SUBJ: Air Traffic Control

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

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


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 Retain this transmittal until superseded by a new basic order.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.

Elizabeth L. Ray
Vice President, Mission Support Services
Air Traffic Organization

Date: May 1, 2015
Explanation of Changes
Change 3

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

a. 2-1-13. FORMATION FLIGHTS
2-1-27. TCAS RESOLUTION

ADVISORIES
2-1-29. TERRAIN AWARENESS WARNING SYSTEM (TAWS) ALERTS
3-1-8. LOW LEVEL WIND SHEAR/MICROBURST ADVISORIES
4-5-7. ALTITUDE INFORMATION
4-8-11. PRACTICE APPROACHES
5-15-6. CA/MCI
7-4-4. APPROACHES TO MULTIPLE RUNWAYS
8-9-8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC CONTROLLED AIRSPACE
9-2-21. NONSTANDARD FORMATION/CELL OPERATIONS
9-2-22. OPEN SKIES TREATY AIRCRAFT

This change will replace the phrases “standard separation” and “radar separation” with the phrase “approved separation” as defined in JO 7110.65, Paragraph 1-2-1.

b. 2-4-3. PILOT ACKNOWLEDGMENT/READ BACK

This change clarifies the duty of pilots and air traffic controllers to ensure that those parts of the ATC clearances and instructions containing altitude assignments, vectors, or runway assignments are read back correctly.

c. 3-9-8. INTERSECTING RUNWAY SEPARATION
3-10-4. INTERSECTING RUNWAY SEPARATION

The title for these paragraphs have been changed to better indicate that it covers procedures addressing intersecting flight paths.

d. 4-2-8. IFR-VFR AND VFR-IFR FLIGHTS

This change provides guidance for controllers when an aircraft reports the inability to climb VFR to the Minimum IFR Altitude (MIA), the Minimum En Route Altitude (MEA), the Minimum Vectoring Altitude (MVA) or the Off Route Obstruction Clearance Altitudes (OROCA) when requesting an IFR clearance. This increases the controllers’ awareness of a pilot’s flight conditions and maneuverability, when these flight conditions are reported to the controller, by a pilot, prior to issuing an IFR clearance to an aircraft operating below the MIA/MEA/MVA or OROCA. This change increases safety and efficiency of flight in marginal weather conditions by clarifying expectations between pilot and controller. This clarifies the responsibility of the pilot to advise ATC when conditions are less than VFR and IFR services are requested.

e. 5-5-4. MINIMA

The reference to the terminal domain has been removed from Paragraph 5-5-4g, Minima. There is no change to operational wake turbulence minima. Guidance is now provided to apply wake turbulence minima if the landing threshold cannot be determined.

f. 5-5-7. PASSING OR DIVERGING

This change incorporates information from DOT-FAA-AFS-440-19, Safety Study Report for Terminal Radar Separation Passing or Diverging Standards Applied to En Route Display Systems Using ASR-9 and ARSR Radars. This change accounts for the use of the FUSION operating environment in Paragraph 5-5-7. It also removes the Note concerning the application of wake turbulence provision in 5-5-4, subparagraphs f and g, and replaces that content into procedural guidance.
g. 5-8-3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

This change authorizes a minimum of 10 degrees course divergence between successive and simultaneous RNAV SID departures; whereby positive course guidance extends from the runway, and parallel runway operations are separated by 2,500 feet or more, if applicable. It also provides additional clarification for controllers concerning climb and turn performance characteristics concerning these types of operations and provides a definition of “immediately after departure” that helps to provide clarity to the long standing use of this phrase.

h. 5-9-1. VECTORS TO FINAL APPROACH COURSE

This change introduces the requirement to ensure 1,000 feet vertical separation between aircraft on the opposite base legs unless another form of approved separation is established when turning onto final approach.

i. Pilot/Controller Glossary

Terms have been added, deleted, or modified within this glossary. Please refer to page PCG–1 for more details.

j. Entire Publication

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

<table>
<thead>
<tr>
<th>REMOVE PAGES</th>
<th>DATED</th>
<th>INSERT PAGES</th>
<th>DATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents i through xx</td>
<td>1/8/15</td>
<td>Table of Contents i through xx</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–1–5</td>
<td>1/8/15</td>
<td>2–1–5</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–1–6</td>
<td>1/8/15</td>
<td>2–1–6</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–1–11</td>
<td>1/8/15</td>
<td>2–1–11</td>
<td>1/8/15</td>
</tr>
<tr>
<td>2–1–12 and 2–1–13</td>
<td>1/8/15</td>
<td>2–1–12 and 2–1–13</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–4–1 through 2–4–3</td>
<td>4/3/14</td>
<td>2–4–1 through 2–4–3</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–6–5</td>
<td>4/3/14</td>
<td>2–6–5</td>
<td>6/25/15</td>
</tr>
<tr>
<td>2–6–6</td>
<td>4/3/14</td>
<td>2–6–6</td>
<td>4/3/14</td>
</tr>
<tr>
<td>3–1–4</td>
<td>4/3/14</td>
<td>3–1–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>3–4–5</td>
<td>7/24/14</td>
<td>3–4–5</td>
<td>6/25/15</td>
</tr>
<tr>
<td>3–6–1</td>
<td>4/3/14</td>
<td>3–6–1</td>
<td>4/3/14</td>
</tr>
<tr>
<td>3–9–8</td>
<td>1/8/15</td>
<td>3–9–8</td>
<td>1/8/15</td>
</tr>
<tr>
<td>3–9–9</td>
<td>1/8/15</td>
<td>3–9–9</td>
<td>1/8/15</td>
</tr>
<tr>
<td>3–9–10</td>
<td>1/8/15</td>
<td>3–9–10</td>
<td>6/25/15</td>
</tr>
<tr>
<td>4–5–7</td>
<td>7/24/14</td>
<td>4–5–7</td>
<td>7/24/14</td>
</tr>
<tr>
<td>4–5–8</td>
<td>7/24/14</td>
<td>4–5–8</td>
<td>6/25/15</td>
</tr>
<tr>
<td>4–8–9</td>
<td>4/3/14</td>
<td>4–8–9</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–4–3</td>
<td>1/8/15</td>
<td>5–4–3</td>
<td>1/8/15</td>
</tr>
<tr>
<td>5–4–4</td>
<td>1/8/15</td>
<td>5–4–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–5–3 through 5–5–6</td>
<td>7/24/14</td>
<td>5–5–3 through 5–5–7</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–8–1 through 5–8–4</td>
<td>4/3/14</td>
<td>5–8–1 through 5–8–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–9–4</td>
<td>4/3/14</td>
<td>5–9–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–9–5</td>
<td>1/8/15</td>
<td>5–9–5</td>
<td>6/25/15</td>
</tr>
<tr>
<td>5–9–6</td>
<td>1/8/15</td>
<td>5–9–6</td>
<td>1/8/15</td>
</tr>
<tr>
<td>7–4–1</td>
<td>4/3/14</td>
<td>7–4–1</td>
<td>4/3/14</td>
</tr>
<tr>
<td>7–4–2 through 7–4–4</td>
<td>4/3/14</td>
<td>7–4–2 through 7–4–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>8–9–3</td>
<td>4/3/14</td>
<td>8–9–3</td>
<td>4/3/14</td>
</tr>
<tr>
<td>8–9–4</td>
<td>4/3/14</td>
<td>8–9–4</td>
<td>6/25/15</td>
</tr>
<tr>
<td>Section Description</td>
<td>Start Date</td>
<td>End Date</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>10–3–1</td>
<td>1/8/15</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>10–3–2</td>
<td>1/8/15</td>
<td>1/8/15</td>
<td></td>
</tr>
<tr>
<td>Appendix A–3 and A–4</td>
<td>4/3/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>Appendix A–7 and A–8</td>
<td>4/3/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>Appendix A–16</td>
<td>4/3/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>Appendix A–19</td>
<td>4/3/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>Appendix A–20</td>
<td>4/3/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG–1</td>
<td>1/8/15</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG C–3</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG C–4 through PCG C–9</td>
<td>1/8/15</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG D–1</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG D–2</td>
<td>1/8/15</td>
<td>1/8/15</td>
<td></td>
</tr>
<tr>
<td>PCG G–1</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG G–2</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG M–1</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG M–2 through PCG M–6</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG P–1</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG P–2</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG S–3</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG S–4 and PCG S–5</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>PCG S–6</td>
<td>7/24/14</td>
<td>7/24/14</td>
<td></td>
</tr>
<tr>
<td>PCG T–3 through PCG T–8</td>
<td>7/24/14</td>
<td>6/25/15</td>
<td></td>
</tr>
<tr>
<td>Index I–1 through I–9</td>
<td>1/8/15</td>
<td>6/25/15</td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents

Chapter 1. General

Section 1. Introduction

Paragraph | Page
--- | ---
1–1–1. PURPOSE OF THIS ORDER | 1–1–1
1–1–2. AUDIENCE | 1–1–1
1–1–3. WHERE TO FIND THIS ORDER | 1–1–1
1–1–4. WHAT THIS ORDER CANCELS | 1–1–1
1–1–5. EXPLANATION OF CHANGES | 1–1–1
1–1–6. SUBMISSION CUTOFF AND EFFECTIVE DATES | 1–1–1
1–1–7. DELIVERY DATES | 1–1–1
1–1–8. RECOMMENDATIONS FOR PROCEDURAL CHANGES | 1–1–1
1–1–9. PROCEDURAL LETTERS OF AGREEMENT | 1–1–2
1–1–10. CONSTRAINTS GOVERNING SUPPLEMENTS AND PROCEDURAL DEVIATIONS | 1–1–2
1–1–11. SAFETY MANAGEMENT SYSTEM (SMS) | 1–1–2
1–1–12. REFERENCES TO FAA NON–AIR TRAFFIC ORGANIZATIONS | 1–1–2
1–1–13. DISTRIBUTION | 1–1–2

Section 2. Terms of Reference

1–2–1. WORD MEANINGS | 1–2–1
1–2–2. COURSE DEFINITIONS | 1–2–2
1–2–3. NOTES | 1–2–2
1–2–4. REFERENCES | 1–2–3
1–2–5. ANNOTATIONS | 1–2–3
1–2–6. ABBREVIATIONS | 1–2–3

Chapter 2. General Control

Section 1. General

2–1–1. ATC SERVICE | 2–1–1
2–1–2. DUTY PRIORITY | 2–1–1
2–1–3. PROCEDURAL PREFERENCE | 2–1–1
2–1–4. OPERATIONAL PRIORITY | 2–1–2
2–1–5. EXPEDIENTIOUS COMPLIANCE | 2–1–3
2–1–6. SAFETY ALERT | 2–1–3
2–1–7. INFLIGHT EQUIPMENT MALFUNCTIONS | 2–1–4
2–1–8. MINIMUM FUEL | 2–1–4
2–1–9. REPORTING ESSENTIAL FLIGHT INFORMATION | 2–1–5
2–1–10. NAVIAD MALFUNCTIONS | 2–1–5
2–1–11. USE OF MARSA | 2–1–5
2–1–12. MILITARY PROCEDURES | 2–1–6
2–1–13. FORMATION FLIGHTS | 2–1–6
2–1–14. COORDINATE USE OF AIRSPACE | 2–1–6
2–1–15. CONTROL TRANSFER | 2–1–7
2–1–16. SURFACE AREAS | 2–1–7
<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–1–17. RADIO COMMUNICATIONS</td>
<td>2–1–7</td>
</tr>
<tr>
<td>2–1–18. OPERATIONAL REQUESTS</td>
<td>2–1–9</td>
</tr>
<tr>
<td>2–1–19. WAKE TURBULENCE</td>
<td>2–1–9</td>
</tr>
<tr>
<td>2–1–20. WAKE TURBULENCE CAUTIONARY ADVISORIES</td>
<td>2–1–9</td>
</tr>
<tr>
<td>2–1–21. TRAFFIC ADVISORIES</td>
<td>2–1–9</td>
</tr>
<tr>
<td>2–1–22. BIRD ACTIVITY INFORMATION</td>
<td>2–1–11</td>
</tr>
<tr>
<td>2–1–23. TRANSFER OF POSITION RESPONSIBILITY</td>
<td>2–1–11</td>
</tr>
<tr>
<td>2–1–24. WHEELS DOWN CHECK</td>
<td>2–1–11</td>
</tr>
<tr>
<td>2–1–25. SUPERVISORY NOTIFICATION</td>
<td>2–1–11</td>
</tr>
<tr>
<td>2–1–26. PILOT DEVIATION NOTIFICATION</td>
<td>2–1–12</td>
</tr>
<tr>
<td>2–1–27. TCAS RESOLUTION ADVISORIES</td>
<td>2–1–12</td>
</tr>
<tr>
<td>2–1–28. RVSM OPERATIONS</td>
<td>2–1–12</td>
</tr>
<tr>
<td>2–1–29. TERRAIN AWARENESS WARNING SYSTEM (TAWS) ALERTS</td>
<td>2–1–13</td>
</tr>
<tr>
<td>2–1–30. “BLUE LIGHTNING” EVENTS</td>
<td>2–1–13</td>
</tr>
</tbody>
</table>

Section 2. Flight Plans and Control Information

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–2–1. RECORDING INFORMATION</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–2. FORWARDING INFORMATION</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–3. FORWARDING VFR DATA</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–4. MILITARY DVFR DEPARTURES</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–5. IFR TO VFR FLIGHT PLAN CHANGE</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–6. IFR FLIGHT PROGRESS DATA</td>
<td>2–2–1</td>
</tr>
<tr>
<td>2–2–7. MANUAL INPUT OF COMPUTER-ASSIGNED BEACON CODES</td>
<td>2–2–2</td>
</tr>
<tr>
<td>2–2–8. ALTRV INFORMATION</td>
<td>2–2–2</td>
</tr>
<tr>
<td>2–2–9. COMPUTER MESSAGE VERIFICATION</td>
<td>2–2–2</td>
</tr>
<tr>
<td>2–2–10. TRANSMIT PROPOSED FLIGHT PLAN</td>
<td>2–2–3</td>
</tr>
<tr>
<td>2–2–11. FORWARDING AMENDED AND UTM DATA</td>
<td>2–2–3</td>
</tr>
<tr>
<td>2–2–12. AIRBORNE MILITARY FLIGHTS</td>
<td>2–2–4</td>
</tr>
<tr>
<td>2–2–13. FORWARDING FLIGHT PLAN DATA BETWEEN U.S. ARTCCs AND CANADIAN ACCs</td>
<td>2–2–4</td>
</tr>
<tr>
<td>2–2–14. TELETYPE FLIGHT DATA FORMAT– U.S. ARTCCs – CANADIAN ACCs</td>
<td>2–2–4</td>
</tr>
<tr>
<td>2–2–15. NORTH AMERICAN ROUTE PROGRAM (NRP) INFORMATION</td>
<td>2–2–5</td>
</tr>
</tbody>
</table>

Section 3. Flight Progress Strips

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–3–1. GENERAL</td>
<td>2–3–1</td>
</tr>
<tr>
<td>2–3–2. EN ROUTE DATA ENTRIES</td>
<td>2–3–3</td>
</tr>
<tr>
<td>2–3–3. OCEANIC DATA ENTRIES</td>
<td>2–3–5</td>
</tr>
<tr>
<td>2–3–4. TERMINAL DATA ENTRIES</td>
<td>2–3–6</td>
</tr>
<tr>
<td>2–3–5. AIRCRAFT IDENTITY</td>
<td>2–3–9</td>
</tr>
<tr>
<td>2–3–6. AIRCRAFT TYPE</td>
<td>2–3–10</td>
</tr>
<tr>
<td>2–3–7. USAF/USN UNDERGRADUATE PILOTS</td>
<td>2–3–10</td>
</tr>
<tr>
<td>2–3–8. AIRCRAFT EQUIPMENT SUFFIX</td>
<td>2–3–10</td>
</tr>
<tr>
<td>2–3–9. CLEARANCE STATUS</td>
<td>2–3–10</td>
</tr>
<tr>
<td>2–3–10. CONTROL SYMBOLOGY</td>
<td>2–3–12</td>
</tr>
</tbody>
</table>

Section 4. Radio and Interphone Communications

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–4–1. RADIO COMMUNICATIONS</td>
<td>2–4–1</td>
</tr>
<tr>
<td>2–4–2. MONITORING</td>
<td>2–4–1</td>
</tr>
<tr>
<td>2–4–3. PILOT ACKNOWLEDGMENT/READ BACK</td>
<td>2–4–1</td>
</tr>
</tbody>
</table>
## Table of Contents

