I103	1P/S			I	
Il−114	I114	2T/L			III	

JETSTREAM (UK – see British Aerospace)

LAKE AIRCRAFT (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
LA−250/270 (Turbo) Renegade, Seawolf, SeaFury***	LA25	1P/S	700	700	I	2
LA−4/200, Buccaneer***	LA4	1P/S	1,100	1,000	I	2

LOCKHEED CORP. (USA)

(Also AERITALIA, CANADAIR, FIAT, FOKKER, HOWARD, LEAR, LOCKHEED–BOEING, LOCKHEED–MARTIN, MBB, MESSERSCHMITT, MITSUBISHI, PACAERO, ROCKWELL, SABCA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
B–34, PV Venture, Harpoon (L–15/137/237)	L37	2P/S+			III	
C–5 Galaxy (L–500)	C5	4J/H	2,500	2,000	III	
C–130A/B/E/F/H, CC–130, DC–130, EC–130/E/G/H/Q, HC–130, JC–130, KC–130B/F/H/R/T, LC–130, MC–130, NC–130, RC–130, TC–130, VC–130, WC–130E/H, T–10, TK–10, TL–10, Tp84 Hercules, Spectre, Aya, Karnaf, Sapeer (L–100/182/282/382)	C130	4T/L	1,500	1,500	III	
C–141 Starlifter (L–300)	C141	4J/H	3,500	3,000	III	
L–049/749/1049 Constellation, Super Constellation, Starliner (C–121, RC–121, EC–121, VC–121, WV, R7V, Warning Star)	CONI	4P/L	1,700	1,700	III	9
F–22 Raptor (L–645)	F22*	2J/L			III	
F–104, RF–104, TF–104 Starfighter (L583/683)	F104*	1J/L	5,000	4,000	III	
F–117 Nighthawk	F117*	2J/L			III	
L–1011 Tri–Star (all series)	L101	3J/H	3,500	3,000	III	9
L–18 Lodestar (C–56/57/59/60, R50, XR50)	L18	2P/S	1,800	2,000	III	8
L–188 Electra	L188	4T/L	1,850	2,000	III	7
L–1329 Jetstar 6/8	L29A	4J/L	4,000	3,500	III	8
L–1329–5 Jetstar 2/731	L29B	4J/L	4,000	3,000	III	9
P–2D to H, SP–2, P2V Neptune (L–426/726/826)	P2	2P/L			III	
P–3, AP–3, EP–3, NP–3, RP–3, TP–3, UP–3, VP–3, WP–3, CP–140 Orion, Aurora, Arcturus (L–85/285/685/785)	P3	4T/L	1,850	2,000	III	
P–38, F–5 Lightning (L–222/322/422)	P38	2P/S+			III	
S–3, ES–3, US–3 Viking (L–394)	S3	2J/L	2,000	2,000	III	
SR–71 Blackbird	SR71	2J/L			III	
T–33, AT–33, NT–33, RT–33 Shooting Star, T–Bird (L–580)	T33*	2J/L	2,000	2,000	III	
U–2, ER–2	U2*	1J/S+	6,000	6,000	III	

MARTIN COMPANY (USA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
404	M404	2P/L	1,600	1,500	III	3
B–26 Marauder (179)	B26M	2P/S+			III	
WB–57 (272)	WB57	2J/L			III	

MAULE AIRCRAFT CORP. (USA)

(Also SAASA)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
M−4 Bee Dee, Jetasen, Rocket, Astro Rocket, Strata Rocket	M4	1P/S	1,000	1,000	I	1
M−5, Strata Rocket, Lunar Rocket, Patroller	M5	1P/S	1,000	1,000	I	1
M−6 Super−Rocket	M6	1P/S	1,500	1,000	I	1
M−7−235/260, MT−7−235/260, MX−7−160/180/235, MXT−7−160/180 Super Rocket, Star Rocket, Comet, Star Craft, Orion, Sportplane	M7	1P/S	825		I	1
M−7−420, MT−7−240, MX−7−420, MXT−7−420 Star Craft	M7T	1T/S	4,500		I	1
M−8	M8	1P/S			I	

MCDONNELL−DOUGLAS CORP. (USA)

(Also ASTA, BOEING, DOUGLAS, GAF, LISUNOV, MITSUBISHI, ON MARK, SHANGHAI, VALMET)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Skywarrior	A3*	2J/L	5,000	6,000	III	
A−4, OA−4, TA−4 Skyhawk	A4*	1J/S+	5,000	5,000	III	
Invader	B26	2P/L	1,000	1,000	III	
YC−15	C15	4J/L			III	
C−17 Globemaster 3	C17	4J/H			III	
DC−10 (KC−10 Extender, KDC−10, MD−10)	DC10	3J/H	2,400	2,000	III	9
Skytrain (C−47, C−53, C−117 A/B/C, R4D 1 to 7)	DC3	2P/S+	1,200	1,200	III	
Super DC−3 (C−117D, R4D 8)	DC3S	2P/S+	1,330	1,330	III	8
Skymaster	DC4	4P/L	2,300	2,300	III	7
DC−6/B Liftmaster	DC6	4P/L	1,000	1,000	III	7
DC−7/B/C Seven Seas	DC7	4P/L	1,250	1,250	III	8
DC−8−50, Jet Trader	DC85	4J/H	4,000	4,000	III	9
DC−8−60	DC86	4J/H	4,000	4,000	III	
DC−8−70	DC87	4J/H	5,000	4,000	III	9
DC−9−10	DC91	2J/L	3,000	3,000	III	8
DC−9−20	DC92	2J/L	3,000	3,000	III	8
DC−9−30 (C−9, VC−9, Nightingale, Skytrain 2)	DC93	2J/L	3,000	3,000	III	8
DC−9−40	DC94	2J/L	3,000	3,000	III	8
DC−9−50	DC95	2J/L	3,000	3,000	III	8
F−15 Eagle, Baz, Akef, Ra'am	F15*	2J/L	8,000	5,000	III	
FA−18, CF−18, CF−188, EF−18, C−15, CE−15, AF−18, ATF−18 Hornet, Super Hornet	F18*	2J/L	8,000	6,000	III	
F−4, RF−4, QF−4 Phantom 2/2000, Kurnass	F4*	2J/L	8,000	6,000	III	

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
MD−11	MD11	3J/H			III	9
MD−81	MD81	2J/L	3,500	3,000	III	7
MD−82	MD82	2J/L	3,500	3,000	III	7
MD−83	MD83	2J/L	3,500	3,000	III	8
MD−87	MD87	2J/L	3,500	3,000	III	7
MD−88	MD88	2J/L	3,500	3,000	III	8
MD−90	MD90	2J/L			III	8

MESSERSCHMITT (FRG)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Bf−108 Taifun	ME08	1P/S	400	500	I	1
Bf−109	ME09	1P/S			I	
Me−262, Replica	ME62	2J/S+			III	

MESSERSCHMITT−BOLKOW (FRG)

(Also BOLKOW, HFB, NORD, SIAT)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
223 Flamingo	S223	1P/S			I	
BO−209 Monsun	B209	1P/S	1,100	1,100	I	4