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–4–4. AUTHORIZED INTERRUPTIONS</td>
<td>2–4–1</td>
</tr>
<tr>
<td>2–4–5. AUTHORIZED TRANSMISSIONS</td>
<td>2–4–1</td>
</tr>
<tr>
<td>2–4–6. FALSE OR DECEPTIVE COMMUNICATIONS</td>
<td>2–4–2</td>
</tr>
<tr>
<td>2–4–7. AUTHORIZED RELAYS</td>
<td>2–4–3</td>
</tr>
<tr>
<td>2–4–8. RADIO MESSAGE FORMAT</td>
<td>2–4–3</td>
</tr>
<tr>
<td>2–4–9. ABBREVIATED TRANSMISSIONS</td>
<td>2–4–3</td>
</tr>
<tr>
<td>2–4–10. INTERPHONE TRANSMISSION PRIORITIES</td>
<td>2–4–3</td>
</tr>
<tr>
<td>2–4–11. PRIORITY INTERRUPTION</td>
<td>2–4–3</td>
</tr>
<tr>
<td>2–4–12. INTERPHONE MESSAGE FORMAT</td>
<td>2–4–4</td>
</tr>
<tr>
<td>2–4–13. INTERPHONE MESSAGE TERMINATION</td>
<td>2–4–5</td>
</tr>
<tr>
<td>2–4–14. WORDS AND PHRASES</td>
<td>2–4–5</td>
</tr>
<tr>
<td>2–4–15. EMPHASIS FOR CLARITY</td>
<td>2–4–5</td>
</tr>
<tr>
<td>2–4–16. ICAO PHONETICS</td>
<td>2–4–6</td>
</tr>
<tr>
<td>2–4–17. NUMBERS USAGE</td>
<td>2–4–6</td>
</tr>
<tr>
<td>2–4–18. NUMBER CLARIFICATION</td>
<td>2–4–8</td>
</tr>
<tr>
<td>2–4–19. FACILITY IDENTIFICATION</td>
<td>2–4–9</td>
</tr>
<tr>
<td>2–4–20. AIRCRAFT IDENTIFICATION</td>
<td>2–4–9</td>
</tr>
<tr>
<td>2–4–21. DESCRIPTION OF AIRCRAFT TYPES</td>
<td>2–4–12</td>
</tr>
<tr>
<td>2–4–22. AIRSPACE CLASSES</td>
<td>2–4–12</td>
</tr>
</tbody>
</table>

**Section 5. Route and NAVID Description**

| 2–5–1. AIR TRAFFIC SERVICE (ATS) ROUTES                                   | 2–5–1|
| 2–5–2. NAVID TERMS                                                        | 2–5–1|
| 2–5–3. NAVID FIXES                                                        | 2–5–2|

**Section 6. Weather Information**

| 2–6–1. FAMILIARIZATION                                                   | 2–6–1|
| 2–6–2. HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)               | 2–6–1|
| 2–6–3. PIREP INFORMATION                                                 | 2–6–1|
| 2–6–4. WEATHER AND CHAFF SERVICES                                        | 2–6–2|
| 2–6–5. CALM WIND CONDITIONS                                              | 2–6–5|
| 2–6–6. REPORTING WEATHER CONDITIONS                                      | 2–6–5|
| 2–6–7. DISSEMINATING WEATHER INFORMATION                                 | 2–6–5|

**Section 7. Altimeter Settings**

| 2–7–1. CURRENT SETTINGS                                                  | 2–7–1|
| 2–7–2. ALTIMETER SETTING ISSUANCE BELOW LOWEST USABLE FL                 | 2–7–1|

**Section 8. Runway Visibility Reporting – Terminal**

| 2–8–1. FURNISH RVR/RVV VALUES                                             | 2–8–1|
| 2–8–2. ARRIVAL/DEPARTURE RUNWAY VISIBILITY                               | 2–8–1|
| 2–8–3. TERMINOLOGY                                                       | 2–8–1|

**Section 9. Automatic Terminal Information Service Procedures**

| 2–9–1. APPLICATION                                                       | 2–9–1|
| 2–9–2. OPERATING PROCEDURES                                             | 2–9–1|
| 2–9–3. CONTENT                                                          | 2–9–2|

**Section 10. Team Position Responsibilities**

| 2–10–1. EN ROUTE SECTOR TEAM POSITION RESPONSIBILITIES                   | 2–10–1|
### Table of Contents

**Chapter 3. Airport Traffic Control—Terminal**

#### Section 1. General
- PROVIDE SERVICE .......................................................... 3–1–1
- PREVENTIVE CONTROL .................................................. 3–1–1
- USE OF ACTIVE RUNWAYS ............................................. 3–1–1
- COORDINATION BETWEEN LOCAL AND GROUND CONTROLLERS 3–1–2
- VEHICLES/EQUIPMENT/PERSONNEL ON RUNWAYS ............ 3–1–2
- TRAFFIC INFORMATION .................................................. 3–1–2
- POSITION DETERMINATION ............................................. 3–1–2
- LOW LEVEL WIND SHEAR/MICROBURST ADVISORIES ........... 3–1–3
- USE OF TOWER RADAR DISPLAYS .................................. 3–1–5
- OBSERVED ABNORMALITIES ........................................... 3–1–5
- SURFACE AREA RESTRICTIONS ....................................... 3–1–5
- VISUALLY SCANNING RUNWAYS ..................................... 3–1–6
- ESTABLISHING TWO–WAY COMMUNICATIONS ..................... 3–1–6
- GROUND OPERATIONS WHEN VOLCANIC ASH IS PRESENT ....... 3–1–6
- GROUND OPERATIONS RELATED TO THREE/FOUR–HOUR TARMAC RULE 3–1–6

#### Section 2. Visual Signals
- LIGHT SIGNALS ............................................................... 3–2–1
- WARNING SIGNAL ........................................................... 3–2–1
- RECEIVER-ONLY ACKNOWLEDGMENT ................................ 3–2–1

#### Section 3. Airport Conditions
- LANDING AREA CONDITION .............................................. 3–3–1
- CLOSED/UNSAFE RUNWAY INFORMATION .......................... 3–3–1
- TIMELY INFORMATION ..................................................... 3–3–1
- BRAKING ACTION ............................................................ 3–3–2
- BRAKING ACTION ADVISORIES ....................................... 3–3–2
- ARRESTING SYSTEM OPERATION ....................................... 3–3–3
- FAR FIELD MONITOR (FFM) REMOTE STATUS UNIT ............ 3–3–4

#### Section 4. Airport Lighting
- EMERGENCY LIGHTING ..................................................... 3–4–1
- RUNWAY END IDENTIFIER LIGHTS .................................... 3–4–1
- VISUAL APPROACH SLOPE INDICATORS (VASI) .................. 3–4–1
- PRECISION APPROACH PATH INDICATORS (PAPI) ............... 3–4–1
- APPROACH LIGHTS ......................................................... 3–4–2
- ALS INTENSITY SETTINGS ............................................. 3–4–2
- SEQUENCED FLASHING LIGHTS (SFL) ............................... 3–4–2
- MALS/ODALS ............................................................... 3–4–2
- ALSF–2/SSALR ............................................................. 3–4–3
- RUNWAY EDGE LIGHTS .................................................... 3–4–3
- HIGH INTENSITY RUNWAY, RUNWAY CENTERLINE, AND TOUCHDOWN ZONE LIGHTS .................................................. 3–4–4

---

**Paragraph**

2–10–2. TERMINAL RADAR/NONRADAR TEAM POSITION RESPONSIBILITIES ........ 2–10–2
2–10–3. TOWER TEAM POSITION RESPONSIBILITIES .............................. 2–10–4
Section 5. Runway Selection

3-5-1. SELECTION .......................................................... 3-5-1
3-5-2. STOL RUNWAYS .................................................. 3-5-1
3-5-3. TAILWIND COMPONENTS ..................................... 3-5-1

Section 6. Airport Surface Detection Procedures

3-6-1. EQUIPMENT USAGE .............................................. 3-6-1
3-6-2. IDENTIFICATION ................................................. 3-6-1
3-6-3. INFORMATION USAGE .......................................... 3-6-1
3-6-4. SAFETY LOGIC ALERT RESPONSES ....................... 3-6-1
3-6-5. RADAR–ONLY MODE ............................................ 3-6-2

Section 7. Taxi and Ground Movement Procedures

3-7-1. GROUND TRAFFIC MOVEMENT .............................. 3-7-1
3-7-2. TAXI AND GROUND MOVEMENT OPERATIONS ........... 3-7-2
3-7-3. GROUND OPERATIONS ....................................... 3-7-4
3-7-4. RUNWAY PROXIMITY ........................................... 3-7-4
3-7-5. PRECISION APPROACH CRITICAL AREA .................. 3-7-4
3-7-6. PRECISION OBSTACLE FREE ZONE (POFZ) AND FINAL APPROACH OBSTACLE CLEARANCE SURFACES (OCS) .............. 3-7-5

Section 8. Spacing and Sequencing

3-8-1. SEQUENCE/SPACING APPLICATION ........................ 3-8-1
3-8-2. TOUCH-AND-GO OR STOP-AND-GO OR LOW APPROACH .................................................. 3-8-1
3-8-3. SIMULTANEOUS SAME DIRECTION OPERATION ......... 3-8-1
3-8-4. SIMULTANEOUS OPPOSITE DIRECTION OPERATION .... 3-8-2

Section 9. Departure Procedures and Separation

3-9-1. DEPARTURE INFORMATION .................................. 3-9-1
3-9-2. DEPARTURE DELAY INFORMATION .......................... 3-9-1
3-9-3. DEPARTURE CONTROL INSTRUCTIONS ..................... 3-9-2
3-9-4. LINE UP AND WAIT (LUAW) ................................... 3-9-2
3-9-5. ANTICIPATING SEPARATION ................................... 3-9-4
3-9-6. SAME RUNWAY SEPARATION ................................... 3-9-4
3-9-7. WAKE TURBULENCE SEPARATION FOR INTERSECTION DEPARTURES .................................. 3-9-6
3-9-8. INTERSECTING RUNWAY/INTERSECTING FLIGHT PATH OPERATIONS .................................. 3-9-7
3-9-9. NONINTERSECTING CONVERGING RUNWAY OPERATIONS .................................................. 3-9-8
3-9-10. TAKEOFF CLEARANCE .......................................... 3-9-10
Section 10. Arrival Procedures and Separation

3–10–1. LANDING INFORMATION ........................................... 3–10–1
3–10–2. FORWARDING APPROACH INFORMATION BY NONAPPROACH
    CONTROL FACILITIES .............................................. 3–10–1
3–10–3. SAME RUNWAY SEPARATION .................................... 3–10–2
3–10–4. INTERSECTING RUNWAY/INTERSECTING FLIGHT PATH SEPARATION .. 3–10–3
3–10–5. LANDING CLEARANCE ............................................ 3–10–6
3–10–6. ANTICIPATING SEPARATION .................................... 3–10–7
3–10–8. WITHHOLDING LANDING CLEARANCE ............................ 3–10–7
3–10–9. RUNWAY EXITING .................................................. 3–10–7
3–10–11. CLOSED TRAFFIC .................................................. 3–10–9
3–10–12. OVERHEAD MANEUVER .......................................... 3–10–9
3–10–13. SIMULATED FLAMEOUT (SFO) APPROACHES/EMERGENCY
    LANDING PATTERN (ELP) OPERATIONS/PRACTICE PRECAUTIONARY
    APPROACHES .......................................................... 3–10–10

Section 11. Helicopter Operations

3–11–1. TAXI AND GROUND MOVEMENT OPERATION .................... 3–11–1
3–11–2. HELICOPTER TAKEOFF CLEARANCE ............................ 3–11–1
3–11–3. HELICOPTER DEPARTURE SEPARATION .......................... 3–11–2
3–11–4. HELICOPTER ARRIVAL SEPARATION ............................. 3–11–3
3–11–5. SIMULTANEOUS LANDINGS OR TAKEOFFS ..................... 3–11–3
3–11–6. HELICOPTER LANDING CLEARANCE ............................. 3–11–4

Section 12. Sea Lane Operations

3–12–1. APPLICATION ....................................................... 3–12–1
3–12–2. DEPARTURE SEPARATION .......................................... 3–12–1
3–12–3. ARRIVAL SEPARATION ............................................ 3–12–1

Chapter 4. IFR

Section 1. NAVAID Use Limitations

4–1–1. ALTITUDE AND DISTANCE LIMITATIONS ......................... 4–1–1
4–1–2. EXCEPTIONS ....................................................... 4–1–2
4–1–3. CROSSING ALTITUDE .............................................. 4–1–2
4–1–4. VFR-ON-TOP ...................................................... 4–1–2
4–1–5. FIX USE ............................................................ 4–1–2

Section 2. Clearances

4–2–1. CLEARANCE ITEMS ................................................. 4–2–1
4–2–2. CLEARANCE PREFIX ............................................... 4–2–1
4–2–3. DELIVERY INSTRUCTIONS ....................................... 4–2–1
4–2–4. CLEARANCE RELAY ................................................ 4–2–1
4–2–5. ROUTE OR ALTITUDE AMENDMENTS ............................ 4–2–1
4–2–6. THROUGH CLEARANCES .......................................... 4–2–3
Paragraph | Page
--- | ---
4–2–7. ALTRV CLEARANCE | 4–2–3
4–2–8. IFR–VFR AND VFR–IFR FLIGHTS | 4–2–3
4–2–9. CLEARANCE ITEMS | 4–2–3
4–2–10. CANCELLATION OF IFR FLIGHT PLAN | 4–2–4

Section 3. Departure Procedures

4–3–1. DEPARTURE TERMINOLOGY | 4–3–1
4–3–2. DEPARTURE CLEARANCES | 4–3–1
4–3–3. ABBREVIATED DEPARTURE CLEARANCE | 4–3–4
4–3–4. DEPARTURE RESTRICTIONS, CLEARANCE VOID TIMES, HOLD FOR RELEASE, AND RELEASE TIMES | 4–3–6
4–3–5. GROUND STOP | 4–3–8
4–3–6. DELAY SEQUENCING | 4–3–8
4–3–7. FORWARD DEPARTURE DELAY INFORMATION | 4–3–8
4–3–8. COORDINATION WITH RECEIVING FACILITY | 4–3–8
4–3–9. VFR RELEASE OF IFR DEPARTURE | 4–3–8
4–3–10. FORWARDING DEPARTURE TIMES | 4–3–8

Section 4. Route Assignment

4–4–1. ROUTE USE | 4–4–1
4–4–2. ROUTE STRUCTURE TRANSITIONS | 4–4–2
4–4–3. DEGREE-DISTANCE ROUTE DEFINITION FOR MILITARY OPERATIONS | 4–4–3
4–4–4. ALTERNATIVE ROUTES | 4–4–3
4–4–5. CLASS G AIRSPACE | 4–4–3
4–4–6. DIRECT CLEARANCES | 4–4–4

Section 5. Altitude Assignment and Verification

4–5–1. VERTICAL SEPARATION MINIMA | 4–5–1
4–5–2. FLIGHT DIRECTION | 4–5–1
4–5–3. EXCEPTIONS | 4–5–1
4–5–4. LOWEST USABLE FLIGHT LEVEL | 4–5–2
4–5–5. ADJUSTED MINIMUM FLIGHT LEVEL | 4–5–2
4–5–6. MINIMUM EN ROUTE ALTITUDES | 4–5–2
4–5–7. ALTITUDE INFORMATION | 4–5–3
4–5–8. ANTICIPATED ALTITUDE CHANGES | 4–5–8

Section 6. Holding Aircraft

4–6–1. CLEARANCE TO HOLDING FIX | 4–6–1
4–6–2. CLEARANCE BEYOND FIX | 4–6–2
4–6–3. DELAYS | 4–6–2
4–6–4. HOLDING INSTRUCTIONS | 4–6–3
4–6–5. VISUAL HOLDING POINTS | 4–6–3
4–6–6. HOLDING FLIGHT PATH DEVIATION | 4–6–3
4–6–7. UNMONITORED NAVAIDS | 4–6–3
4–6–8. ILS PROTECTION/Critical AREAS | 4–6–3

Section 7. Arrival Procedures

4–7–1. CLEARANCE INFORMATION | 4–7–1
Paragraph | Page
--- | ---
4–7–2. ADVANCE DESCENT CLEARANCE | 4–7–1
4–7–3. SINGLE FREQUENCY APPROACHES (SFA) | 4–7–1
4–7–4. RADIO FREQUENCY AND RADAR BEACON CHANGES FOR MILITARY AIRCRAFT | 4–7–2
4–7–5. MILITARY TURBOJET EN ROUTE DESCENT | 4–7–2
4–7–6. ARRIVAL INFORMATION | 4–7–3
4–7–7. WEATHER INFORMATION | 4–7–3
4–7–8. BELOW MINIMA REPORT BY PILOT | 4–7–4
4–7–9. TRANSFER OF JURISDICTION | 4–7–4
4–7–10. APPROACH INFORMATION | 4–7–4
4–7–11. ARRIVAL INFORMATION BY APPROACH CONTROL FACILITIES | 4–7–5
4–7–12. AIRPORT CONDITIONS | 4–7–5
4–7–13. SWITCHING ILS/MLS RUNWAYS | 4–7–6

Section 8. Approach Clearance Procedures

4–8–1. APPROACH CLEARANCE | 4–8–1
4–8–2. CLEARANCE LIMIT | 4–8–7
4–8–3. RELAYED APPROACH CLEARANCE | 4–8–7
4–8–4. ALTITUDE ASSIGNMENT FOR MILITARY HIGH ALTITUDE INSTRUMENT APPROACHES | 4–8–7
4–8–5. SPECIFYING ALTITUDE | 4–8–7
4–8–6. CIRCLING APPROACH | 4–8–7
4–8–7. SIDE–STEP MANEUVER | 4–8–8
4–8–8. COMMUNICATIONS RELEASE | 4–8–8
4–8–9. MISSED APPROACH | 4–8–8
4–8–10. APPROACH INFORMATION | 4–8–8
4–8–11. PRACTICE APPROACHES | 4–8–8
4–8–12. LOW APPROACH AND TOUCH–AND–GO | 4–8–9

Chapter 5. Radar

Section 1. General

5–1–1. PRESENTATION AND EQUIPMENT PERFORMANCE | 5–1–1
5–1–2. ALIGNMENT ACCURACY CHECK | 5–1–1
5–1–3. RADAR USE | 5–1–1
5–1–4. BEACON RANGE ACCURACY | 5–1–2
5–1–5. ELECTRONIC ATTACK (EA) ACTIVITY | 5–1–2
5–1–6. SERVICE LIMITATIONS | 5–1–3
5–1–7. ELECTRONIC CURSOR | 5–1–3
5–1–8. MERGING TARGET PROCEDURES | 5–1–3
5–1–9. HOLDING PATTERN SURVEILLANCE | 5–1–4
5–1–10. DEVIATION ADVISORIES | 5–1–4
5–1–11. RADAR FIX POSTING | 5–1–4
5–1–12. POSITION REPORTING | 5–1–4
5–1–13. RADAR SERVICE TERMINATION | 5–1–4

Section 2. Beacon Systems

5–2–1. ASSIGNMENT CRITERIA | 5–2–1
5–2–2. DISCRETE ENVIRONMENT | 5–2–1
### Table of Contents

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–2–3. Nondiscrete Environment</td>
<td>5–2–1</td>
</tr>
<tr>
<td>5–2–4. Mixed Environment</td>
<td>5–2–1</td>
</tr>
<tr>
<td>5–2–5. Radar Beacon Code Changes</td>
<td>5–2–2</td>
</tr>
<tr>
<td>5–2–6. Function Code Assignments</td>
<td>5–2–2</td>
</tr>
<tr>
<td>5–2–8. Radio Failure</td>
<td>5–2–3</td>
</tr>
<tr>
<td>5–2–9. VFR Code Assignments</td>
<td>5–2–3</td>
</tr>
<tr>
<td>5–2–10. Beacon Code for Pressure Suit Flights and Flights Above FL 600</td>
<td>5–2–4</td>
</tr>
<tr>
<td>5–2–11. Air Defense Exercise Beacon Code Assignment</td>
<td>5–2–4</td>
</tr>
<tr>
<td>5–2–12. Standby or Low Sensitivity Operation</td>
<td>5–2–5</td>
</tr>
<tr>
<td>5–2–14. Failure to Display Assigned Beacon Code or Inoperative/Malfunctioning Transponder</td>
<td>5–2–5</td>
</tr>
<tr>
<td>5–2–15. Inoperative or Malfunctioning Interrogator</td>
<td>5–2–6</td>
</tr>
<tr>
<td>5–2–16. Failed Transponder in Class A Airspace</td>
<td>5–2–6</td>
</tr>
<tr>
<td>5–2–17. Validation of Mode C Readout</td>
<td>5–2–6</td>
</tr>
<tr>
<td>5–2–18. Altitude Confirmation– Mode C</td>
<td>5–2–7</td>
</tr>
<tr>
<td>5–2–19. Altitude Confirmation– Non–Mode C</td>
<td>5–2–7</td>
</tr>
<tr>
<td>5–2–20. Automatic Altitude Reporting</td>
<td>5–2–8</td>
</tr>
<tr>
<td>5–2–21. Inflight Deviations from Transponder/Mode C Requirements Between 10,000 Feet and 18,000 Feet</td>
<td>5–2–8</td>
</tr>
<tr>
<td>5–2–22. Beacon Termination</td>
<td>5–2–8</td>
</tr>
<tr>
<td>5–2–23. Altitude Filters</td>
<td>5–2–9</td>
</tr>
<tr>
<td>5–2–24. Inoperative or Malfunctioning ADS-B Transmitter</td>
<td>5–2–9</td>
</tr>
</tbody>
</table>

### Section 3. Radar Identification

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–3–1. Application</td>
<td>5–3–1</td>
</tr>
<tr>
<td>5–3–2. Primary Radar Identification Methods</td>
<td>5–3–1</td>
</tr>
<tr>
<td>5–3–5. Questionable Identification</td>
<td>5–3–2</td>
</tr>
<tr>
<td>5–3–8. Target Markers</td>
<td>5–3–3</td>
</tr>
</tbody>
</table>

### Section 4. Transfer of Radar Identification

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–4–1. Application</td>
<td>5–4–1</td>
</tr>
<tr>
<td>5–4–2. Terms</td>
<td>5–4–1</td>
</tr>
<tr>
<td>5–4–3. Methods</td>
<td>5–4–1</td>
</tr>
<tr>
<td>5–4–4. Traffic</td>
<td>5–4–2</td>
</tr>
<tr>
<td>5–4–5. Transferring Controller Handoff</td>
<td>5–4–2</td>
</tr>
<tr>
<td>5–4–6. Receiving Controller Handoff</td>
<td>5–4–3</td>
</tr>
<tr>
<td>5–4–7. Point Out</td>
<td>5–4–4</td>
</tr>
<tr>
<td>5–4–8. Automated Information Transfer (AIT)</td>
<td>5–4–5</td>
</tr>
<tr>
<td>5–4–9. Interfacility Automated Information Transfer</td>
<td>5–4–5</td>
</tr>
<tr>
<td>5–4–10. Prearranged Coordination</td>
<td>5–4–5</td>
</tr>
<tr>
<td>5–4–11. En Route Fourth Line Data Block Usage</td>
<td>5–4–5</td>
</tr>
</tbody>
</table>

### Section 5. Radar Separation

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–5–1. Application</td>
<td>5–5–1</td>
</tr>
</tbody>
</table>
### Table of Contents

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–5–2. TARGET SEPARATION</td>
<td>5–5–1</td>
</tr>
<tr>
<td>5–5–3. TARGET RESOLUTION</td>
<td>5–5–2</td>
</tr>
<tr>
<td>5–5–4. MINIMA</td>
<td>5–5–2</td>
</tr>
<tr>
<td>5–5–5. VERTICAL APPLICATION</td>
<td>5–5–4</td>
</tr>
<tr>
<td>5–5–6. EXCEPTIONS</td>
<td>5–5–4</td>
</tr>
<tr>
<td>5–5–7. PASSING OR DIVERGING</td>
<td>5–5–4</td>
</tr>
<tr>
<td>5–5–8. ADDITIONAL SEPARATION FOR FORMATION FLIGHTS</td>
<td>5–5–5</td>
</tr>
<tr>
<td>5–5–9. SEPARATION FROM OBSTRUCTIONS</td>
<td>5–5–6</td>
</tr>
<tr>
<td>5–5–10. ADJACENT AIRSPACE</td>
<td>5–5–6</td>
</tr>
<tr>
<td>5–5–11. EDGE OF SCOPE</td>
<td>5–5–6</td>
</tr>
<tr>
<td>5–5–12. BEACON TARGET DISPLACEMENT</td>
<td>5–5–7</td>
</tr>
</tbody>
</table>

#### Section 6. Vectoring

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–6–1. APPLICATION</td>
<td>5–6–1</td>
</tr>
<tr>
<td>5–6–2. METHODS</td>
<td>5–6–1</td>
</tr>
<tr>
<td>5–6–3. VECTORS BELOW MINIMUM ALTITUDE</td>
<td>5–6–2</td>
</tr>
</tbody>
</table>

#### Section 7. Speed Adjustment

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–7–1. APPLICATION</td>
<td>5–7–1</td>
</tr>
<tr>
<td>5–7–2. METHODS</td>
<td>5–7–2</td>
</tr>
<tr>
<td>5–7–3. MINIMA</td>
<td>5–7–3</td>
</tr>
<tr>
<td>5–7–4. TERMINATION</td>
<td>5–7–4</td>
</tr>
</tbody>
</table>

#### Section 8. Radar Departures

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–8–1. PROCEDURES</td>
<td>5–8–1</td>
</tr>
<tr>
<td>5–8–2. INITIAL HEADING</td>
<td>5–8–1</td>
</tr>
<tr>
<td>5–8–3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES</td>
<td>5–8–1</td>
</tr>
<tr>
<td>5–8–4. DEPARTURE AND ARRIVAL</td>
<td>5–8–3</td>
</tr>
<tr>
<td>5–8–5. DEPARTURES AND ARRIVALS ON PARALLEL OR NONINTERSECTING DIVERGING RUNWAYS</td>
<td>5–8–3</td>
</tr>
</tbody>
</table>

#### Section 9. Radar Arrivals

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–9–1. VECTORS TO FINAL APPROACH COURSE</td>
<td>5–9–1</td>
</tr>
<tr>
<td>5–9–2. FINAL APPROACH COURSE INTERCEPTION</td>
<td>5–9–1</td>
</tr>
<tr>
<td>5–9–3. VECTORS ACROSS FINAL APPROACH COURSE</td>
<td>5–9–2</td>
</tr>
<tr>
<td>5–9–4. ARRIVAL INSTRUCTIONS</td>
<td>5–9–2</td>
</tr>
<tr>
<td>5–9–5. APPROACH SEPARATION RESPONSIBILITY</td>
<td>5–9–5</td>
</tr>
<tr>
<td>5–9–6. SIMULTANEOUS DEPENDENT APPROACHES</td>
<td>5–9–6</td>
</tr>
<tr>
<td>5–9–7. SIMULTANEOUS INDEPENDENT APPROACHES—DUAL &amp; TRIPLE</td>
<td>5–9–7</td>
</tr>
<tr>
<td>5–9–8. SIMULTANEOUS INDEPENDENT CLOSE PARALLEL APPROACHES—HIGH UPDATE RADAR</td>
<td>5–9–9</td>
</tr>
<tr>
<td>5–9–9. SIMULTANEOUS INDEPENDENT CLOSE PARALLEL APPROACHES—HIGH UPDATE RADAR NOT REQUIRED</td>
<td>5–9–10</td>
</tr>
<tr>
<td>5–9–10. SIMULTANEOUS OFFSET INSTRUMENT APPROACHES (SOIA)—HIGH UPDATE RADAR</td>
<td>5–9–11</td>
</tr>
<tr>
<td>5–9–11. SIMULTANEOUS INDEPENDENT APPROACHES TO WIDELY-SPACED PARALLEL RUNWAYS WITHOUT FINAL MONITORS</td>
<td>5–9–14</td>
</tr>
</tbody>
</table>

#### Section 10. Radar Approaches—Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–10–1. APPLICATION</td>
<td>5–10–1</td>
</tr>
</tbody>
</table>
Section 11. Surveillance Approaches—Terminal

5–11–1. ALTITUDE INFORMATION ........................................... 5–11–1
5–11–2. VISUAL REFERENCE REPORT ...................................... 5–11–1
5–11–3. DESCENT NOTIFICATION .......................................... 5–11–1
5–11–4. DESCENT INSTRUCTIONS .......................................... 5–11–1
5–11–5. FINAL APPROACH GUIDANCE .................................... 5–11–1
5–11–6. APPROACH GUIDANCE TERMINATION ............................. 5–11–2

Section 12. PAR Approaches—Terminal

5–12–1. GLIDEPATH NOTIFICATION .......................................... 5–12–1
5–12–2. DECISION HEIGHT (DH) NOTIFICATION .......................... 5–12–1
5–12–3. DESCENT INSTRUCTION ........................................... 5–12–1
5–12–4. GLIDEPATH AND COURSE INFORMATION ......................... 5–12–1
5–12–5. DISTANCE FROM TOUCHDOWN .................................. 5–12–1
5–12–6. DECISION HEIGHT .................................................. 5–12–1
5–12–7. POSITION ADVISORIES ............................................ 5–12–1
5–12–8. APPROACH GUIDANCE TERMINATION ............................. 5–12–2
5–12–9. COMMUNICATION TRANSFER ...................................... 5–12–2
5–12–10. ELEVATION FAILURE ............................................ 5–12–2
5–12–11. SURVEILLANCE UNUSABLE ...................................... 5–12–3

Section 13. Use of PAR for Approach Monitoring—Terminal

5–13–1. MONITOR ON PAR EQUIPMENT .................................... 5–13–1
5–13–2. MONITOR AVAILABILITY ........................................... 5–13–1
5–13–3. MONITOR INFORMATION ........................................... 5–13–1

Section 14. Automation—En Route

5–14–1. CONFLICT ALERT (CA) AND MODE C INTRUDER (MCI) ALERT .............................. 5–14–1
5–14–2. EN ROUTE MINIMUM SAFE ALTITUDE WARNING (E-MSAW) .......................... 5–14–1
5–14–3. COMPUTER ENTRY OF ASSIGNED ALTITUDE .......................... 5–14–2
5–14–4. ENTRY OF REPORTED ALTITUDE ................................... 5–14–2
5–14–5. SELECTED ALTITUDE LIMITS ...................................... 5–14–2
5–14–6. SECTOR ELIGIBILITY ................................................ 5–14–2
5–14–7. COAST TRACKS ...................................................... 5–14–2
<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–14–8. CONTROLLER INITIATED COAST TRACKS</td>
<td>5–14–2</td>
</tr>
</tbody>
</table>

### Section 15. Automated Radar Terminal Systems (ARTS)– Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–15–1. APPLICATION</td>
<td>5–15–1</td>
</tr>
<tr>
<td>5–15–2. RESPONSIBILITY</td>
<td>5–15–1</td>
</tr>
<tr>
<td>5–15–3. FUNCTIONAL USE</td>
<td>5–15–1</td>
</tr>
<tr>
<td>5–15–4. SYSTEM REQUIREMENTS</td>
<td>5–15–1</td>
</tr>
<tr>
<td>5–15–5. INFORMATION DISPLAYED</td>
<td>5–15–1</td>
</tr>
<tr>
<td>5–15–6. CA/MCI</td>
<td>5–15–2</td>
</tr>
<tr>
<td>5–15–7. INHIBITING MINIMUM SAFE ALTITUDE WARNING (MSAW)</td>
<td>5–15–2</td>
</tr>
<tr>
<td>5–15–8. TRACK SUSPEND FUNCTION</td>
<td>5–15–2</td>
</tr>
</tbody>
</table>

### Section 16. TPX–42– Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–16–1. APPLICATION</td>
<td>5–16–1</td>
</tr>
<tr>
<td>5–16–2. RESPONSIBILITY</td>
<td>5–16–1</td>
</tr>
<tr>
<td>5–16–3. FUNCTIONAL USE</td>
<td>5–16–1</td>
</tr>
<tr>
<td>5–16–4. SYSTEM REQUIREMENTS</td>
<td>5–16–1</td>
</tr>
<tr>
<td>5–16–5. INFORMATION DISPLAYED</td>
<td>5–16–1</td>
</tr>
<tr>
<td>5–16–6. INHIBITING LOW ALTITUDE ALERT SYSTEM (LAAS)</td>
<td>5–16–1</td>
</tr>
</tbody>
</table>