MITSUBISHI AIRCRAFT INTERNATIONAL INC. (USA/Japan)

(Also BEECH, RAYTHEON)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A6M Zero	ZERO	1P/S			I	
F−1	F1	2J/S+			III	
F−2	F2	1J/L	8,000	5,000	III	
F−86 Sabre	F86*	IJ/S+	4,000	4,000	III	
MU−2, Marquise, Solitaire (LR−1)	MU2	2T/S	3,500	3,000	II	6
MU−300 Diamond	MU30	2J/S+	3,500	4,000	III	7
T−2	MT2	2J/S+			III	

MOONEY AIRCRAFT CORP. (USA)

(Also AEROSTAR, ALON)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
A−2 Aircoupe	ERCO	1P/S	630	630	I	2
M−10 Cadet	M10	1P/S	800	800	I	1
M−18 Mite, Wee Scotsman	MITE	1P/S	750	750	I	1
M−20, M−20/A/B/C/D/E/F/G/J/L/R/S, Mark 21, Allegro, Eagle, Ranger, Master, Super 21, Chaparral, Executive, Statesman, Ovation, 201, 202, 205, 220, ATS, MSE, PFM (nonturbocharged engine)	M20P	1P/S	1,000	1,000	I	4
M−20K/M, Encore, Bravo, 231, 252, TLS, TSE (turbocharged engine)	M20T	1P/S	1,500	1,200	I	6
M−22, Mustang	M22	1P/S	1,300	1,300	I	3

MUDRY (France)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
CAP−10	CP10	1P/S	1,500	2,000	I	4
CAP−20	CP20	1P/S	1,500	2,000	I	4
CAP−21	CP21	1P/S			I	
CAP−230/231/232	CP23	1P/S			I	
D−140 Mousquetaire	D140	1P/S			I	

NAMC (Japan)

(Also MITSUBISHI)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
YS−11	YS11	2T/L	1,500	1,500	III	6

NAVION (USA)

(Also CAMAIR, RILEY, TEMCO)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Rangemaster	RANG	1P/S	1,250	1,500	I	1

NOORDYUN AVIATION LTD. (Canada)

(Also CCF)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Norseman Mk 4/5/6	NORS	1P/S	700	1,000	I	2

NORD (France)

(Also AEROSPATIALE, HOLSTE, NORDFLUG, TRANSALL)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Transall C−160	C160	2T/L	2,000	2,000	III	
260 Super Broussard	N260	2T/S+	2,500	2,000	III	
262, Frégate, Mohawk 298	N262	2T/S+	2,500	2,000	III	
1000, 1001, 1002 Pingouin	ME08	1P/S	400	500	I	1
1101, 1102, Noralpha, Ramier	N110	1P/S			I	
1200 to 1204 Norecrin	N120	1P/S			I	
2501 to 2508 Noratlas	NORA	2P/L	1,500	1,500	III	
3202	N320	1P/S			I	
3400	N340	1P/S			I	
SV−4	SV4	1P/S			I	

NORTHERN AVIATION *(USA−see Bellanca)*

NORTHROP CORP. (USA)

(Also CANADAIR, CASA, AIDC, F+W EMMEN, KOREAN AIR, NORTHROP GRUMMAN)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
B−2 Spirit	B2	4J/H			III	
C−125 Raider	C125	3P/L			III	
E−2 Hawkeye	E2	2T/L	2,690	3,000	III	
F−5, RF−5 Freedom Fighter, Tiger 2, Tigereye (N−156C/F)	F5*	2J/S+	8,000	5,000	III	
P−61 Black Widow	P61	2P/S+			III	
T−38, AT−38 Talon (N−156T)	T38*	2J/S+	8,000	5,000	III	

PARTENAVIA (Italy)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
AP−68TP−300 Spartacus	P68T	2T/S	1,500	1,500	II	3
AP−68TP−600 Viator	VTOR	2T/S	1,500	1,500	II	8
P−57 Fachiro 2	P57	1P/S			I	
P−64/66 Oscar, Charlie	OSCR	1P/S	800	1,000	I	2
P68,Victor, Observer	P68	2P/S	1,200	1,000	II	3

PIAGGIO (Industrie Aeronautiche E Meccaniche Rinaldo Piaggio SpA) (Italy)

(Also PIAGGIO–DOUGLAS, TRECKER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
P–136***	P136	2P/S	1,250	1,500	II	4
P–148	P148	1P/S			I	
P–149	P149	1P/S			I	
P–166, P–166A/B/C/DL2/M/S, Portofino, Albatross	P66P	2P/S	1,350	1,500	II	3
P–166DL3/DP1	P66T	2T/S			II	
P–180 Avanti	P180	2T/S			II	1

PILATUS FLUGZEUGWERKE AG (Switzerland)

(Also FAIRCHILD, FAIRCHILD–HILLER)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
P–2	PP2	1P/S			I	
P–3	PP3	1P/S			I	
PC–6 Porter	PC6P	1P/S	600	600	I	
PC–6A/B/C Turbo Porter (UV–20 Chiricahua)	PC6T	1T/S	1,250	1,500	I	
PC–7 Turbo Trainer (AT–92, Astra)	PC7	1T/S	2,800		I	1
PC–9, Hudurnik	PC9	1T/S			I	
PC–12, Eagle	PC12	1T/S	1,900		I	4

PIPER AIRCRAFT CORP. (USA)

(Also AEROSTAR, AICSA, CHINCUL, COLEMILL, EMBRAER, INDAER CHILE, JOHNSTON, MACHEN, MILLER, NIEVA, SCHAFER, SEGUIN, PZL–MIELEC, TED SMITH, WAGAERO)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
AP–60, Aerostar	AEST	2P/S	1,500	1,500	II	5
J–2 Cub	J2	1P/S	500	500	I	1
J–3 Cub (L–4, NE)	J3	1P/S	500	500	I	1
J–4 Cub Coupe	J4	1P/S	500	500	I	1
J–5 Cub Cruiser (L–14, AE)	J5	1P/S	500	500	I	1
PA–11 Cub Special (L–18B)	PA11	1P/S	500	500	I	1
PA–12 Super Cruiser	PA12	1P/S	600	600	I	1
PA–14 Family Cruiser	PA14	1P/S	600	600	I	1
PA–15 Vagabond	PA15	1P/S	500	500	I	1
PA–16 Clipper	PA16	1P/S	500	500	I	1
PA–17 Vagabond, Vagabond Trainer	PA17	1P/S	500	500	I	1
PA–18 Super Cub (L–18C, L–21, U–7)	PA18	1P/S	1,000	1,000	I	1
PA–20 Pacer	PA20	1P/S	850	1,000	I	1
PA–22 Tri–Pacer, Caribbean, Colt	PA22	1P/S	1,000	1,000	I	2
PA–23–150/160 Apache	PA23	2P/S	1,050	1,000	II	2
PA–24 Comanche	PA24	1P/S	900	1,000	I	4
Model	**Type Designator**	**Description**	**Performance Information**			