### Chapter 6. Nonradar

#### Section 1. General

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–1–1. DISTANCE</td>
<td>6–1–1</td>
</tr>
<tr>
<td>6–1–2. NONRECEIPT OF POSITION REPORT</td>
<td>6–1–1</td>
</tr>
<tr>
<td>6–1–3. DUPLICATE POSITION REPORTS</td>
<td>6–1–1</td>
</tr>
<tr>
<td>6–1–4. ADJACENT AIRPORT OPERATION</td>
<td>6–1–1</td>
</tr>
<tr>
<td>6–1–5. ARRIVAL MINIMA</td>
<td>6–1–1</td>
</tr>
</tbody>
</table>

#### Section 2. Initial Separation of Successive Departing Aircraft

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–2–1. MINIMA ON DIVERGING COURSES</td>
<td>6–2–1</td>
</tr>
<tr>
<td>6–2–2. MINIMA ON SAME COURSE</td>
<td>6–2–3</td>
</tr>
</tbody>
</table>

#### Section 3. Initial Separation of Departing and Arriving Aircraft

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–3–1. SEPARATION MINIMA</td>
<td>6–3–1</td>
</tr>
</tbody>
</table>

#### Section 4. Longitudinal Separation

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–4–1. APPLICATION</td>
<td>6–4–1</td>
</tr>
<tr>
<td>6–4–2. MINIMA ON SAME, CONVERGING, OR CROSSING COURSES</td>
<td>6–4–1</td>
</tr>
<tr>
<td>6–4–3. MINIMA ON OPPOSITE COURSES</td>
<td>6–4–5</td>
</tr>
<tr>
<td>6–4–4. SEPARATION BY PILOTS</td>
<td>6–4–6</td>
</tr>
<tr>
<td>6–4–5. RNAV AIRCRAFT ALONG VOR AIRWAYS/ROUTES</td>
<td>6–4–6</td>
</tr>
</tbody>
</table>

#### Section 5. Lateral Separation

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–5–1. SEPARATION METHODS</td>
<td>6–5–1</td>
</tr>
<tr>
<td>6–5–2. MINIMA ON DIVERGING RADIALS</td>
<td>6–5–1</td>
</tr>
<tr>
<td>6–5–3. DME ARC MINIMA</td>
<td>6–5–2</td>
</tr>
<tr>
<td>6–5–4. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES</td>
<td>6–5–2</td>
</tr>
<tr>
<td>Paragraph</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>6–5–5. RNAV MINIMA– DIVERGING/CROSSING COURSES</td>
<td>6–5–4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 6. Vertical Separation</strong></td>
<td></td>
</tr>
<tr>
<td>6–6–1. APPLICATION</td>
<td>6–6–1</td>
</tr>
<tr>
<td>6–6–2. EXCEPTIONS</td>
<td>6–6–1</td>
</tr>
<tr>
<td>6–6–3. SEPARATION BY PILOTS</td>
<td>6–6–1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 7. Timed Approaches</strong></td>
<td></td>
</tr>
<tr>
<td>6–7–1. APPLICATION</td>
<td>6–7–1</td>
</tr>
<tr>
<td>6–7–2. APPROACH SEQUENCE</td>
<td>6–7–1</td>
</tr>
<tr>
<td>6–7–3. SEQUENCE INTERRUPTION</td>
<td>6–7–2</td>
</tr>
<tr>
<td>6–7–4. LEVEL FLIGHT RESTRICTION</td>
<td>6–7–2</td>
</tr>
<tr>
<td>6–7–5. INTERVAL MINIMA</td>
<td>6–7–2</td>
</tr>
<tr>
<td>6–7–6. TIME CHECK</td>
<td>6–7–2</td>
</tr>
<tr>
<td>6–7–7. MISSED APPROACHES</td>
<td>6–7–2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chapter 7. Visual</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 1. General</strong></td>
<td></td>
</tr>
<tr>
<td>7–1–1. CLASS A AIRSPACE RESTRICTIONS</td>
<td>7–1–1</td>
</tr>
<tr>
<td>7–1–2. VFR CONDITIONS</td>
<td>7–1–1</td>
</tr>
<tr>
<td>7–1–3. APPROACH CONTROL SERVICE FOR VFR ARRIVING AIRCRAFT</td>
<td>7–1–1</td>
</tr>
<tr>
<td>7–1–4. VISUAL HOLDING OF VFR AIRCRAFT</td>
<td>7–1–1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 2. Visual Separation</strong></td>
<td></td>
</tr>
<tr>
<td>7–2–1. VISUAL SEPARATION</td>
<td>7–2–1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 3. VFR-On-Top</strong></td>
<td></td>
</tr>
<tr>
<td>7–3–1. VFR-ON-TOP</td>
<td>7–3–1</td>
</tr>
<tr>
<td>7–3–2. ALTITUDE FOR DIRECTION OF FLIGHT</td>
<td>7–3–2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 4. Approaches</strong></td>
<td></td>
</tr>
<tr>
<td>7–4–1. VISUAL APPROACH</td>
<td>7–4–1</td>
</tr>
<tr>
<td>7–4–2. VECTORS FOR VISUAL APPROACH</td>
<td>7–4–1</td>
</tr>
<tr>
<td>7–4–3. CLEARANCE FOR VISUAL APPROACH</td>
<td>7–4–1</td>
</tr>
<tr>
<td>7–4–4. APPROACHES TO MULTIPLE RUNWAYS</td>
<td>7–4–2</td>
</tr>
<tr>
<td>7–4–5. CHARTED VISUAL FLIGHT PROCEDURES (CVFP). USA/USN NOT APPLICABLE</td>
<td>7–4–3</td>
</tr>
<tr>
<td>7–4–6. CONTACT APPROACH</td>
<td>7–4–3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 5. Special VFR (SVFR)</strong></td>
<td></td>
</tr>
<tr>
<td>7–5–1. AUTHORIZATION</td>
<td>7–5–1</td>
</tr>
<tr>
<td>7–5–2. PRIORITY</td>
<td>7–5–1</td>
</tr>
<tr>
<td>7–5–3. SEPARATION</td>
<td>7–5–2</td>
</tr>
<tr>
<td>7–5–4. ALTITUDE ASSIGNMENT</td>
<td>7–5–2</td>
</tr>
<tr>
<td>7–5–5. LOCAL OPERATIONS</td>
<td>7–5–3</td>
</tr>
<tr>
<td>7–5–6. CLIMB TO VFR</td>
<td>7–5–3</td>
</tr>
<tr>
<td>7–5–7. GROUND VISIBILITY BELOW ONE MILE</td>
<td>7–5–3</td>
</tr>
</tbody>
</table>

Table of Contents
### 7. Terminal Radar Service Area (TRSA) – Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7–7–1. APPLICATION</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–2. ISSUE OF EFC</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–3. SEPARATION</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–4. HELICOPTER TRAFFIC</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–5. ALTITUDE ASSIGNMENTS</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–6. APPROACH INTERVAL</td>
<td>7–7–1</td>
</tr>
<tr>
<td>7–7–7. TRSA DEPARTURE INFORMATION</td>
<td>7–7–1</td>
</tr>
</tbody>
</table>

### 8. Class C Service – Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7–8–1. APPLICATION</td>
<td>7–8–1</td>
</tr>
<tr>
<td>7–8–2. CLASS C SERVICES</td>
<td>7–8–1</td>
</tr>
<tr>
<td>7–8–3. SEPARATION</td>
<td>7–8–1</td>
</tr>
<tr>
<td>7–8–4. ESTABLISHING TWO-WAY COMMUNICATIONS</td>
<td>7–8–1</td>
</tr>
<tr>
<td>7–8–5. ALTITUDE ASSIGNMENTS</td>
<td>7–8–2</td>
</tr>
<tr>
<td>7–8–6. EXCEPTIONS</td>
<td>7–8–2</td>
</tr>
<tr>
<td>7–8–7. ADJACENT AIRPORT OPERATIONS</td>
<td>7–8–2</td>
</tr>
<tr>
<td>7–8–8. TERMINATION OF SERVICE</td>
<td>7–8–2</td>
</tr>
</tbody>
</table>

### 9. Class B Service Area – Terminal

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7–9–1. APPLICATION</td>
<td>7–9–1</td>
</tr>
<tr>
<td>7–9–2. VFR AIRCRAFT IN CLASS B AIRSPACE</td>
<td>7–9–1</td>
</tr>
<tr>
<td>7–9–3. METHODS</td>
<td>7–9–1</td>
</tr>
<tr>
<td>7–9–4. SEPARATION</td>
<td>7–9–2</td>
</tr>
<tr>
<td>7–9–5. TRAFFIC ADVISORIES</td>
<td>7–9–2</td>
</tr>
<tr>
<td>7–9–6. HELICOPTER TRAFFIC</td>
<td>7–9–2</td>
</tr>
<tr>
<td>7–9–7. ALTITUDE ASSIGNMENTS</td>
<td>7–9–2</td>
</tr>
<tr>
<td>7–9–8. APPROACH INTERVAL</td>
<td>7–9–2</td>
</tr>
</tbody>
</table>

### Chapter 8. Offshore/Oceanic Procedures

#### Section 1. General

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–1–1. ATC SERVICE</td>
<td>8–1–1</td>
</tr>
<tr>
<td>Paragraph</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>8–1–2. OPERATIONS IN OFFSHORE AIRSPACE AREAS</td>
<td>8–1–2</td>
</tr>
<tr>
<td>8–1–3. VFR FLIGHT PLANS</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–4. TYPES OF SEPARATION</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–5. ALTIMETER SETTING</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–6. RECEIPT OF POSITION REPORTS</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–7. OCEANIC NAVIGATIONAL ERROR REPORTING (ONER) PROCEDURES</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–8. USE OF CONTROL ESTIMATES</td>
<td>8–1–1</td>
</tr>
<tr>
<td>8–1–9. RVSM OPERATIONS</td>
<td>8–1–1</td>
</tr>
</tbody>
</table>

**Section 2. Coordination**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–2–1. GENERAL</td>
<td>8–2–1</td>
</tr>
<tr>
<td>8–2–2. TRANSFER OF CONTROL AND COMMUNICATIONS</td>
<td>8–2–1</td>
</tr>
<tr>
<td>8–2–3. AIR TRAFFIC SERVICES INTERFACILITY DATA COMMUNICATIONS (AIDC)</td>
<td>8–2–1</td>
</tr>
</tbody>
</table>

**Section 3. Longitudinal Separation**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–3–1. APPLICATION</td>
<td>8–3–1</td>
</tr>
<tr>
<td>8–3–2. SEPARATION METHODS</td>
<td>8–3–1</td>
</tr>
<tr>
<td>8–3–3. MACH NUMBER TECHNIQUE</td>
<td>8–3–2</td>
</tr>
</tbody>
</table>

**Section 4. Lateral Separation**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–4–1. APPLICATION</td>
<td>8–4–1</td>
</tr>
<tr>
<td>8–4–2. SEPARATION METHODS</td>
<td>8–4–1</td>
</tr>
<tr>
<td>8–4–3. REDUCTION OF ROUTE PROTECTED AIRSPACE</td>
<td>8–4–3</td>
</tr>
<tr>
<td>8–4–4. TRACK SEPARATION</td>
<td>8–4–4</td>
</tr>
</tbody>
</table>

**Section 5. Offshore/Oceanic Transition Procedures**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–5–1. ALTITUDE/FLIGHT LEVEL TRANSITION</td>
<td>8–5–1</td>
</tr>
<tr>
<td>8–5–2. COURSE DIVERGENCE</td>
<td>8–5–1</td>
</tr>
<tr>
<td>8–5–3. OPPOSITE DIRECTION</td>
<td>8–5–1</td>
</tr>
<tr>
<td>8–5–4. SAME DIRECTION</td>
<td>8–5–2</td>
</tr>
<tr>
<td>8–5–5. RADAR IDENTIFICATION APPLICATION</td>
<td>8–5–2</td>
</tr>
</tbody>
</table>

**Section 6. Separation from Airspace Reservations**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–6–1. TEMPORARY STATIONARY AIRSPACE RESERVATIONS</td>
<td>8–6–1</td>
</tr>
<tr>
<td>8–6–2. REFUSAL OF AVOIDANCE CLEARANCE</td>
<td>8–6–1</td>
</tr>
<tr>
<td>8–6–3. TEMPORARY MOVING AIRSPACE RESERVATIONS</td>
<td>8–6–1</td>
</tr>
</tbody>
</table>

**Section 7. North Atlantic ICAO Region**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–7–1. APPLICATION</td>
<td>8–7–1</td>
</tr>
<tr>
<td>8–7–2. VERTICAL SEPARATION</td>
<td>8–7–1</td>
</tr>
<tr>
<td>8–7–3. LONGITUDINAL SEPARATION</td>
<td>8–7–1</td>
</tr>
<tr>
<td>8–7–4. LATERAL SEPARATION</td>
<td>8–7–2</td>
</tr>
<tr>
<td>8–7–5. PROCEDURES FOR WEATHER DEVIATIONS IN NORTH ATLANTIC (NAT) AIRSPACE</td>
<td>8–7–2</td>
</tr>
</tbody>
</table>

**Section 8. Caribbean ICAO Region**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–8–1. APPLICATION</td>
<td>8–8–1</td>
</tr>
<tr>
<td>8–8–2. VERTICAL SEPARATION</td>
<td>8–8–1</td>
</tr>
</tbody>
</table>
### Paragraph Page

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–8–3. LONGITUDINAL SEPARATION</td>
<td>8–8–1</td>
</tr>
<tr>
<td>8–8–4. LATERAL SEPARATION</td>
<td>8–8–2</td>
</tr>
<tr>
<td>8–8–5. VFR CLIMB AND DESCENT</td>
<td>8–8–2</td>
</tr>
</tbody>
</table>

#### Section 9. Pacific ICAO Region

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–9–1. APPLICATION</td>
<td>8–9–1</td>
</tr>
<tr>
<td>8–9–2. VERTICAL SEPARATION</td>
<td>8–9–1</td>
</tr>
<tr>
<td>8–9–3. LONGITUDINAL SEPARATION</td>
<td>8–9–1</td>
</tr>
<tr>
<td>8–9–4. LATERAL SEPARATION</td>
<td>8–9–2</td>
</tr>
<tr>
<td>8–9–5. COMPOSITE SEPARATION MINIMA</td>
<td>8–9–2</td>
</tr>
<tr>
<td>8–9–6. COMPOSITE SEPARATION ALTITUDE ASSIGNMENT</td>
<td>8–9–2</td>
</tr>
<tr>
<td>8–9–7. COMPOSITE SEPARATION APPLICATION</td>
<td>8–9–3</td>
</tr>
<tr>
<td>8–9–8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC CONTROLLED AIRSPACE</td>
<td>8–9–4</td>
</tr>
</tbody>
</table>

#### Section 10. North American ICAO Region

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–10–1. APPLICATION</td>
<td>8–10–1</td>
</tr>
<tr>
<td>8–10–2. VERTICAL SEPARATION</td>
<td>8–10–1</td>
</tr>
<tr>
<td>8–10–3. LONGITUDINAL SEPARATION</td>
<td>8–10–1</td>
</tr>
<tr>
<td>8–10–4. LATERAL SEPARATION</td>
<td>8–10–1</td>
</tr>
</tbody>
</table>

#### Chapter 9. Special Flights

##### Section 1. General

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–1–1. GENERAL</td>
<td>9–1–1</td>
</tr>
<tr>
<td>9–1–2. SPECIAL HANDLING</td>
<td>9–1–1</td>
</tr>
<tr>
<td>9–1–3. FLIGHT CHECK AIRCRAFT</td>
<td>9–1–1</td>
</tr>
</tbody>
</table>

##### Section 2. Special Operations

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–2–1. AIRCRAFT CARRYING DANGEROUS MATERIALS</td>
<td>9–2–1</td>
</tr>
<tr>
<td>9–2–2. CELESTIAL NAVIGATION TRAINING</td>
<td>9–2–1</td>
</tr>
<tr>
<td>9–2–3. DEPARTMENT OF ENERGY (DOE) SPECIAL FLIGHTS</td>
<td>9–2–1</td>
</tr>
<tr>
<td>9–2–4. EXPERIMENTAL AIRCRAFT OPERATIONS</td>
<td>9–2–2</td>
</tr>
<tr>
<td>9–2–5. FAA RESEARCH AND DEVELOPMENT FLIGHTS</td>
<td>9–2–2</td>
</tr>
<tr>
<td>9–2–6. FLYNET</td>
<td>9–2–2</td>
</tr>
<tr>
<td>9–2–7. IFR MILITARY TRAINING ROUTES</td>
<td>9–2–2</td>
</tr>
<tr>
<td>9–2–8. INTERCEPTOR OPERATIONS</td>
<td>9–2–4</td>
</tr>
<tr>
<td>9–2–9. SPECIAL INTEREST SITES</td>
<td>9–2–4</td>
</tr>
<tr>
<td>9–2–10. WASHINGTON, DC, SPECIAL FLIGHT RULES AREA (DC SFRA)/ATC SECURITY SERVICES</td>
<td>9–2–4</td>
</tr>
<tr>
<td>9–2–11. SECURITY NOTICE (SECNOT)</td>
<td>9–2–5</td>
</tr>
<tr>
<td>9–2–12. LAW ENFORCEMENT OPERATIONS BY CIVIL AND MILITARY ORGANIZATIONS</td>
<td>9–2–5</td>
</tr>
<tr>
<td>9–2–13. MILITARY AERIAL REFUELING</td>
<td>9–2–6</td>
</tr>
<tr>
<td>9–2–14. MILITARY OPERATIONS ABOVE FL 600</td>
<td>9–2–7</td>
</tr>
<tr>
<td>9–2–15. MILITARY SPECIAL USE FREQUENCIES</td>
<td>9–2–8</td>
</tr>
<tr>
<td>9–2–16. AVOIDANCE OF AREAS OF NUCLEAR RADIATION</td>
<td>9–2–8</td>
</tr>
<tr>
<td>9–2–17. SAMP</td>
<td>9–2–8</td>
</tr>
<tr>
<td>9–2–18. AWACS/NORAD SPECIAL FLIGHTS</td>
<td>9–2–9</td>
</tr>
</tbody>
</table>
## Table of Contents

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–2–19. WEATHER RECONNAISSANCE FLIGHTS</td>
<td>9–2–9</td>
</tr>
<tr>
<td>9–2–20. EVASIVE ACTION MANEUVER</td>
<td>9–2–9</td>
</tr>
<tr>
<td>9–2–21. NONSTANDARD FORMATION/CELL OPERATIONS</td>
<td>9–2–10</td>
</tr>
<tr>
<td>9–2–22. OPEN SKIES TREATY AIRCRAFT</td>
<td>9–2–10</td>
</tr>
</tbody>
</table>

**Section 3. Special Use, ATC–Assigned Airspace, and Stationary ALTRVs**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–3–1. APPLICATION</td>
<td>9–3–1</td>
</tr>
<tr>
<td>9–3–2. SEPARATION MINIMA</td>
<td>9–3–1</td>
</tr>
<tr>
<td>9–3–3. VFR-ON-TOP</td>
<td>9–3–1</td>
</tr>
<tr>
<td>9–3–4. TRANSITING ACTIVE SUA/ATCAA</td>
<td>9–3–2</td>
</tr>
</tbody>
</table>

**Section 4. Fuel Dumping**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–4–1. INFORMATION REQUIREMENTS</td>
<td>9–4–1</td>
</tr>
<tr>
<td>9–4–2. ROUTING</td>
<td>9–4–1</td>
</tr>
<tr>
<td>9–4–3. ALTITUDE ASSIGNMENT</td>
<td>9–4–1</td>
</tr>
<tr>
<td>9–4–4. SEPARATION MINIMA</td>
<td>9–4–1</td>
</tr>
<tr>
<td>9–4–5. INFORMATION DISSEMINATION</td>
<td>9–4–1</td>
</tr>
</tbody>
</table>

**Section 5. Jettisoning of External Stores**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–5–1. JETTISONING OF EXTERNAL STORES</td>
<td>9–5–1</td>
</tr>
</tbody>
</table>

**Section 6. Unmanned Free Balloons**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–6–1. APPLICATION</td>
<td>9–6–1</td>
</tr>
<tr>
<td>9–6–2. DERELICT BALLOONS</td>
<td>9–6–2</td>
</tr>
</tbody>
</table>

**Section 7. Parachute Operations**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–7–1. COORDINATION</td>
<td>9–7–1</td>
</tr>
<tr>
<td>9–7–2. CLASS A, CLASS B, AND CLASS C AIRSPACE</td>
<td>9–7–1</td>
</tr>
<tr>
<td>9–7–3. CLASS D AIRSPACE</td>
<td>9–7–1</td>
</tr>
<tr>
<td>9–7–4. OTHER CONTROL AIRSPACE</td>
<td>9–7–1</td>
</tr>
</tbody>
</table>

**Section 8. Unidentified Flying Object (UFO) Reports**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–8–1. GENERAL</td>
<td>9–8–1</td>
</tr>
</tbody>
</table>

**Chapter 10. Emergencies**

**Section 1. General**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–1–1. EMERGENCY DETERMINATIONS</td>
<td>10–1–1</td>
</tr>
<tr>
<td>10–1–2. OBTAINING INFORMATION</td>
<td>10–1–1</td>
</tr>
<tr>
<td>10–1–3. PROVIDING ASSISTANCE</td>
<td>10–1–1</td>
</tr>
<tr>
<td>10–1–4. RESPONSIBILITY</td>
<td>10–1–1</td>
</tr>
<tr>
<td>10–1–5. COORDINATION</td>
<td>10–1–2</td>
</tr>
<tr>
<td>10–1–6. AIRPORT GROUND EMERGENCY</td>
<td>10–1–2</td>
</tr>
<tr>
<td>10–1–7. INFLIGHT EMERGENCIES INVOLVING MILITARY FIGHTER-TYPE AIRCRAFT</td>
<td>10–1–2</td>
</tr>
</tbody>
</table>

**Section 2. Emergency Assistance**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–2–1. INFORMATION REQUIREMENTS</td>
<td>10–2–1</td>
</tr>
<tr>
<td>Paragraph</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>10–2–2. FREQUENCY CHANGES</td>
<td>10–2–1</td>
</tr>
<tr>
<td>10–2–3. AIRCRAFT ORIENTATION</td>
<td>10–2–1</td>
</tr>
<tr>
<td>10–2–4. ALTITUDE CHANGE FOR IMPROVED RECEPTION</td>
<td>10–2–1</td>
</tr>
<tr>
<td>10–2–5. EMERGENCY SITUATIONS</td>
<td>10–2–1</td>
</tr>
<tr>
<td>10–2–6. HIJACKED AIRCRAFT</td>
<td>10–2–2</td>
</tr>
<tr>
<td>10–2–7. VFR AIRCRAFT IN WEATHER DIFFICULTY</td>
<td>10–2–2</td>
</tr>
<tr>
<td>10–2–8. RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY</td>
<td>10–2–2</td>
</tr>
<tr>
<td>10–2–9. RADAR ASSISTANCE TECHNIQUES</td>
<td>10–2–3</td>
</tr>
<tr>
<td>10–2–10. EMERGENCY LOCATOR TRANSMITTER (ELT) SIGNALS</td>
<td>10–2–3</td>
</tr>
<tr>
<td>10–2–11. AIRCRAFT BOMB THREATS</td>
<td>10–2–4</td>
</tr>
<tr>
<td>10–2–12. EXPLOSIVE DETECTION K–9 TEAMS</td>
<td>10–2–5</td>
</tr>
<tr>
<td>10–2–13. MANPADS ALERT</td>
<td>10–2–5</td>
</tr>
<tr>
<td>10–2–14. UNAUTHORIZED LASER ILLUMINATION OF AIRCRAFT</td>
<td>10–2–5</td>
</tr>
<tr>
<td>10–2–15. EMERGENCY AIRPORT RECOMMENDATION</td>
<td>10–2–6</td>
</tr>
<tr>
<td>10–2–16. GUIDANCE TO EMERGENCY AIRPORT</td>
<td>10–2–6</td>
</tr>
<tr>
<td>10–2–17. EMERGENCY OBSTRUCTION VIDEO MAP (EOVM)</td>
<td>10–2–6</td>
</tr>
<tr>
<td>10–2–18. VOLCANIC ASH</td>
<td>10–2–6</td>
</tr>
<tr>
<td>10–2–19. REPORTING DEATH, ILLNESS, OR OTHER PUBLIC HEALTH RISK ON BOARD AIRCRAFT</td>
<td>10–2–7</td>
</tr>
</tbody>
</table>

**Section 3. Overdue Aircraft**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–3–1. OVERDUE AIRCRAFT/OTHER SITUATIONS</td>
<td>10–3–1</td>
</tr>
<tr>
<td>10–3–2. INFORMATION TO BE FORWARDED TO ARTCC</td>
<td>10–3–1</td>
</tr>
<tr>
<td>10–3–3. INFORMATION TO BE FORWARDED TO RCC</td>
<td>10–3–1</td>
</tr>
<tr>
<td>10–3–4. ALNOT</td>
<td>10–3–2</td>
</tr>
<tr>
<td>10–3–5. RESPONSIBILITY TRANSFER TO RCC</td>
<td>10–3–2</td>
</tr>
<tr>
<td>10–3–6. LAST KNOWN POSITION DETERMINATION</td>
<td>10–3–3</td>
</tr>
<tr>
<td>10–3–7. ALNOT CANCELLATION</td>
<td>10–3–3</td>
</tr>
</tbody>
</table>

**Section 4. Control Actions**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–4–1. TRAFFIC RESTRICTIONS</td>
<td>10–4–1</td>
</tr>
<tr>
<td>10–4–2. LIGHTING REQUIREMENTS</td>
<td>10–4–1</td>
</tr>
<tr>
<td>10–4–3. TRAFFIC RESUMPTION</td>
<td>10–4–1</td>
</tr>
<tr>
<td>10–4–4. COMMUNICATIONS FAILURE</td>
<td>10–4–1</td>
</tr>
</tbody>
</table>

**Section 5. Miscellaneous Operations**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–5–1. EXPLOSIVE CARGO</td>
<td>10–5–1</td>
</tr>
</tbody>
</table>

**Section 6. Oceanic Emergency Procedures**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–6–1. APPLICATION</td>
<td>10–6–1</td>
</tr>
<tr>
<td>10–6–2. PHASES OF EMERGENCY</td>
<td>10–6–1</td>
</tr>
<tr>
<td>10–6–3. ALERTING SERVICE AND SPECIAL ASSISTANCE</td>
<td>10–6–1</td>
</tr>
<tr>
<td>10–6–4. INFLIGHT CONTINGENCIES</td>
<td>10–6–2</td>
</tr>
<tr>
<td>10–6–5. SERVICES TO RESCUE AIRCRAFT</td>
<td>10–6–3</td>
</tr>
</tbody>
</table>

**Section 7. Ground Missile Emergencies**

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–7–1. INFORMATION RELAY</td>
<td>10–7–1</td>
</tr>
<tr>
<td>10–7–2. IFR AND SVFR MINIMA</td>
<td>10–7–1</td>
</tr>
<tr>
<td>10–7–3. VFR MINIMA</td>
<td>10–7–1</td>
</tr>
</tbody>
</table>
Chapter 11. Traffic Management Procedures

Section 1. General

11–1–1. DUTY RESPONSIBILITY ........................................... 11–1–1
11–1–2. DUTIES AND RESPONSIBILITIES ................................. 11–1–1
11–1–3. TIME BASED FLOW MANAGEMENT (TBFM) ..................... 11–1–2

Chapter 12. Canadian Airspace Procedures

Section 1. General Control

12–1–1. APPLICATION ........................................................ 12–1–1
12–1–2. AIRSPACE CLASSIFICATION ...................................... 12–1–1
12–1–3. ONE THOUSAND–ON–TOP .......................................... 12–1–1
12–1–4. SEPARATION .......................................................... 12–1–1
12–1–5. DEPARTURE CLEARANCE/COMMUNICATION FAILURE ............ 12–1–2
12–1–6. PARACHUTE JUMPING .............................................. 12–1–2
12–1–7. SPECIAL VFR (SVFR) .................................................. 12–1–2

Chapter 13. Decision Support Tools

Section 1. User Request Evaluation Tool (URET) – En Route

13–1–1. DESCRIPTION ......................................................... 13–1–1
13–1–2. CONFLICT DETECTION AND RESOLUTION ....................... 13–1–1
13–1–3. TRIAL PLANNING .................................................... 13–1–1
13–1–4. URET–BASED CLEARANCES ........................................ 13–1–1
13–1–5. THE AIRCRAFT LIST (ACL), DEPARTURE LIST (DL) AND FLIGHT DATA MANAGEMENT ........................... 13–1–1
13–1–6. MANUAL COORDINATION AND THE URET COORDINATION MENU .................................................. 13–1–2
13–1–7. HOLDING .............................................................. 13–1–2
13–1–8. RECORDING OF CONTROL DATA ................................... 13–1–2
13–1–9. ACKNOWLEDGEMENT OF AUTOMATED NOTIFICATION ............. 13–1–5
13–1–10. CURRENCY OF TRAJECTORY INFORMATION ...................... 13–1–5
13–1–11. DELAY REPORTING .................................................. 13–1–5
13–1–12. OVERDUE AIRCRAFT ................................................ 13–1–5
13–1–13. USE OF GRAPHICS PLAN DISPLAY (GPD) ........................ 13–1–6
13–1–14. FORECAST WINDS ................................................... 13–1–6
13–1–15. INTERFACILITY CONNECTIVITY .................................... 13–1–6
13–1–16. PRIMARY HOST OUTAGES .......................................... 13–1–6
13–1–17. URET AIRSPACE CONFIGURATION ELEMENTS ................... 13–1–6

Section 2. Ocean21 – Oceanic

13–2–1. DESCRIPTION ......................................................... 13–2–1
13–2–2. CONFLICT DETECTION AND RESOLUTION ....................... 13–2–1
13–2–3. INFORMATION MANAGEMENT ....................................... 13–2–2
<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>13–2–4. CONTROLLER PILOT DATA LINK COMMUNICATIONS (CPDLC)</td>
<td>13–2–3</td>
</tr>
<tr>
<td>13–2–5. COORDINATION</td>
<td>13–2–4</td>
</tr>
<tr>
<td>13–2–6. TEAM RESPONSIBILITIES – MULTIPLE PERSON OPERATION</td>
<td>13–2–4</td>
</tr>
</tbody>
</table>

### Appendices

- **Appendix A. Aircraft Information Fixed-Wing Aircraft** ........................................ Appendix A–1
- **Appendix B. Aircraft Information Helicopters/Rotorcrafts** ................................ Appendix B–1
- **Appendix C. Aircraft Information Specific Amateur-Built/Experimental Aircraft** ...... Appendix C–1
- **Appendix D. Standard Operating Practice (SOP) for the Transfer of Position Responsibility** ........................................ Appendix D–1
- **PILOT/CONTROLLER GLOSSARY** ................................................................. PCG–1
2–1–9. REPORTING ESSENTIAL FLIGHT INFORMATION

Report as soon as possible to the appropriate FSS, airport manager’s office, ARTCC, approach control facility, operations office, or military operations office any information concerning components of the NAS or any flight conditions which may have an adverse effect on air safety.

**NOTE**—FSSs are responsible for classifying and disseminating Notices to Airmen.

**REFERENCE**—
FAAO JO 7110.65, Para 3–3–3 Timely Information.
FAAO JO 7110.65, Para 5–1–6 Service Limitations.
FAAO JO 7210.3, Para 3–1–2, Periodic Maintenance.
USN, See OPNAVINST 3721.30.

2–1–10. NAVAID MALFUNCTIONS

a. When an aircraft reports a ground–based NAVAID malfunction, take the following actions:

1. Request a report from a second aircraft.

2. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230–4 or appropriate military form.

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

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

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

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

1. Record the following minimum information:
   (a) Aircraft make, model, and call sign.
   (b) Location or position, and altitude at the time where GPS or WAAS anomaly was observed.
   (c) Date/time of occurrence.