		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
PA−25 Pawnee	PA25	1P/S	650	650	I	1
PA−23−235/250 Aztec, Turbo Aztec (U−11, E−19, UC−26)	PA27	2P/S	1,500	1,500	II	3
PA−28−140/150/151/ 160/161/180/181Archer, Cadet, Cherokee, Cherokee Archer/ Challenger/Chief/Cruiser/Flite Liner/ Warrior	P28A	1P/S	750	1,000	I	1
PA−28−201T/235/236 Cherokee, Cherokee Charger/Pathfinder, Dakota, Turbo Dakota	P28B	1P/S	900	1,000	I	3
PA−28R−1802/3, Turbo Arrow 3/200/201 Cherokee Arrow, Arrow	P28R	1P/S	750	1,000	I	3
PA−28RT Arrow 4, Turbo Arrow 4	P28T	1P/S	900	1,000	I	2
PA−30/39 Twin Comanche, Twin Comanche CR, Turbo Twin Comanche	PA30	2P/S	1,500	1,500	II	1
PA−31/31P Navajo, Navajo Chieftain, Chieftain, Pressurized Navajo, Mohave, T−1020	PA31	2P/S	1,500	1,500	II	2
PA−32 Cherokee Six, Six, Saratoga, Turbo Saratoga, 6, 6XT	PA32	1P/S	850	1,000	I	3
PA−32R Cherokee Lance, Lance, Saratoga SP/2 HP/2TC, Turbo Saratoga SP	P32R	1P/S	850	1,000	I	3
PA−32RT Lance 2, Turbo Lance 2	P32T	1P/S	850	1,000	I	4
PA−34 Seneca	PA34	2P/S	1,300	1,300	II	7
PA−36 Pawnee Brave	PA36	1P/S	800	1,000	I	2
PA−38 Tomahawk	PA38	1P/S	750	750	I	3
PA−44, Seminole, Turbo Seminole	PA44	2P/S	1,100	1,000	II	2
PA−46 310P/350P Malibu, Malibu Mirage	PA46	1P/S	1,000	1,000	I	4
PA−46−500TP Malibu Meridian	P46T	1T/S	1,500	1,500	I	4
PA−31T3−500 T−1040	PAT4	2T/S	1,300	1,200	II	
PA−31T1−500 Cheyenne 1	PAY1	2T/S	2,200	2,000	II	5
PA−31T−620.T2−620 Cheyenne, Cheyenne 2	PAY2	2T/S	2,400	2,000	II	2
PA−42−720 Cheyenne 3	PAY3	2T/S	2,400	2,000	II	8
PA−42−1000 Cheyenne 400	PAY4	2T/S	2,500	2,000	II	4
PA−28R−300 Pillán	PILL	1P/S	750	1,000	I	
108 Voyager, Station Wagon 108	S108	1P/S	800	800	I	2

PITTS AEROBATICS (Manufactured by Christen Industries, Inc.)(USA)

(Also AEROTEK, AVIAT, CHRISTEN, KIMBALL)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
S−1 Special	PTS1	1P/S	1,500	1,500	I	
S−1−11 Super Stinker	PTSS	1P/S			I	
S−2 Special	PTS2	1P/S	1,500	1,500	I	
S−12 Macho Stinker, Super Stinker	PTMS	1P/S			I	

RAYTHEON (See BEECH)

ROBIN (France)

(Also APEX)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
R−1180 Aiglon	R100	1P/S			I	
R−2100/2112/2120/2160, Alpha, Alpha Sport, Super Club	R200	1P/S			I	
R−300/3000/3100/3120/3140	R300	1P/S			I	

ROCKWELL INTERNATIONAL CORP. (USA)

(Also AERO COMMANDER, CANADAIR, CCF, COMMANDER, COMMONWEALTH, GULFSTREAM, HAMILTON, MITSUBISHI, NOORDUYN, NORTH AMERICAN PACAERO, NORTH AMERICAN ROCKWELL, PACIFIC AIRMOTIVE, ROCKWELL, RYAN, SUD, TUSCO)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
100 Commander 100	VO10	1P/S	850	850	I	1
112, 114 Commander 112/114, Alpine Commander, Gran Turismo Commander	AC11	1P/S	1,000	1,200	I	2
200 Commander 200	M200	1P/S	1,400	1,000	I	1
500 Shrike Commander	AC50	2P/S	1,340	1,500	II	3
Commander 520	AC52	2P/S	1,340	1,500	II	1
560 Commander 560	AC56	2P/S	1,400	1,500	II	4
680F, 680FP, Commander 680F/680FP	AC68	2P/S	1,375	1,375	II	5
680FL, Grand Commander, Commander 685	AC6L	2P/S	1,250	1,250	II	6
720 Alti−Cruiser	AC72	2P/S	1,300	1,300	II	4
680T, 680V Turbo Commander	AC80	2T/S	2,000	1,500	II	4
690 Turbo Commander 690, Jetprop Commander 840	AC90	2T/S	2,500	2,500	II	6
695 Jetprop Commander 980/1000	AC95	2T/S	2,500	2,500	II	6
700, 710 Commander 700/710	RC70	2P/S			II	
AC−130 Spectre	C130	4T/L	1,500	1,500	III	
B−1 Lancer	B1*	4J/H	3,000	5,000	III	
Mitchell	B25	2P/L	980	980	III	
Sabre	F86*	1J/L	4,000	4,000	III	

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Jet Commander 1121	JCOM	2J/S+	5,000	4,500	III	9
Lark 100 Commander	LARK	1P/S	700	1,000	I	1
Navion NA 145/154	NAVI	1P/S	750	600	I	2
Mustang	P51	1P/S	2,500	2,500	III	
NA−265 Sabre 40/60/65	SBR1	2J/S+	4,000	3,500	III	
NA−265 Sabre 75/80	SBR2	2J/S+			III	
OV−10 Bronco	V10	2T/S	2,000	2,500	II	
S−2 Thrush Commander	SS2P	1P/S			I	
Super Sabre F−100	SSAB	1J/L	4,000	4,000	III	
T−2 Buckeye	T2*	2J/L	5,700	6,000	III	
Trojan, Nomair, Nomad	T28	1P/S	2,500	2,500	III	
Texan, Harvard	T6	1P/S	800	800	I	2
Darter 100	VO10	1P/S	850	850	I	

RUSCHMEYER (FRG)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
R−90−230FG	R90F	1P/S	1,000	1,000	I	
R−90−230RG, MF−85	R90R	1P/S	1,000	1,000	I	
R−90−420AT	R90T	1T/S	1,100	1,100	I	

SAAB (Sweden/USA)

(Also SAAB−FAIRCHILD)