2. Request a report from a second aircraft.

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

4. Inform other aircraft of the anomaly as specified in paragraph 4–8–1j or k, as applicable.

**PHRASEOLOGY**—
Attention all aircraft, GPS reported unreliable (or WAAS unavailable) in vicinity/area (position).

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

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

2–1–11. USE OF MARSA

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

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

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

C. DOD must ensure that military pilots requesting special-use airspace/ATCAAs have coordinated with the scheduling agency, have obtained approval for entry, and are familiar with the appropriate MARSA procedures. ATC is not responsible for determining which military aircraft are authorized to enter special-use airspace/ATCAAs.
2–1–12. MILITARY PROCEDURES

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

a. ATC facilities operated by that military service.

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

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

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

REFERENCE–
FAA JO 7110.65, Para 1–2–5 Annotations.

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

REFERENCE–
FAA JO 7110.65, Para 9–2–13 Military Aerial Refueling.

2–1–13. FORMATION FLIGHTS

a. Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

NOTE–
1. Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until approved separation has been attained.
2. Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

REFERENCE–
FAA JO 7110.65, Para 5–5–8 Additional Separation for Formation Flights.

P/C/G Term– Formation Flight.

b. Military and civil formation flights in RVSM airspace.

1. Utilize RVSM separation standards for a formation flight, which consists of all RVSM approved aircraft.
2. Utilize non–RVSM separation standards for a formation flight above FL 290, which does not consist of all RVSM approved aircraft.
3. If aircraft are requesting to form a formation flight to FL 290 or above, the controller who issues the clearance creating the formation flight is responsible for ensuring that the proper equipment suffix is entered for the lead aircraft.
4. If the flight departs as a formation, and is requesting FL 290 or above, the first center sector must ensure that the proper equipment suffix is entered.
5. If the formation flight is below FL 290 and later requests FL 290 or above, the controller receiving the RVSM altitude request must ensure the proper equipment suffix is entered.
6. Upon break–up of the formation flight, the controller initiating the break–up must ensure that all aircraft or flights are assigned their proper equipment suffix.

2–1–14. COORDINATE USE OF AIRSPACE

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

ALTIMETER UNKNOWN.

**EXAMPLE—**
“Traffic, one zero miles east of Forsythe V–O–R, Southbound, M–D Eighty, descending to one six thousand.”
“Traffic, reported one zero miles west of Downey V–O–R, northbound, Apache, altitude unknown, estimated Joliet V–O–R one three one five.”
“Traffic, eight minutes west of Chicago Heights V–O–R, westbound, Mooney, eight thousand, estimated Joliet V–O–R two zero three five.”
“Traffic, numerous aircraft, vicinity of Delia airport.”

c. For aircraft displaying Mode C, not radar identified, issue indicated altitude.

**EXAMPLE—**
“Traffic, one o’clock, six miles, eastbound, altitude indicates six thousand five hundred.”

**REFERENCE—**
FAAO JO 7110.65, Para 3–1–6 Traffic Information.
FAAO JO 7110.65, Para 7–2–1 Visual Separation.
FAAO JO 7110.65, Para 7–6–10 VFR Departure Information.

**2–1–22. BIRD ACTIVITY INFORMATION**

a. Issue advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

**EXAMPLE—**
“Flock of geese, one o’clock, seven miles, northbound, last reported at four thousand.”
“Flock of small birds, southbound along Mohawk River, last reported at three thousand.”
“Numerous flocks of ducks, vicinity Lake Winnebago, altitude unknown.”

b. Relay bird activity information to adjacent facilities and to FSSs whenever it appears it will become a factor in their areas.

**2–1–23. TRANSFER OF POSITION RESPONSIBILITY**

The transfer of position responsibility must be accomplished in accordance with the “Standard Operating Practice (SOP) for the Transfer of Position Responsibility,” and appropriate facility directives each time operational responsibility for a position is transferred from one specialist to another.

**2–1–24. WHEELS DOWN CHECK**

**USA/USAF/USN**

Remind aircraft to check wheels down on each approach unless the pilot has previously reported wheels down for that approach.

**NOTE—**
The intent is solely to remind the pilot to lower the wheels, not to place responsibility on the controller.

a. Tower must issue the wheels down check at an appropriate place in the pattern.

**PHRASEOLOGY—**
CHECK WHEELS DOWN.

b. Approach/arrival control, GCA must issue the wheels down check as follows:

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

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

**PHRASEOLOGY—**
WHEELS SHOULD BE DOWN.

**2–1–25. SUPERVISORY NOTIFICATION**

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

a. Weather.

b. Equipment status.

c. Potential sector overload.

d. Emergency situations.

e. Special flights/operations.

2–1–26. PILOT DEVIATION NOTIFICATION

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

**PHRASEOLOGY—**

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

**REFERENCE—**

FAAO 8020.11, Aircraft Accident and Incident Notification, Investigation, and Reporting, Para 84, Pilot Deviations.

2–1–27. TCAS RESOLUTION ADVISORIES

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

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

c. Once the responding aircraft has begun a maneuver in response to an RA, the controller is not responsible for providing approved separation between the aircraft that is responding to an RA and any other aircraft, airspace, terrain or obstructions.

Responsibility for approved separation resumes when one of the following conditions are met:

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

**NOTE—**

1. AC 120–55A, Air Carrier Operational Approval and Use of TCAS II, suggests pilots use the following phraseology to notify controllers during TCAS events.

When a TCAS RA may affect an ATC clearance, inform ATC when beginning the maneuver, or as soon as workload permits.

**EXAMPLE—**

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

**NOTE—**

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

**EXAMPLE—**

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

2–1–28. RVSM OPERATIONS

Controller responsibilities must include but not be limited to the following:

a. Non–RVSM aircraft operating in RVSM airspace.

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

**NOTE—**

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

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

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

b. Non–RVSM aircraft transitioning RVSM airspace.

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

c. Apply appropriate separation standards and remove any aircraft from RVSM airspace that advises it is unable RVSM due to equipment while en route.
d. Use “negative RVSM” in all verbal ground–to–ground communications involving non–RVSM aircraft while cleared to operate within RVSM airspace.

**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 approved separation between the aircraft that is responding to a TAWS alert and any other aircraft, airspace, terrain or obstructions. Responsibility for approved 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 approved separation has been reestablished, or
3. The responding aircraft has executed an alternate clearance and you observe that approved 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.
d. Air traffic managers at automated terminal radar facilities may waive the requirement to use flight progress strips provided:

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

2. Local procedures are documented in a facility directive. These procedures should include but not be limited to:
   (a) Departure areas and/or procedures.
   (b) Arrival procedures.
   (c) Overflight handling procedures.
   (d) Transition from radar to nonradar.
   (e) Transition from ARTS to non–ARTS.
   (f) Transition from ASR to CENRAP.
   (g) Transition to or from ESL.

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

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

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

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

2–3–5. AIRCRAFT IDENTITY

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

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

\[ \text{EXAMPLE—} \]

“N12345.”
“TN555Q.”
“AA192.”
“LN751B.”

\[ \text{NOTE—} \]

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

\[ \text{b. Military Aircraft.} \]

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

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

\[ \text{EXAMPLE—} \]

“SAMP Three One Six.”

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

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

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

\[ \begin{array}{|l|l|}
\hline
\text{Prefix} & \text{Branch} \\
\hline
A & \text{U.S. Air Force} \\
C & \text{U.S. Coast Guard} \\
G & \text{Air or Army National Guard} \\
R & \text{U.S. Army} \\
VM & \text{U.S. Marine Corps} \\
VV & \text{U.S. Navy} \\
CFC & \text{Canadian Forces} \\
CTG & \text{Canadian Coast Guard} \\
\hline
\end{array} \]

\[ \text{TBL 2–3–7} \]

\[ \text{Military Mission Prefix} \]

\[ \text{Prefix} \]

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

(b) The service prefix and a digit and a letter (use phonetic alphabet equivalent) followed by 2 or 3 digits.
5. Aircraft carrying the President, Vice President, and/or their family members will use the identifiers in the following tables. See TBL 2–3–8 and TBL 2–3–9.

<table>
<thead>
<tr>
<th>TBL 2–3–8</th>
<th>President and Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>President</td>
</tr>
<tr>
<td>Air Force</td>
<td>AF1</td>
</tr>
<tr>
<td>Marine</td>
<td>VM1</td>
</tr>
<tr>
<td>Navy</td>
<td>VR1</td>
</tr>
<tr>
<td>Army</td>
<td>RR1</td>
</tr>
<tr>
<td>Coast Guard</td>
<td>C1</td>
</tr>
<tr>
<td>Guard</td>
<td>G1</td>
</tr>
<tr>
<td>Commercial</td>
<td>EXEC1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TBL 2–3–9</th>
<th>Vice President and Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Vice President</td>
</tr>
<tr>
<td>Air Force</td>
<td>AF2</td>
</tr>
<tr>
<td>Marine</td>
<td>VM2</td>
</tr>
<tr>
<td>Navy</td>
<td>VR2</td>
</tr>
<tr>
<td>Army</td>
<td>RR2</td>
</tr>
<tr>
<td>Coast Guard</td>
<td>C2</td>
</tr>
<tr>
<td>Guard</td>
<td>G2</td>
</tr>
<tr>
<td>Commercial</td>
<td>EXEC2</td>
</tr>
</tbody>
</table>

c. Special-use. Approved special-use identifiers.

2–3–6. AIRCRAFT TYPE

Use the approved codes listed in Appendix A through Appendix C to indicate aircraft type.

2–3–7. USAF/USN UNDERGRADUATE PILOTS

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

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

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

2–3–8. AIRCRAFT EQUIPMENT SUFFIX

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

b. GNSS-equipped aircraft:
   1. Have an equipment suffix of /G, /L, /S, or /N.
   2. May be determined by executing an ICAO flight plan readout and verifying a filed “G” in the ICAO equipment list.
   3. May be determined by verifying with the pilot that the aircraft is GNSS-equipped.

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

EXAMPLE–
“Cessna Three–ten slant Tango.”
“A–en slant November.”
“F–Sixteen slant Papa.”
“Seven–sixty–seven slant Golf.”

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

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

2–3–9. CLEARANCE STATUS

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

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

b. The symbols “F” or “O” to indicate the clearance limit when a delay is not anticipated.
Section 4. Radio and Interphone Communications

2–4–1. RADIO COMMUNICATIONS

Use radio frequencies for the special purposes for which they are intended. A single frequency may be used for more than one function except as follows:

**TERMINAL.** When combining positions in the tower, do not use ground control frequency for airborne communications.

**NOTE—**
Due to the limited number of frequencies assigned to towers for the ground control function, it is very likely that airborne use of a ground control frequency could cause interference to other towers or interference to your aircraft from another tower. When combining these functions, it is recommended combining them on local control. The ATIS may be used to specify the desired frequency.

2–4–2. MONITORING

Monitor interphones and assigned radio frequencies continuously.

**NOTE—**
Although all FAA facilities, including RAPCONs and RATCFs, are required to monitor all assigned frequencies continuously, USAF facilities may not monitor all unpublished discrete frequencies.

2–4–3. PILOT ACKNOWLEDGMENT/READ BACK

Ensure pilots acknowledge all Air Traffic Clearances and ATC Instructions. When a pilot reads back an Air Traffic Clearance or ATC Instruction:

- **a.** Ensure that items read back are correct.
- **b.** Ensure the read back of hold short instructions, whether a part of taxi instructions or a LAHSO clearance.
- **c.** Ensure pilots use call signs and/or registration numbers in any read back acknowledging an Air Traffic Clearance or ATC Instruction.

**NOTE—**
1. ATC Clearance/Instruction Read Back guidance for pilots in the AIM states:
   - **a.** Although pilots should read back the “numbers,” unless otherwise required by procedure or controller request, pilots may acknowledge clearances, control instructions, or other information by using “Wilco,” “Roger,” “Affirmative,” or other words or remarks with their aircraft identification.
   - **b.** Altitudes contained in charted procedures, such as departure procedures, instrument approaches, etc., need not be read back unless they are specifically stated by the controller.
   - **c.** Initial read back of a taxi, departure or landing clearance should include the runway assignment, including left, right, center, etc. if applicable.

2. Until a pilot acknowledges a controller’s clearance or instruction, a controller cannot know if a pilot will comply with the clearance or remain as previously cleared.

**EXAMPLE—**
“Climbing to Flight Level three three zero, United Twelve” or “November Five Charlie Tango, roger, cleared to land runway four left.”

**REFERENCE—**
P/CG Term – Air Traffic Clearance
P/CG Term – ATC Instructions
JO 7110.65, 3-7-2. Taxi and Ground Movement Operations
JO 7110.65, 10-4-4. Communications Failure
AIM Para 4-2-3. Contact Procedures
AIM Para 4-4-7 Pilot Responsibility upon Clearance Issuance
AIM Para 6-4-1, Two-way Radio Communications Failure
Federal Register, April 1, 1999 14 CFR Part 91 Pilot Responsibility for Compliance with ATC Clearances and Instructions

2–4–4. AUTHORIZED INTERRUPTIONS

As necessary, authorize a pilot to interrupt his/her communications guard.

**NOTE—**
Some users have adopted procedures to ensure uninterrupted receiving capability with ATC when a pilot with only one operative communications radio must interrupt his/her communications guard because of a safety related problem requiring airborne communications with his/her company. In this event, pilots will request approval to abandon guard on the assigned ATC frequency for a mutually agreeable time period. Additionally, they will inform controllers of the NAVAID voice facility and the company frequency they will monitor.

2–4–5. AUTHORIZED TRANSMISSIONS

Transmit only those messages necessary for air traffic control or otherwise contributing to air safety.

**REFERENCE—**
FAA JO 7210.3, Para 3–2–2, Authorized Messages Not Directly Associated with Air Traffic Services.
2–4–6. FALSE OR DECEPTIVE COMMUNICATIONS

Take action to detect, prevent, and report false, deceptive, or phantom controller communications to an aircraft or controller. The following must be accomplished when false or deceptive communications occur:

a. Correct false information.

b. Broadcast an alert to aircraft operating on all frequencies within the area where deceptive or phantom transmissions have been received.

EXAMPLE—
“Attention all aircraft. False ATC instructions have been received in the area of Long Beach Airport. Exercise extreme caution on all frequencies and verify instructions.”

c. Collect pertinent information regarding the incident.

d. Notify the operations supervisor of the false, deceptive, or phantom transmission and report all relevant information pertaining to the incident.

2–4–7. AUTHORIZED RELAYS

a. Relay operational information to aircraft or aircraft operators as necessary. Do not agree to handle such messages on a regular basis. Give the source of any such message you relay.

b. Relay official FAA messages as required.

NOTE—
The FAA Administrator and Deputy Administrator will sometimes use code phrases to identify themselves in air-to-ground communications as follows:
Administrator: “SAFEAIR ONE.”
Deputy Administrator: “SAFEAIR TWO.”

EXAMPLE—
“Miami Center, Jetstar One, this is SAFEAIR ONE, (message).”

c. Relay operational information to military aircraft operating on, or planning to operate on IRs.

2–4–8. RADIO MESSAGE FORMAT

Use the following format for radio communications with an aircraft:

a. Sector/position on initial radio contact:
   1. Identification of aircraft.
   2. Identification of ATC unit.
   3. Message (if any).
   4. The word “over” if required.

b. Subsequent radio transmissions from the same sector/position must use the same format, except the identification of the ATC unit may be omitted.

TERMINAL. You may omit aircraft identification after initial contact when conducting the final portion of a radar approach.

REFERENCE—
FAAO JO 7110.65, Para 2–4–20, Aircraft Identification.

2–4–9. ABBREVIATED TRANSMISSIONS

Transmissions may be abbreviated as follows:

a. Use the identification prefix and the last 3 digits or letters of the aircraft identification after communications have been established. Do not abbreviate similar sounding aircraft identifications or the identification of an air carrier or other civil aircraft having an FAA authorized call sign.

REFERENCE—
FAAO JO 7110.65, Para 2–4–20, Aircraft Identification.

b. Omit the facility identification after communication has been established.

c. Transmit the message immediately after the callup (without waiting for the aircraft’s reply) when the message is short and receipt is generally assured.

d. Omit the word “over” if the message obviously requires a reply.

2–4–10. INTERPHONE TRANSMISSION PRIORTIES

Give priority to interphone transmissions as follows:

a. First priority. Emergency messages including essential information on aircraft accidents or suspected accidents. After an actual emergency has passed, give a lower priority to messages relating to that accident.

b. Second priority. Clearances and control instructions.

   c. Third priority. Movement and control messages using the following order of preference when possible:

   1. Progress reports.
   2. Departure or arrival reports.
3. Flight plans.
   d. Fourth priority. Movement messages on VFR aircraft.