Model	Type Designator	Description	Performance Information			
		Number & Type Engines/ Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
29 (J29)	SB29	1J/S			III	
32 Lansen (J32)	SB32	1J/S+			III	
35 Draken (J35, Sk35, F−35, RF−35, TF−35)	SB35	1J/S+			III	
37 Viggen (AJ37, AJS37, JA37, SP37, SH37, Sk37)	SB37	1J/S+			III	
39 Gripen (JAS39)	SB39	1J/S+			III	
91 Safir (Sk50)	SB91	1J/S			III	
105 (Sk60)	SB05	2J/S			III	
340	SF34	2T/L	2,000	2,000	III	5
2000	SB20	2T/L			III	
MFI−15/17 Safari, Supporter (T−17)	MF17	1P/S			I	

Appendix C. Aircraft Information Specific Amateur−Built/Experimental Aircraft

Amateur−Built and Experimental Aircraft*

Designator Criteria	Type Designator	Performance Information**		
		Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.
Aircraft with cruise (indicated) airspeeds of 100 knots or less	HXA	500	500	I
Aircraft with cruise (indicated) airspeeds of greater than 100 knots, up to and including 200 knots	HXB	750	750	I
Aircraft with cruise (indicated) airspeeds greater than 200 knots	HXC	1,000	1,000	I

NOTE−
**Configuration diversity and the fact that airworthiness certificates are issued to aircraft builders, vice manufacturers, necessitates the assignment of generic aircraft type designators based on cruise performance, rather than specific manufacturer and normal descriptive/performance information.*

***All performance criteria has been estimated because configuration diversity precludes determining precise aircraft−specificinformation.*

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:
GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) [ICAO]
GLOBAL NAVIGATION SATELLITE SYSTEM MINIMUM EN ROUTE IFR ALTITUDE (GNSS MEA)

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

G

GATE HOLD PROCEDURES– Procedures at selected airports to hold aircraft at the gate or other ground location whenever departure delays exceed or are anticipated to exceed 15 minutes. The sequence for departure will be maintained in accordance with initial call-up unless modified by flow control restrictions. Pilots should monitor the ground control/clearance delivery frequency for engine start/taxi advisories or new proposed start/taxi time if the delay changes.

GBT–
(See GROUND–BASED TRANSCEIVER.)

GCA–
(See GROUND CONTROLLED APPROACH.)

GDP–
(See GROUND DELAY PROGRAM.)

GENERAL AVIATION– That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators.
(See ICAO term GENERAL AVIATION.)

GENERAL AVIATION [ICAO]– All civil aviation operations other than scheduled air services and nonscheduled air transport operations for remuneration or hire.

GEO MAP– The digitized map markings associated with the ASR-9 Radar System.

GLIDEPATH–
(See GLIDESLOPE.)

GLIDEPATH [ICAO]– A descent profile determined for vertical guidance during a final approach.

GLIDEPATH INTERCEPT ALTITUDE–
(See GLIDESLOPE INTERCEPT ALTITUDE.)

GLIDESLOPE– Provides vertical guidance for aircraft during approach and landing. The glideslope/glidepath is based on the following:

a. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS/MLS, or

b. Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.

c. PAR. Used by ATC to inform an aircraft making a PAR approach of its vertical position (elevation) relative to the descent profile.
(See ICAO term GLIDEPATH.)

GLIDESLOPE INTERCEPT ALTITUDE– The minimum altitude to intercept the glideslope/path on a precision approach. The intersection of the published intercept altitude with the glideslope/path, designated on Government charts by the lightning bolt symbol, is the precision FAF; however, when the approach chart shows an alternative lower glideslope intercept altitude, and ATC directs a lower altitude, the resultant lower intercept position is then the FAF.
(See FINAL APPROACH FIX.)
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) [ICAO]– A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

GLOBAL NAVIGATION SATELLITE SYSTEM MINIMUM EN ROUTE IFR ALTITUDE (GNSS MEA)– The minimum en route IFR altitude on a published ATS route or route segment which assures acceptable Global Navigation Satellite System reception and meets obstacle clearance requirements.
(Refer to 14 CFR Part 91.)
(Refer to 14 CFR Part 95.)

GLOBAL POSITIONING SYSTEM (GPS)– A space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system. The GPS concept is predicated upon accurate and continuous knowledge of the spatial position of each satellite in the system with respect to time and distance from a

transmitting satellite to the user. The GPS receiver automatically selects appropriate signals from the satellites in view and translates these into three-dimensional position, velocity, and time. System accuracy for civil users is normally 100 meters horizontally.

GNSS [ICAO]–
(See GLOBAL NAVIGATION SATELLITE SYSTEM.)

GNSS MEA–
(See GLOBAL NAVIGATION SATELLITE SYSTEM MINIMUM EN ROUTE IFR ALTITUDE.)

GO AHEAD– Proceed with your message. Not to be used for any other purpose.

GO AROUND– Instructions for a pilot to abandon his/her approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC; e.g., "Go around" (additional instructions if required).
(See LOW APPROACH.)
(See MISSED APPROACH.)

GPD–
(See GRAPHIC PLAN DISPLAY.)

GPS–
(See GLOBAL POSITIONING SYSTEM.)

GRAPHIC PLAN DISPLAY (GPD)– A view available with URET that provides a graphic display of aircraft, traffic, and notification of predicted conflicts. Graphic routes for Current Plans and Trial Plans are displayed upon controller request.
(See USER REQUEST EVALUATION TOOL.)

GROUND–BASED TRANSCEIVER (GBT)– The ground–based transmitter/receiver (transceiver) receives automatic dependent surveillance–broadcast messages, which are forwarded to an air traffic control facility for processing and display with other radar targets on the plan position indicator (radar display).
(See AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST.)

GROUND CLUTTER– A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion.
(See CLUTTER.)

GROUND COMMUNICATION OUTLET (GCO)– An unstaffed, remotely controlled, ground/ground communications facility. Pilots at uncontrolled airports may contact ATC and FSS via VHF to a telephone connection to obtain an instrument clearance or close a VFR or IFR flight plan. They may also get an updated weather briefing prior to takeoff. Pilots will use four "key clicks" on the VHF radio to contact the appropriate ATC facility or six "key clicks" to contact the FSS. The GCO system is intended to be used only on the ground.

GROUND CONTROLLED APPROACH– A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired.
(See RADAR APPROACH.)

GROUND DELAY PROGRAM (GDP)– A traffic management process administered by the ATCSCC; when aircraft are held on the ground. The purpose of the program is to support the TM mission and limit airborne holding. It is a flexible program and may be implemented in various forms depending upon the needs of the AT system. Ground delay programs provide for equitable assignment of delays to all system users.

GROUND SPEED– The speed of an aircraft relative to the surface of the earth.

GROUND STOP (GS)– The GS is a process that requires aircraft that meet a specific criteria to remain on the ground. The criteria may be airport specific, airspace specific, or equipment specific; for example, all departures to San Francisco, or all departures entering Yorktown sector, or all Category I and II

aircraft going to Charlotte. GSs normally occur with little or no warning.

GROUND VISIBILITY–
(See VISIBILITY.)

GS–
(See GROUND STOP.)

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BRIEFING GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Initiated By: AJV−0
Vice President, Mission Support Services

Table of Contents

1. PARAGRAPH NUMBER AND TITLE: 2−1−6. SAFETY ALERT

2. BACKGROUND: Phraseology for issuing a low altitude alert includes providing the applicable altitude based on either the aircraft's location and/or activity. RNAV instrument approaches such as LPV DA, LNAV/VNAV DA, and LNAV MDA, all indicate different altitudes for their respective Decision Altitude (DA), Minimum Descent Altitude (MDA), or Decision Height (DH) based on several factors (for example, approach category, inoperative equipment (aircraft or ground), crew qualifications, and company authorization). These are all examples of issues that may either limit or change the height of a published MDA, DA or DH. Controllers may not be aware of these restrictions and are only required to clear an aircraft for the type of approach that is listed on the approach plate (for example, "(Callsign) Cleared RNAV Runway 35C approach"). Therefore, providing the correct DA, MDA, or DH to the pilot quickly and accurately is largely precluded.

3. CHANGE:

OLD	**NEW**
2-1-6. SAFETY ALERT	**2-1-6. SAFETY ALERT**
Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.	Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude **that**, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.
NOTE	No Change
a. Terrain/Obstruction Alert. Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude which, in your judgment, places it in unsafe proximity to terrain/obstructions. Issue the alert as follows:	**a.** Terrain/Obstruction Alert. Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude **that**, in your judgment, places it in unsafe proximity to terrain **and**/**or** obstructions. Issue the alert as follows:
PHRASEOLOGY– *LOW ALTITUDE ALERT (call sign),* *CHECK YOUR ALTITUDE IMMEDIATELY.*	***PHRASEOLOGY–*** *LOW ALTITUDE ALERT (call sign),* *CHECK YOUR ALTITUDE IMMEDIATELY.*
Add	***and, if the aircraft is not yet on final approach,***
THE (as appropriate) MEA/MVA/MOCA/MIA IN YOUR AREA IS (altitude),	*THE (as appropriate) MEA/MVA/MOCA/MIA IN YOUR AREA IS (altitude),*
or if an aircraft is past the final approach fix (non-precision approach),	Delete
or the outer marker,	Delete
or the fix used in lieu of the outer marker (precision approach),	Delete
and, if known, issue	Delete
THE (as appropriate) MDA/DH IS (altitude).	Delete
Add	***REFERENCE–*** ***P/CG Term – Final Approach - IFR***

b. Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.	**b.** Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action. **When an alternate course of action is given, end the transmission with the word "immediately."**
c. When an alternate course of action is given, end the transmission with the word "immediately."	Delete
PHRASEOLOGY–	No Change
Add	***EXAMPLE–*** ***"Traffic Alert, Cessna Three Four Juliet, advise you turn left immediately."***
Add	***or***
Add	***"Traffic Alert, Cessna Three-Four Juliet, advise you turn left and climb immediately."***

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1. PARAGRAPH NUMBER AND TITLE: 2–1–30. "BLUE LIGHTNING" EVENTS

2. BACKGROUND: Human smuggling is a global problem that is growing in frequency and scope. The criminal organizations behind the major smuggling rings have often utilized commercial air transportation to move their victims from country to country, or from continent to continent. The Secretaries of the Department of Transportation and Department of Homeland Security (DHS) have committed their departments (including the FAA) to provide a process intended to allow aircrews to notify the appropriate law enforcement agency about a possible human smuggling event on an air carrier flight inbound to the United States. Passing the information on ATC frequencies would only occur if the primary means (through company channels) of notification have failed.

3. CHANGE:

OLD	**NEW**
Add	**2-1-30. "BLUE LIGHTNING" EVENTS**
Add	Ensure that the supervisor/controller-in-charge (CIC) is notified of reports of possible human trafficking. These may be referred to as "Blue Lightning" events.

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1. PARAGRAPH NUMBER AND TITLE: 4–5–6. MINIMUM EN ROUTE ALTITUDES

2. BACKGROUND: Since 2002, Global Positioning Systems/Wide Area Augmentation System (GPS/WAAS) Minimum En Route Altitudes (MEA) have been certified on some low altitude Air Traffic Service (ATS) routes, mostly in Alaska. Global Navigation Satellite System (GNSS) equipped aircraft are equipped with GPS or WAAS, with en route and terminal capability. The GNSS MEA allows appropriately-equipped GNSS aircraft to fly at altitudes lower than conventional MEAs when there are restrictions due to NAVAID coverage. When established on Victor airways, the GNSS MEA provides an advantage to pilots by allowing flight below potential adverse weather conditions (i.e., icing conditions or other) where conventional MEAs may be restricted

due to NAVAID coverage. The GNSS MEA on a Victor airway provides air traffic control an advantage by making additional cardinal altitudes available on the airway. GNSS MEAs are also published on low altitude Tango or "T" routes, high altitude Q routes as well as jet routes. No guidance was previously published regarding GNSS MEAs. For the purpose of this change, all previously designated routes are termed ATS routes as defined in the Pilot/Controller Glossary. The GNSS MEA is for use in the 48 contiguous states only, Alaska requirements remain unchanged.

3. CHANGE:

OLD	**NEW**
4-5-6. MINIMUM EN ROUTE ALTITUDES	4-5-6. MINIMUM EN ROUTE ALTITUDES
Title thru c	No Change
Add	**d. GNSS MEAs may be approved on published ATS routes. Air traffic may assign GNSS MEAs to GNSS-equipped aircraft where established.**
Add	***NOTE–*** ***On high altitude ATS routes, the GNSS MEA is FL180 unless published higher.***
d	Re-letter **e**

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1. PARAGRAPH NUMBER AND TITLE: 5−2−17. VALIDATION OF MODE C READOUT

2. BACKGROUND: The Pilot Controller Glossary (PCG) correctly defines the term "verify" to mean "Request confirmation of information." The PCG also correctly leaves out the term "confirm." Throughout the order, the term "verify" is correctly used in examples of phraseology when the intent of the phraseology is to "confirm" information. This change identifies an instances where the term is not used.

3. CHANGE:

OLD	**NEW**
5-2-17. VALIDATION OF MODE C READOUT	5-2-17. VALIDATION OF MODE C READOUT
Title through d	No Change
1.Confirm that the pilot is using 29.92 inches of mercury as the altimeter setting and has accurately reported the altitude.	1.**Verify** that the pilot is using 29.92 inches of mercury as the altimeter setting and has accurately reported the altitude.
PHRASEOLOGY– *CONFIRM USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING.*	***PHRASEOLOGY–*** ***VERIFY*** *USING TWO NINER NINER TWO AS YOUR ALTIMETER SETTING.*

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1. PARAGRAPH NUMBER AND TITLE: 5−5−4. MINIMA

2. BACKGROUND: At the request of Terminal Operations, Headquarters, FAA Flight Systems Laboratory conducted an analytical study to re-examine the separation standards that are applicable to terminal use of the ASR-11. This study addressed several paragraphs in FAA Order JO 7110.65, Chapter 5, Section 5, Radar Separation, including target separation, target resolution, vertical application, rules on the use of passing and diverging, the minimum separation from obstructions, minimum separation from adjacent airspace, and, if applicable, edge-of-scope separation. The performance of the ASR-11 with MSSR was compared against the

performance of similar systems, specifically ASR-9 with Mode S, that are currently allowed to be used for these operations. The study concluded that performance of the ASR-11 (MSSR) is equivalent to the performance of an ASR-9 with Mode S. Therefore, allowing the use of the terminal separation standard minima of 3 NM for properly performing transponder-equipped aircraft at ranges from the radar of up to 60 NM from the sensor antenna should incur no greater risk or hazard than the current separation standard minima. There are currently 68 ASR-11 radar systems installed in the National Airspace System (NAS). Increasing the usability of the existing installed infrastructure provided by the ASR-11 will increase the efficiency of the NAS, with no impact on overall safety.