2–4–11. PRIORITY INTERRUPTION

Use the words “emergency” or “control” for interrupting lower priority messages when you have an emergency or control message to transmit.

2–4–12. INTERPHONE MESSAGE FORMAT

Use the following format for interphone intra/interfacility communications:

a. Both the caller and receiver identify their facility and/or position in a manner that ensures they will not be confused with another position.

   NOTE—
   Other means of identifying a position, such as substituting departure or arrival gate/fix names for position identification, may be used. However, it must be operationally beneficial, and the procedure fully covered in a letter of agreement or a facility directive, as appropriate.

EXAMPLE—
Caller: “Albuquerque Center Sixty Three, Amarillo Departure.”

Receiver: “Albuquerque Center.”

b. Between two facilities which utilize numeric position identification, the caller must identify both facility and position.

EXAMPLE—
Caller: “Albuquerque Sixty Three, Fort Worth Eighty Two.”

c. Caller states the type of coordination to be accomplished when advantageous. For example, handoff or APREQ.

d. The caller states the message.

e. The receiver states the response to the caller’s message followed by the receiver’s operating initials.

f. The caller states his or her operating initials.

EXAMPLE—
1.
Caller: “Denver High, R Twenty–five.”

Receiver: “Denver High.”

Caller: “Request direct Denver for Northwest Three Twenty–eight.”

Receiver: “Northwest Three Twenty–eight direct Denver approved. H.F.”

Caller: “G.M.”

2.
Receiver: “Denver High, Go ahead override.”

Caller: “R Twenty–five, Request direct Denver for Northwest Three Twenty–eight.”

Receiver: “Northwest Three Twenty–eight direct Denver approved. H.F.”

Caller: “G.M.”

3.
Caller: (“Bolos” is a departure gate in Houston ARTCC’s Sabine sector) “Bolos, Houston local.”

Receiver: “Bolos.”

Caller: “Request Flight Level three five zero for American Twenty–five.”

Receiver: “American Twenty–five Flight Level three five zero approved, A.C.”

Caller: “G.M.”

4.
Caller: “Sector Twelve, Ontario Approach, APREQ.”

Receiver: “Sector Twelve.”

Caller: “Cactus Five forty–two heading one three zero and climbing to one four thousand.”

Receiver: “Cactus Five forty–two heading one three zero and climbing to one four thousand approved. B.N.”

Caller: “A.M.”

5.
Caller: “Zanesville, Columbus, seventy–three line, handoff.”

Receiver: “Zanesville.”

Caller: “Five miles east of Appleton VOR, United Three Sixty–six.”

Receiver: “United Three Sixty–six, radar contact, A.Z.”

Caller: “M.E.”
g. Identify the interphone voice line on which the call is being made when two or more such lines are collocated at the receiving operating position.

**EXAMPLE—**
“Washington Center, Washington Approach on the Fifty Seven line.”

“Chicago Center, O’Hare Tower handoff on the Departure West line.”

h. **TERMINAL.** The provisions of subparas a, b, c, e, f, g, and para 2–4–13, Interphone Message Termination, may be omitted provided:

1. Abbreviated standard coordination procedures are contained in a facility directive describing the specific conditions and positions that may utilize an abbreviated interphone message format; and

2. There will be no possibility of misunderstanding which positions are using the abbreviated procedures.

2–4–13. INTERPHONE MESSAGE TERMINATION

Terminate interphone messages with your operating initials.

2–4–14. WORDS AND PHRASES

a. Use the words or phrases in radiotelephone and interphone communication as contained in the P/CG or, within areas where Controller Pilot Data Link Communications (CPDLC) is in use, the phraseology contained in the applicable CPDLC message set.

b. The word “heavy” must be used as part of the identification of heavy jet aircraft as follows:

**TERMINAL.** In all communications with or about heavy jet aircraft.

**EN ROUTE.** The use of the word heavy may be omitted except as follows:

1. In communications with a terminal facility about heavy jet operations.

2. In communications with or about heavy jet aircraft with regard to an airport where the en route center is providing approach control service.

3. In communications with or about heavy jet aircraft when the separation from a following aircraft may become less than 5 miles by approved procedure.

4. When issuing traffic advisories.

**EXAMPLE—**
“United Fifty–Eight Heavy.”

**NOTE—**
Most airlines will use the word “heavy” following the company prefix and flight number when establishing communications or when changing frequencies within a terminal facility’s area.

5. When in radio communications with “Air Force One” or “Air Force Two,” do not add the heavy designator to the call sign. State only the call sign “Air Force One/Two” regardless of the type aircraft.

2–4–15. EMPHASIS FOR CLARITY

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

**EXAMPLE—**
“United Thirty–one United, Miami Center, U.S. Air Thirty–one also on this frequency, acknowledge.”

“U.S. Air Thirty–one U.S. Air, Miami Center, United Thirty–one also on this frequency, acknowledge.”

**REFERENCE—**
FAAO JO 7110.65, Para 2–4–20 Aircraft Identification.
FAAO JO 7210.3, Para 2–1–13, Aircraft Identification Problems.

b. Notify the operations supervisor–in-charge of any duplicate flight identification numbers or phonetically similar-sounding call signs when the aircraft are operating simultaneously within the same sector.

**REFERENCE—**
FAAO JO 7210.3, Para 2–1–13, Aircraft Identification Problems.

**NOTE—**
This is especially important when this occurs on a repetitive, rather than an isolated, basis.
(b) The free text character limitation prevents the use of fourth line coordination. Verbal coordination is required.

EXAMPLE—
“Deviation 30 degrees left approved, when able fly heading zero niner zero, vector join J324 and advise.”

k. The supervisory traffic management coordinator-in-charge/operations supervisor/controller-in-charge shall verify the digitized radar weather information by the best means available (e.g., pilot reports, local tower personnel, etc.) if the weather data displayed by digitized radar is reported as questionable or erroneous. Errors in weather radar presentation shall be reported to the technical operations technician and the air traffic supervisor shall determine if the digitized radar derived weather data is to be displayed and a NOTAM distributed.

NOTE—
Anomalous propagation (AP) is a natural occurrence affecting radar and does not in itself constitute a weather circuit failure.

2–6–5. CALM WIND CONDITIONS

TERMINAL. Describe the wind as calm when the wind velocity is less than three knots.

REFERENCE—

2–6–6. REPORTING WEATHER CONDITIONS

a. When the prevailing visibility at the usual point of observation, or at the tower level, is less than 4 miles, tower personnel must take prevailing visibility observations and apply the observations as follows:

1. Use the lower of the two observations (tower or surface) for aircraft operations.

2. Forward tower visibility observations to the weather observer.

3. Notify the weather observer when the tower observes the prevailing visibility decrease to less than 4 miles or increase to 4 miles or more.

b. Forward current weather changes to the appropriate control facility as follows:

1. When the official weather changes to a condition which is below 1,000-foot ceiling or below the highest circling minimum, whichever is greater, or less than 3 miles visibility, and when it improves to a condition which is better than those above.

2. Changes which are classified as special weather observations during the time that weather conditions are below 1,000-foot ceiling or the highest circling minimum, whichever is greater, or less than 3 miles visibility.

c. Towers at airports where military turbo-jet en route descents are routinely conducted must also report the conditions to the ARTCC even if it is not the controlling facility.

d. If the receiving facility informs you that weather reports are not required for a specific time period, discontinue the reports. The time period specified should not exceed the duration of the receiving controller’s tour of duty.

e. EN ROUTE. When you determine that weather reports for an airport will not be required for a specific time period, inform the FSS or tower of this determination. The time period specified should not exceed the duration of receiving controller’s tour of duty.

REFERENCE—
FAAO JO 7110.65, Para 3–10–2 Forwarding Approach Information by Nonapproach Control Facilities.

2–6–7. DISSEMINATING WEATHER INFORMATION

TERMINAL. Observed elements of weather information must be disseminated as follows:

a. General weather information, such as “large breaks in the overcast,” “visibility lowering to the south,” or similar statements which do not include specific values, and any elements derived directly from instruments, pilots, or radar may be transmitted to pilots or other ATC facilities without consulting the weather reporting station.

b. Specific values, such as ceiling and visibility, may be transmitted if obtained by one of the following means:

1. You are properly certificated and acting as official weather observer for the elements being reported.

NOTE—
USAF controllers do not serve as official weather observers.
2. You have obtained the information from the official observer for the elements being reported.

3. The weather report was composed or verified by the weather station.

4. The information is obtained from an official Automated Weather Observation System (AWOS) or an Automated Surface Observation System (ASOS).

c. Differences between weather elements observed from the tower and those reported by the weather station must be reported to the official observer for the element concerned.
3–1–8. LOW LEVEL WIND SHEAR/ MICROBURST ADVISORIES

a. When low level wind shear/microburst is reported by pilots, Integrated Terminal Weather System (ITWS), or detected on wind shear detection systems such as LLWAS NE++, LLWAS–RS, WSP, or TDWR, controllers must issue the alert to all arriving and departing aircraft. Continue the alert to aircraft until it is broadcast on the ATIS and pilots indicate they have received the appropriate ATIS code. A statement must be included on the ATIS for 20 minutes following the last report or indication of the wind shear/microburst.

PHRASEOLOGY–
LOW LEVEL WIND SHEAR (or MICROBURST, as appropriate) ADVISORIES IN EFFECT.

NOTE–
Some aircraft are equipped with Predictive Wind Shear (PWS) alert systems that warn the flight crew of a potential wind shear up to 3 miles ahead and 25 degrees either side of the aircraft heading at or below 1200’ AGL. Pilot reports may include warnings received from PWS systems.

REFERENCE–
FAAO JO 7110.65, Para 2–6–3 PIREP Information.
FAAO JO 7110.65, Para 2–9–3 Content.
FAAO JO 7110.65, Para 3–10–1 Landing Information.

b. At facilities without ATIS, ensure that wind shear/microburst information is broadcast to all arriving and departing aircraft for 20 minutes following the last report or indication of wind shear/microburst.

1. At locations equipped with LLWAS, the local controller must provide wind information as follows:

NOTE–
The LLWAS is designed to detect low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation.

REFERENCE–

(a) If an alert is received, issue the airport wind and the displayed field boundary wind.

PHRASEOLOGY–
WIND SHEAR ALERT. AIRPORT WIND (direction) AT (velocity). (Location of sensor) BOUNDARY WIND (direction) AT (velocity).

EXAMPLE–
17A MBA 40K – 3MF

PHRASEOLOGY–
RUNWAY 17 ARRIVAL MICROBURST ALERT 40 KNOT LOSS 3 MILE FINAL.

EXAMPLE–
17D WSA 25K+ 2MD

PHRASEOLOGY–
RUNWAY 17 DEPARTURE WIND SHEAR ALERT 25 KNOT GAIN 2 MILE DEPARTURE.

(b) If requested by the pilot or deemed appropriate by the controller, issue the displayed wind information oriented to the threshold or departure end of the runway.

PHRASEOLOGY–
(Runway) DEPARTURE/THRESHOLD WIND (direction) AT (velocity).
(c) LLWAS NE++ or LLWAS–RS may detect a possible wind shear/microburst at the edge of the system but may be unable to distinguish between a wind shear and a microburst. A wind shear alert message will be displayed, followed by an asterisk, advising of a possible wind shear outside of the system network.

**NOTE**—LLWAS NE++ when associated with TDWR can detect wind shear/microbursts outside the network if the TDWR fails.

**PHRASEOLOGY**—
(Appropriate wind or alert information) POSSIBLE WIND SHEAR OUTSIDE THE NETWORK.

(d) If unstable conditions produce multiple alerts, issue an advisory of multiple wind shear/microburst alerts followed by specific alert or wind information most appropriate to the aircraft operation.

**PHRASEOLOGY**—
MULTIPLE WIND SHEAR/MICROBURST ALERTS (specific alert or wind information).

(e) The LLWAS NE++ and LLWAS–RS are designed to operate with as many as 50 percent of the total sensors inoperative. When all three remote sensors designated for a specific runway arrival or departure wind display line are inoperative then the LLWAS NE++ and LLWAS–RS for that runway arrival/departure must be considered out of service. When a specific runway arrival or departure wind display line is inoperative and wind shear/microburst activity is likely; (for example, frontal activity, convective storms, PIREPs), the following statement must be included on the ATIS, “WIND SHEAR AND MICROBURST INFORMATION FOR RUNWAY (runway number) ARRIVAL/DEPARTURE NOT AVAILABLE.”

**NOTE**—
The geographic situation display (GSD) is a supervisory planning tool and is not intended to be a primary tool for microburst or wind shear.

c. Wind Shear Escape Procedures.

1. If an aircraft under your control informs you that it is performing a wind shear escape, do not issue control instructions that are contrary to pilot actions. ATC should continue to provide safety alerts regarding terrain or obstacles and traffic advisories for the escape aircraft, as appropriate.

**EXAMPLE**—
“Denver Tower, United 1154, wind shear escape.”

**NOTE**—Aircraft that execute a wind shear escape maneuver will usually conduct a full power climb straight ahead and will not accept any control instructions until onboard systems advise the crew or the pilot in command (PIC) advises ATC that the escape maneuver is no longer required.

**REFERENCE**—
P/CG Term – Wind Shear Escape

2. Unless advised by additional aircraft that they are also performing an escape procedure, do not presume that other aircraft in the proximity of the escape aircraft are responding to wind shear alerts/events as well. Continue to provide control instructions, safety alerts, and traffic advisories, as appropriate.

3. Once the responding aircraft has initiated a wind shear escape maneuver, the controller is not responsible for providing approved separation between the aircraft that is responding to an escape and any other aircraft, airspace, terrain, or obstacle. Responsibility for approved separation resumes when one of the following conditions are met:

(a) Departures:

(1) A crew member informs ATC that the wind shear escape maneuver is complete and ATC observes that approved separation has been re-established, or

(2) A crew member informs ATC that the escape maneuver is complete and has resumed a previously assigned departure clearance/routing.

(b) Arrivals:

(1) A crew member informs ATC that the escape maneuver is complete, and

(2) The aircrew has executed an alternate clearance or requested further instructions.

**NOTE**—When the escape procedure is complete, the flight crew must advise ATC they are returning to their previously assigned clearance or request further instructions.

**EXAMPLE**—
“Denver Tower, United 1154, wind shear escape complete, resuming last assigned heading/(name) DP/clearance.” Or

“Denver Tower, United 1154, wind shear escape complete, request further instructions.”
3–4–16. HIGH SPEED TURNOFF LIGHTS
Operate high speed turnoff lights:

a. Whenever the associated runway lights are used for arriving aircraft. Leave them on until the aircraft has either entered a taxiway or passed the last light.

b. As required by facility directives to meet local conditions.

c. As requested by the pilot.

3–4–17. TAXIWAY LIGHTS
Operate taxiway lights in accordance with TBL 3–4–11, TBL 3–4–12, or TBL 3–4–13 except:

a. Where a facility directive specifies other settings or times to meet local conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot request.

**TBL 3–4–11**
Three Step Taxiway Lights

<table>
<thead>
<tr>
<th>Step</th>
<th>Visibility Day</th>
<th>Visibility Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Less than 1 mile</td>
<td>When requested</td>
</tr>
<tr>
<td>2</td>
<td>When requested</td>
<td>Less than 1 mile</td>
</tr>
<tr>
<td>1</td>
<td>When requested</td>
<td>1 mile or more</td>
</tr>
</tbody>
</table>

**TBL 3–4–12**
Five Step Taxiway Lights

<table>
<thead>
<tr>
<th>Step</th>
<th>Visibility Day</th>
<th>Visibility Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Less than 1 mile</td>
<td>When requested</td>
</tr>
<tr>
<td>4</td>
<td>When requested</td>
<td>Less than 1 mile</td>
</tr>
<tr>
<td>3</td>
<td>When requested</td>
<td>1 mile or more</td>
</tr>
<tr>
<td>1 &amp; 2</td>
<td>When requested</td>
<td>When requested</td>
</tr>
</tbody>
</table>

**TBL 3–4–13**
One Step Taxiway Lights

<table>
<thead>
<tr>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 mile</td>
<td>On</td>
</tr>
</tbody>
</table>

**NOTE—**
AC 150/5340-30, Design and Installation Details for Airport Visual Aides, contains recommended brightness levels for variable setting taxiway lights.

3–4–18. OBSTRUCTION LIGHTS
If controls are provided, turn the lights on between sunset and sunrise.