3. CHANGE:

OLD	**NEW**
5-5-4. MINIMA	5-5-4. MINIMA
Title thru a3	No Change
Add	**4. For single sensor ASR-11 MSSR Beacon, when less than 60 miles from the antenna–** ***3 miles.***
NOTE− *Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.*	***NOTE−*** *Wake turbulence procedures specify increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.*

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1. PARAGRAPH NUMBER AND TITLE: 5−8−2. INITIAL HEADING

2. BACKGROUND: The Air Traffic Control Procedures and Phraseology Action Team (ATCPP) is a working group under the Performance Based Operations Aviation Rulemaking Committee (PARC) established to address RNAV and required navigation performance implementation issues and propose action to the FAA. The ATCPP is composed of air traffic, aviation industry, and human factors subject matter experts. The ATCPP reviews, assesses, and proposes changes to ATC procedures and phraseology and is tasked with incorporating those changes into FAA Order JO 7110.65, the AIM, and AIP.

Extensive evaluation of RNAV SIDs that begin at the runway has established that aircraft have occasionally flown an unexpected flight path on departure due to loading of an incorrect procedure in the Flight Management System (FMS). Pilots enter the departure procedure and route of flight received in the ATC clearance prior to departure from the gate area. RNAV SIDs are recalled from a database for entry into the FMS. Runway specific RNAV SIDs may be programmed into the FMS based on the anticipated departure runway. Human error may result in an incorrect procedure being recalled from the database, or the runway assignment on taxi may not be coincident with the RNAV SID or transition. However, human factors studies have established that there is greater potential for an incorrect procedure to be entered in the FMS when a change in the procedure entered in the FMS is required after departure from the gate. Extensive evaluation of procedure implementations and field testing of various runway verification phraseology has established that an ATC advisory to pilots prior to departure can assist aircrew in ensuring the correct departure procedure is entered in the FMS. The phraseology in this change has been demonstrated successfully at Dallas/Fort Worth International, Charlotte/Douglas International, and Hartsfield-Jackson Atlanta International airports.

3. CHANGE:

OLD	**NEW**
5-8-2. INITIAL HEADING	5-8-2. INITIAL HEADING
Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.	**a.** Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.

Phraseology thru Reference	No Change
Add	**b. When conducting simultaneous parallel runway departures utilizing RNAV SIDs, advise aircraft of the initial fix/waypoint on the RNAV route.**
Add	***PHRASEOLOGY–*** ***RNAV to (fix/waypoint), RUNWAY (number), CLEARED FOR TAKEOFF.***
Add	***EXAMPLE–*** ***"RNAV to MPASS, Runway Two-Six Left, cleared for takeoff."***
Add	***NOTE-*** **1.** ***TERMINAL. A purpose for an initial waypoint advisory is not necessary since pilots associate this advisory with the flight path to their planned route of flight. Pilots must immediately advise ATC if a different RNAV SID is entered in the aircraft FMS.***
Add	**2.** ***The SID transition is not restated as it is contained in the ATC clearance.***
Add	**3.** ***Aircraft cleared via RNAV SIDs designed to begin with a vector to the initial waypoint are assigned a heading before departure.***
Add	***REFERENCE–*** ***FAAO JO 7110.65, Para 3-9-9, Takeoff Clearance*** ***FAAO JO 7110.65, Para 4-3-2, Departure Clearances*** ***AIM, Para 5–2–7. Departure Control***

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1. PARAGRAPH NUMBER AND TITLE: 7-2-1. VISUAL SEPARATION

2. BACKGROUND: Current air traffic procedures specify that visual separation may be applied between aircraft under the control of the same facility within the terminal area. With the advent of consolidated air traffic control facilities, this restriction has limited the ability to apply the procedure as the radar facility is no longer "the same facility" even though there have been minor or no changes to the airspace or operation. Additionally, controllers are required to advise the pilot if aircraft are on converging courses during the initial traffic description, along with the direction of the other aircraft.

3. CHANGE:

OLD	**NEW**
7-2-1. VISUAL SEPARATION	7-2-1. VISUAL SEPARATION
Title thru REFERENCE	No Change
a. *TERMINAL.* Visual separation may be applied between aircraft under the control of the same facility within the terminal area up to but not including FL180 provided:	a. *TERMINAL.* Visual separation may be applied between aircraft up to but not including FL180 **under the following conditions**:
Add	**1. Tower-applied visual separation.**
1. Communication is maintained with at least one of the aircraft involved or the capability to communicate immediately as prescribed in para 3-9-3, Departure Control Instructions, subpara a2 is available, and:	**(a) Maintain c**ommunication with at least one of the aircraft involved or **ensure there is an ability** to communicate immediately as prescribed in para**graph** 3-9-3, Departure Control Instructions, subpara**graph** a2**.**

2. The aircraft are visually observed by the tower and visual separation is maintained between the aircraft by the tower. The tower must not provide visual separation between aircraft when wake turbulence separation is required or when the lead aircraft is a B757.

Add

Add

Add

Add

3. A pilot sees another aircraft and is instructed to maintain visual separation from the aircraft as follows:

(a) Tell the pilot about the other aircraft including position, direction and, unless it is obvious, the other aircraft's intention.

(b) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

Add

Add

Add

Add

NOTE
Issue this advisory in conjunction with the instruction to maintain visual separation, or thereafter if the controller subsequently becomes aware that the targets are merging.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

(b) The **tower** visually observe**s** the aircraft**, issues timely traffic advisories,** and **maintains** visual separation between the aircraft. The **use of** tower**-applied** visual separation **is not authorized** when wake turbulence separation is required.

(c) Issue subsequent control instructions as necessary to ensure continued separation between the applicable aircraft.

NOTE–
Adjacent airports with operating ATCTs are not authorized to apply visual separation between their traffic and the other ATCT's traffic.

2. Pilot-applied visual separation.

(a) Maintain communication with at least one of the aircraft involved and ensure there is an ability to communicate with the other aircraft.

(b) The pilot sees another aircraft and is instructed to maintain visual separation from the aircraft as follows:

(1) Tell the pilot about the other aircraft**. Include** position, direction**,** and, unless it is obvious, the other aircraft's intention.

(2) Obtain acknowledgment from the pilot that the other aircraft is in sight.

(3) Instruct the pilot to maintain visual separation from that aircraft.

Delete

PHRASEOLOGY–
TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), (intentions and other relevant information).

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION.

Delete

Delete

(f) If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (the pilot must use that entire phrase), the controller need only "approve" the operation instead of restating the instructions.

PHRASEOLOGY–

TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), (intentions and other relevant information).

If applicable,

ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative,

MAINTAIN VISUAL SEPARATION.

If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (pilot must use that entire phrase):

APPROVED

Add

Add

If aircraft are on converging courses, advise the other aircraft:

TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

Add

Add

Add

Add

(c) If the pilot advises he/she has the traffic in sight and will maintain visual separation from it (the pilot must use that entire phrase), the controller need only "approve" the operation instead of restating the instructions.

PHRASEOLOGY–

Delete

Delete

Delete

Delete

Delete

Delete

APPROVED

NOTE-
Pilot-applied visual separation between aircraft is achieved when the controller has instructed the pilot to maintain visual separation and the pilot acknowledges or when the controller has approved pilot-initiated visual separation.

REFERENCE–
FAAO JO 7110.65, Para 5-4-5, Transferring Controller Handoff

(d) If **the** aircraft are on converging courses, **inform** the other aircraft **of the traffic and that visual separation is being applied.**

PHRASEOLOGY–
TRAFFIC, (clock position and distance), (direction) BOUND, (type of aircraft), HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

(e) Advise the pilots if the radar targets appear likely to merge.

NOTE-
Issue this advisory in conjunction with the instruction to maintain visual separation, the advisory to the other aircraft of the converging course, or thereafter if the controller subsequently becomes aware that the targets are merging.

EXAMPLE–
"Radar targets appear likely to merge."

b. *TERMINAL.* Control of aircraft maintaining visual separation may be transferred to an adjacent position/ sector/ facility. Coordination procedures must be specified in an LOA or facility directive.

Add	***REFERENCE–*** ***FAAO JO 7210.3, Para 4-3-1, Letters of Agreement***
Subparagraphs b thru c	Renumber **c** thru **d**

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1. PARAGRAPH NUMBER AND TITLE: 7-4-4. APPROACHES TO MULTIPLE RUNWAYS

2. BACKGROUND: In an effort to move towards proactive risk mitigation and the reduction of risk in the NAS, the Air Traffic Organization (ATO) adopted the Risk Analysis Process (RAP) from EUROCONTROL. The RAP tool, developed by EUROCONTROL, is used to quantify the level of risk present for any air traffic incident. RAP is a post-event investigation analysis process and is applied to events involving a loss of separation with a measure of compliance of less than 66 percent. These events are known as Risk Analysis Events (RAEs). The RAP is a Safety Management System (SMS) process that assesses the risk of an RAE. A review of several RAEs in the NAS indicted that approach clearances were being issued to aircraft at questionable times, such as high and fast on the downwind or base leg, which resulted in an overshoot of the extended runway centerline. This caused a conflict with aircraft on approach to the other runway with both aircraft in a side-by-side belly-up situation.

3. CHANGE:

OLD	**NEW**
7-4-4. APPROACHES TO MULTIPLE RUNWAYS	7-4-4. APPROACHES TO MULTIPLE RUNWAYS
a. All aircraft must be informed that approaches are being conducted to parallel/intersecting/ converging runways. This may be accomplished through use of the ATIS.	a. All aircraft must be informed that approaches are being conducted to parallel**,** intersecting**, or** converging runways. This may be accomplished through use of the ATIS.
b through c2	No Change
(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and the pilot has acknowledged receipt of the visual approach clearance.	(a) Standard separation is provided until the aircraft are established on a heading which will intercept the extended centerline of the runway at an angle not greater than 30 degrees, and each aircraft has been issued and **one** pilot has acknowledged receipt of the visual approach clearance**, and the other pilot has acknowledged receipt of the visual or instrument approach clearance.**
NOTE– *The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the final, and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn to the final are factors to be considered by the controller when vectoring aircraft to parallel runways.*	***NOTE–*** **1.** *The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the* ***extended centerline of the runway*** *and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn are factors to be considered when vectoring aircraft to parallel runways.*
Add	**2.** ***Variances between heading assigned to intercept the extended centerline of the runway and aircraft ground track are expected due to the effect of wind and course corrections after completion of the turn and pilot acknowledgment of a visual approach clearance.***
Add	***REFERENCE–*** ***FAA Publication, Pilot's Handbook of Aeronautical Knowledge, Chapter 15 "Effect of Wind."***

c2(b) through c3(c)	No Change
Add	**(d) Each aircraft must be assigned headings which will allow the aircraft to intercept the extended centerline of the runway at an angle not greater than 30 degrees.**
Add	***NOTE–*** **1.** ***The intent of the 30 degree intercept angle is to reduce the potential for overshoots of the extended centerline of the runway and preclude side-by-side operations with one or both aircraft in a "belly-up" configuration during the turn. Aircraft performance, speed, and the number of degrees of the turn are factors to be considered when vectoring aircraft to parallel runways.***
Add	**2.** ***Variances between heading assigned to intercept the extended centerline of the runway and aircraft ground track are expected due to the effect of wind and course corrections after completion of the turn and pilot acknowledgment of a visual approach clearance.***
Add	***REFERENCE–*** ***FAA Publication, Pilot's Handbook of Aeronautical Knowledge, Chapter 15 "Effect of Wind.***

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1. PARAGRAPH NUMBER AND TITLE: 9-2-7. IFR MILITARY TRAINING ROUTES

2. BACKGROUND: FAA JO 7110.65, Pilot Controller Glossary (PCG) correctly defines the term "VERIFY" to mean "Request confirmation of information." The PCG also correctly leaves out the term "CONFIRM." Throughout the order, the term "VERIFY" is correctly used in EXAMPLES or PHRASEOLOGY when the intent of the phraseology is to "confirm" information. This change identifies an instances where the term is not used.

3. CHANGE:

OLD	**NEW**
9-2-7. IFR MILITARY TRAINING ROUTES	9-2-7. IFR MILITARY TRAINING ROUTES
Title thru e	No Change
PHRASEOLOGY– *(Call sign)* ***CONFIRM*** *YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,* *and if applicable,* *THE NUMBER OF REENTRIES.*	***PHRASEOLOGY–*** *(Call sign)* ***VERIFY*** *YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT,* *and if applicable,* *THE NUMBER OF REENTRIES.*

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1. PARAGRAPH NUMBER AND TITLE: Appendix A. AIRCRAFT INFORMATION FIXED WING AIRCRAFT

2. BACKGROUND: FAA JO 7110.65 includes aircraft type designator and performance information. This information is currently a portion of the aircraft type designators that have been approved by the International Civil Aviation Organization (ICAO), which is responsible for issuing aircraft type designators for use in air traffic control. The FAA includes additional operational/procedural information such as FAA Weight Class, Same Runway Separation, and Land and Hold Short Operations (LAHSO) Grouping.

3. CHANGE:

OLD	**NEW**
Appendix A. AIRCRAFT INFORMATION FIXED WING AIRCRAFT	Appendix A. AIRCRAFT INFORMATION FIXED WING AIRCRAFT See attachment

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AERMACCHI SpA (Italy)

(Also AGUSTA, SIAI□MARCHETTI)

Action	**Model**	**Type Designator**	**Description**	**Performance Information**			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	MB−326	**M326**	1J/S			III	
Change	S−211	**S211**	**1J/S**			**III**	

BEECH AIRCRAFT COMPANY (USA)

(Also CCF, COLEMILL, DINFIA, EXCALIBUR, FUJI, HAMILTON, JETCRAFTERS, RAYTHEON, SWEARINGEN, VOLPAR)

Action	**Model**	**Type Designator**	**Description**	**Performance Information**			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	18 (turbine)	B18T	2T/S	2,000	2,000	II	**1**

BOEING COMPANY (USA)

(Also GRUMMAN, IAI, LOCKHEED-BOEING, MCDONNELL DOUGLAS, NORTHROP-GRUMMAN, ROHR)

Action	**Model**	**Type Designator**	**Description**	**Performance Information**			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Add	**B747−8**	**B748**	**4J/H**			**III**	
Delete	KC−135A Stratotanker (J57 engines)	K35A	4J/H	2,500	3,000	III	

Change	707−100 (C−137B)	B701	**4J/L**	3,500	3,500	III	9
Change	B737−800, BBJ2	B738	2J/L	4,000	4,000	III	**9**
Change	B737−900	B739	2J/L	4,000	4,000	III	**9**
Change	B777−200LR, B777−200LRF To read: **B777−200LRF, B777−F**	B77L	2J/H			III	**9**

BRITISH AEROSPACE (BAe) (UK)

(Also AIL, AVRO, BAC, BUCURESTI, DE HAVILLAND, HANDLEY PAGE, HAWKER SIDDELEY, JETSTREAM, KANPUR, MCDONNELL DOUGLAS, RAYTHEON, SCOTTISH AVIATION, VOLPAR)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	Nimrod	**NIM**	4J/L			III	

BRITTEN NORMAN LTD. (A subsidiary of Pilatus Aircraft LTD.) (UK)

(Also AVIONS FAIREY, BAC, BUCURESTI, DE HAVILLAND, HAWKER-SIDDELEY, IRMA, PADC, ROMAERO, VICKERS)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Delete	Trident	TRID	3J/L	3,000	3,000	III	

Appendix A-10
CANADAIR BOMBARDIER LTD. (Canada)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	CL−66, CV−580 (CC−109 Cosmopolitan)	CVLT	2T/L	1,500	1,500	III	**7**

CESSNA AIRCRAFT COMPANY (USA)

(Also AVIONES COLOMBIA, COLEMILL, DINFIA, ECTOR, FMA, FUJI, REIMS, RILEY, SUMMIT, WREN)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group

Add	**350, Corvalis, Columbia 300/350, LC40/42**	**COL3**	**1P/S**			**I**	
Add	**400, Corvalis TT, Columbia 400, LC 41**	**COL4**	**1P/S**			**I**	

Appendix A-13
DASSAULT BREGUET (France)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Add	**Falcon 7X**	**FA7X**	**3J/L**			**III**	
Change	Alpha jet	AJET	**2J/S+**			III	

EMBRAER (Brazil)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Add	**EMB−500, Phenom 100**	**E50P**	**2J/S**			**III**	
Add	**EMB−505, Phenom 300**	**E55P**	**2J/S+**			**III**	

FAIRCHILD DORNIER (USA/FRG)
(Also CONAIR, FAIRCHILD¿HILLER, FLEET, FOKKER, KAISER, PILATUS, SWEARINGEN)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	328	D328	2T/S+	2,000	2,000	III	**7**

GULFSTREAM AEROSPACE CORP. (USA)
(Also GRUMMAN, GRUMMAN AMERICAN, GULFSTREAM, GULFSTREAM AMERICAN, IAI)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	695 Jetprop Commander 980/1000	AC95	2T/S	2,500	2,500	II	**6**
Change	G-1159, G-1159B/TT, Gulfstream 2/2B/2SP/2TT	GLF2	2J/L	5,000	4,000	III	**8**

HAMILTON AVIATION (USA)

(Also VOLPAR)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	Little Liner	BE18	2P/S	1,400	1,000	II	**4**
Change	T-28 Nomair	T28	1P/S	2,500	2,500	**III**	

ILYUSHIN (Russia)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	Il-38	IL38	**4T/L**			III	

LOCKHEED CORP. (USA)

(Also AERITALIA, CANADAIR, FIAT, FOKKER, HOWARD, LEAR, LOCKHEED¿BOEING, LOCKHEED¿MARTIN, MBB, MESSERSCHMITT, MITSUBISHI, PACAERO, ROCKWELL, SABCA)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	F-117 Nighthawk	**F117***	2J/L			III	
Change	L-18 Lodestar (C-56/57/59/60, R50, XR50	L18	2P/**S**	1,800	2,000	III	**8**

MITSUBISHI AIRCRAFT INTERNATIONAL INC. (USA/Japan)

(Also BEECH, RAYTHEON)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	F-86 Sabre	**F86***	1J/**S+**	4,000	4,000	III	

NORD (France)

(Also AEROSPATIALE, HOLSTE, NORDFLUG, TRANSALL)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change/Add	1000,1001, 1002 Pingouin	ME08	1P/S	400	500	**I**	**1**

PARTENAVIA (Italy)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	P68, Victor, Observer	P68	2P/S	1,200	1,000	**II**	3

PIAGGIO (Industrie Aeronautiche E Meccaniche Rinaldo Piaggio SpA) (Italy)

(Also PIAGGIO□DOUGLAS, TRECKER)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Delete	PD−808	P808	2J/S+	4,000	3.500	III	9

PIPER AIRCRAFT CORP. (USA)

(Also AEROSTAR, AICSA, CHINCUL, COLEMILL, EMBRAER, INDAER CHILE, JOHNSTON, MACHEN, MILLER, NIEVA, SCHAFER, SEGUIN, PZL□MIELEC, TED SMITH, WAGAERO)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	PA-31T3-500 T-1040	PAT4	**2T/S**	1,300	1,200	**II**	
Change	AP-60, Aerostar	AEST					**5**

ROCKWELL INTERNATIONAL CORP. (USA)

(Also AERO COMMANDER, CANADAIR, CCF, COMMANDER, COMMONWEALTH, GULFSTREAM, HAMILTON, MITSUBISHI, NOORDUYN, NORTH AMERICAN PACAERO, NORTH AMERICAN ROCKWELL, PACIFIC AIRMOTIVE,ROCKWELL, RYAN, SUD, TUSCO)

Action	Model	Type Designator	Description	Performance Information			
			Number & Type Engines/Weight Class	Climb Rate (fpm)	Descent Rate (fpm)	SRS Cat.	LAHSO Group
Change	695 Jetprop Commander 980/1000	AC95	**2T/S**	2,500	2,500	II	6
Delete	FR−06 Fanranger, Ranger 2000	R2TH	1J/S			III	
Delete	X−31	X31	1J/S+			III	