3–4–19. ROTATING BEACON
If controls are provided, turn the rotating beacon on:

a. Between sunset and sunrise.

b. Between sunrise and sunset when the reported ceiling or visibility is below basic VFR minima.

3–4–20. RUNWAY STATUS LIGHTS (RWSL) TERMINAL
RWSL is equipped with automatic intensity settings and must be operated on a continuous basis except under the following conditions:

a. If a pilot or vehicle report indicates any portion of the RWSL system is on and is not able to accept an ATC clearance; then

1. ATC must visually scan the entire runway. If the runway is observed to be clear and the lights are still illuminated, then the lights must be turned off and clearance re-issued.

2. If a portion of the runway is not visible from the tower, ATC must visually scan the ASDE-X. If the runway is observed to be clear and the lights are still illuminated, then the lights must be turned off and clearance re-issued.

b. When the RWSL Operational Status displays “Lost Comm with System,” consider the RWSL system out of service until checked and confirmed to be operational by technical operations personnel.

c. Once RWSL systems are turned off, they must remain off until returned to service by technical operations personnel.

d. Upon pilot request, adjust the light intensity.
Section 6. Airport Surface Detection Procedures

3–6–1. EQUIPMENT USAGE

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

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

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

2. ASDE systems without safety logic must be operated:
   (a) Continuously between sunset and sunrise.
   (b) When visibility is less than the most distant point in the active movement area, or
   (c) When, in your judgment, its use will assist you in the performance of your duties at any time.

3–6–2. IDENTIFICATION

a. To identify an observed target/track on an ASDE system display, correlate its position with one or more of the following:
   1. Pilot/vehicle operator position report.
   2. Controller’s visual observation.
   3. An identified target observed on the ASR or CTRD.

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

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

3–6–3. INFORMATION USAGE

a. ASDE system derived information may be used to:
   1. Formulate clearances and control instructions to aircraft and vehicles on the movement area.

REFERENCE–
FAAO JO 7210.3, Para 3–7–2, Radar Use.

2. Position aircraft and vehicles using the movement area.

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

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

5. Confirm pilot reported positions.

6. Provide directional taxi information, as appropriate.

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

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

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

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

3–6–4. SAFETY LOGIC ALERT RESPONSES

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

a. When an arrival aircraft (still airborne, prior to the landing threshold) activates a warning alert, the controller must issue go–around instructions. (Exception: Alerts involving known formation flights, as they cross the landing threshold, may be disregarded if all other factors are acceptable.)
NOTE—
The intent of this paragraph is that an aircraft does not land on the runway, on that approach, when the safety logic system has generated a warning alert. A side-step maneuver or circle to land on another runway satisfies this requirement.

REFERENCE—
FAAO JO 7110.65, Para 3–8–1 Sequence/Spacing Application.
FAAO JO 7110.65, Para 3–9–6 Same Runway Separation.
FAAO JO 7110.65, Para 3–10–3 Same Runway Separation.
P/CG Term— Go Around.

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

REFERENCE—

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

3–6–5. RADAR–ONLY MODE

Radar–only mode is an enhancement of the ASDE–X system which allows the system to stay operational with safety logic processing, despite a critical fault in the Multilateration (MLAT) subsystem. The system stays in full core alert status under radar–only mode without data block capability.
touch—and—go, stop—and—go, option, or unrestricted low approach on the same runway.

**REFERENCE—**
FAAO JO 7110.65, Para 3–10–5 Landing Clearance.

d. When an aircraft is authorized to line up and wait, inform it of the closest traffic requesting a full—stop, touch—and—go, stop—and—go, option, or unrestricted low approach to the same runway.

**EXAMPLE—**
“United Five, Runway One Eight, line up and wait. Traffic a Boeing Seven Thirty Seven, six mile final.

e. USAF/USN. When an aircraft is authorized to line up and wait, inform it of the closest traffic within 6 miles on final approach to the same runway. If the approaching aircraft is on a different frequency, inform it of the aircraft taxiing into position.

f. Do not authorize an aircraft to line up and wait when the departure point is not visible from the tower, unless the aircraft’s position can be verified by ASDE or the runway is used for departures only.

g. An aircraft may be authorized to line up and wait at an intersection between sunset and sunrise under the following conditions:

1. The procedure must be approved by the appropriate Director, Terminal Operations (service area) as well as the Director, Terminal Safety and Operations Support.

2. The procedure must be contained in a facility directive.

3. The runway must be used as a departure—only runway.

4. Only one aircraft at a time is permitted to line up and wait on the same runway.

5. Document on FAA Form 7230–4, Daily Record of Facility Operation, the following: “LUAW at INT of Rwy (number) and Twy (name) IN EFFECT” when using runway as a departure—only runway. “LUAW at INT of Rwy (number) and Twy (name) SUSPENDED” when runway is not used as a departure—only runway.

h. Do not authorize an aircraft to line up and wait at anytime when the intersection is not visible from the tower.

i. Do not authorize aircraft to simultaneously line up and wait on the same runway, between sunrise and sunset, unless the local assist/local monitor position is staffed.

j. USN. Do not authorize aircraft to line up and wait simultaneously on intersecting runways.

**PHRASEOLOGY—**
CONTINUE HOLDING,

**REFERENCE—**
FAAO JO 7110.65, Para 3—10—10 Altitude Restricted Low Approach.

k. When aircraft are authorized to line up and wait on runways that intersect, traffic must be exchanged between that aircraft and the aircraft that is authorized to line up and wait, depart, or arrive to the intersecting runway(s).

**EXAMPLE—**
“United Five, Runway Four, line up and wait, traffic holding Runway Three–One.”

“Delta One, Runway Three–One, line up and wait, traffic holding Runway Four.”

Or, when issuing traffic information to an arrival aircraft and an aircraft that is holding on runway(s) that intersect(s):

“Delta One, Runway Four, line up and wait, traffic landing Runway Three–One.”

“United Five, Runway Three–One, cleared to land. Traffic holding in position Runway Four.”

Or, when issuing traffic information to a departing aircraft and an aircraft that is holding on runway(s) that intersect(s):

“Delta One, Runway Three–One, line up and wait, traffic departing Runway Four.”

“United Five, Runway Four, cleared for takeoff, traffic holding in position Runway Three–One.”

**REFERENCE—**

l. When a local controller delivers or amends an ATC clearance to an aircraft awaiting departure and that aircraft is holding short of a runway or is holding in position on a runway, an additional clearance must be issued to prevent the possibility of the aircraft inadvertently taxiing onto the runway and/or beginning takeoff roll. In such cases, append one of the following ATC instructions as appropriate:
1. HOLD SHORT OF RUNWAY, or

2. HOLD IN POSITION.

m. USAF/USN. When issuing additional instructions or information to an aircraft holding in takeoff position, include instructions to continue holding or taxi off the runway, unless it is cleared for takeoff.

**PHRASEOLOGY--**

CONTINUE HOLDING,

or

TAXI OFF THE RUNWAY.

**REFERENCE--**


n. When authorizing an aircraft to line up and wait at an intersection, state the runway intersection.

**PHRASEOLOGY--**

RUNWAY (number) AT (taxiway designator), LINE UP AND WAIT.

o. When two or more aircraft call the tower ready for departure, one or more at the full length of a runway and one or more at an intersection, state the location of the aircraft at the full length of the runway when authorizing that aircraft to line up and wait.

**PHRASEOLOGY--**

RUNWAY (number), FULL-LENGTH, LINE UP AND WAIT.

**EXAMPLE--**

“American Four Eighty Two, Runway Three–Zero full length, line up and wait.”

**NOTE--**

The controller need not state the location of the aircraft departing the full length of the runway if there are no aircraft holding for departure at an intersection for that same runway.

p. Do not use the term “full length” when the runway length available for departure has been temporarily shortened. On permanently shortened runways, do not use the term “full length” until the A/FD is updated to include the change(s).

**NOTE--**

The use of the term “full length” could be interpreted by the pilot(s) as the available runway length prior to the runway being shortened.

q. Whenever a runway length has been temporarily or permanently shortened, state the word “shortened” immediately following the runway number as part of the line up and wait clearance.

1. The addition of “shortened” must be included in the line up and wait clearance for the duration of the construction project when the runway is temporarily shortened.

2. The addition of “shortened” must be included in the line up and wait clearance until the A/FD is updated to include the change(s) when the runway is permanently shortened.

**PHRASEOLOGY--**

RUNWAY (number) SHORTENED, LINE UP AND WAIT.

**EXAMPLE--**

“Runway Two-Seven shortened, line up and wait.”

**REFERENCE--**

FAAO JO 7210.3, Para 10-3-11, Airport Construction
FAAO JO 7210.3, Para 10-3-12, Change in Runway Length Due to Construction

3–9–5. ANTICIPATING SEPARATION

Takeoff clearance needs not be withheld until prescribed separation exists if there is a reasonable assurance it will exist when the aircraft starts takeoff roll.

**REFERENCE--**

P/CG Term-- Clear of the Runway.

3–9–6. SAME RUNWAY SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same runway by ensuring that it does not begin takeoff roll until:

a. The other aircraft has departed and crossed the runway end or turned to avert any conflict. (See FIG 3–9–1.) If you can determine distances by reference to suitable landmarks, the other aircraft needs only be airborne if the following minimum distance exists between aircraft: (See FIG 3–9–2.)

1. When only Category I aircraft are involved—3,000 feet.

2. When a Category I aircraft is preceded by a Category II aircraft—3,000 feet.

3. When either the succeeding or both are Category II aircraft—4,500 feet.

4. When either is a Category III aircraft—6,000 feet.

5. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima.
b. The 3-minute interval is not required when:

1. A pilot has initiated a request to deviate from that interval unless the preceding departing aircraft is a heavy aircraft/B757.

**NOTE**
A request for takeoff does not initiate a waiver request; the request for takeoff must be accomplished by a request to deviate from the 3-minute interval.

2. USA NOT APPLICABLE. The intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction.

3. Successive touch-and-go and stop-and-go operations are conducted with a small aircraft following another small aircraft weighing more than 12,500 lbs. or a large aircraft in the pattern, or a small aircraft weighing more than 12,500 lbs. or a large aircraft departing the same runway, provided the pilot of the small aircraft is maintaining visual separation/spacing behind the preceding large aircraft. Issue a wake turbulence cautionary advisory and the position of the large aircraft.

**EXAMPLE**
"Caution wake turbulence, DC-9 on base leg."

4. Successive touch-and-go and stop-and-go operations are conducted with any aircraft following a heavy aircraft/B757 in the pattern, or heavy aircraft/B757 departing the same runway, provided the pilot of the aircraft is maintaining visual separation/spacing behind the preceding heavy aircraft/B757. Issue a wake turbulence cautionary advisory and the position of the heavy aircraft/B757.

**EXAMPLE**
"Caution wake turbulence, heavy Lockheed C5A departing runway two three."

5. If action is initiated to reduce the separation between successive touch-and-go or stop-and-go operations, apply 3 minutes separation.

c. When applying the provision of subpara b:

1. Issue a wake turbulence advisory before clearing the aircraft for takeoff.

2. Do not clear the intersection departure for an immediate takeoff.

3. Issue a clearance to permit the trailing aircraft to deviate from course enough to avoid the flight path of the preceding large departure when applying subpara b1 or b2.

4. Separation requirements in accordance with para 3–9–6, Same Runway Separation, must also apply.

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

### 3–9–8. INTERSECTING RUNWAY/INTERSECTING FLIGHT PATH OPERATIONS

a. Issue traffic information to each aircraft operating on intersecting runways.

b. Separate departing aircraft from another aircraft using an intersecting runway by ensuring that the departure does not begin takeoff roll until one of the following exists:

**REFERENCE**
FAAO JO 7110.65, Para 2–1–21 Traffic Advisories.

1. The preceding aircraft has departed and passed the intersection or is turning to avert any conflict. (See FIG 3-9-5).

**FIG 3–9–5**
**Intersecting Runway Separation**

2. A preceding arriving aircraft is clear of the landing runway, completed the landing roll and will hold short of the intersection, or has passed the intersection. (See FIG 3-9-6).

**REFERENCE**
P/CG Term – Clear of the Runway.
3. Separate IFR/VFR aircraft taking off behind a heavy jet/B757 departure by 2 minutes when departing:

**NOTE**—
Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet/B757 begins takeoff roll.

(a) Intersecting runways if projected flight paths will cross. (See FIG 3–9–7).

(b) A parallel runway separated by 2,500 feet or more if projected flight paths will cross. (See FIG 3–9–8.)

4. Separate IFR/VFR aircraft departing behind a landing heavy jet/B757 on an intersecting runway if the departure will fly through the airborne path of the arrival—2 minutes. (See FIG 3–9–9.)

5. Air traffic controllers must not approve pilot requests to deviate from the required wake turbulence time interval if the preceding aircraft is a heavy jet/B757.

**REFERENCE**—
FAAO JO 7110.65, Para 5–8–3 Successive or Simultaneous Departures.
FAAO JO 7110.65, Para 5–8–5 Departures and Arrivals on Parallel or Nonintersecting Diverging Runways.

**3–9–9. NONINTERSECTING CONVERGING RUNWAY OPERATIONS**

a. Separate departing aircraft from an aircraft using a nonintersecting runway when the flight paths intersect by ensuring that the departure does not begin takeoff roll until one of the following exists:

**REFERENCE**—
FAAO JO 7110.65, Para 2–1–21, Traffic Advisories.
1. The preceding aircraft has departed and crossed the departure runway, or is turning to avert any conflict. (See FIG 3–9–10).

*FIG 3–9–10*
Intersecting Runway Separation

2. A preceding arriving aircraft has completed the landing roll and will hold short of the projected intersection, passed the projected intersection, or has crossed over the departure runway (See FIG 3–9–11 and FIG 3-9-12).

*FIG 3–9–11*
Intersecting Runway Separation

**WAKE TURBULENCE APPLICATION**

b. Separate IFR/VFR aircraft taking off behind a heavy jet/B757 departure by 2 minutes when departing a crossing runway if projected flight paths will cross. (See FIG 3–9–13).

*FIG 3–9–13*
Intersecting Runway Separation

**NOTE—**
Takeoff clearance to the following aircraft should not be issued until 2 minutes after the heavy jet/B757 begins takeoff roll.

c. Separate IFR/VFR aircraft departing behind a landing heavy jet/B757 on a crossing runway if the
departure will fly through the airborne path of the arrival 2 minutes. (See FIG 3–9–14).

**FIG 3–9–14**

Intersecting Runway Separation

![Departure on Crossing Runway Needs 2 Minutes](image)

Touchdown Point

**d.** Air traffic controllers must not approve pilot requests to deviate from the required wake turbulence time interval if the preceding aircraft is a heavy jet/B757.

**REFERENCE—**
FAAO JO 7110.65, Para 5–8–3, Successive or Simultaneous Departures.
FAAO JO 7110.65, Para 5–8–5, Departures and Arrivals on Parallel or Nonintersecting Diverging Runways.

**e.** If the extended centerline of a runway crosses a converging runway or the extended centerline of a converging runway within 1 NM of either departure end, apply the provisions of Paragraph 3–9–8, Intersecting Runway/Intersecting Flight Path Operations. (See FIG 3-9-15).

**REFERENCE—**
FAAO JO 7210.3, Para 10–3–14, Go-Around/Missed Approach

**FIG 3–9–15**

Intersecting Runway Separation

![Intersecting Runway Separation](image)

**3–9–10. TAKEOFF CLEARANCE**

**a.** When issuing a clearance for takeoff, first state the runway number followed by the takeoff clearance.

**PHRASEOLOGY—**
RUNWAY (number), CLEARED FOR TAKEOFF.

**EXAMPLE—**
“RUNWAY TWO SEVEN, CLEARED FOR TAKEOFF.”

**NOTE—**
Turbine–powered aircraft may be considered ready for takeoff when they reach the runway unless they advise otherwise.

**REFERENCE—**
FAAO JO 7110.65, Para 4–3–1 Departure Terminology.

**b.** When clearing an aircraft for takeoff from an intersection, state the runway intersection.

**PHRASEOLOGY—**
RUNWAY (number) AT (taxiway designator) CLEARED FOR TAKEOFF.

**c.** When two or more aircraft call the tower ready for departure, one or more at the full length of a runway and one or more at an intersection, state the location of the aircraft at the full length of the runway when clearing that aircraft for takeoff.

**PHRASEOLOGY—**
RUNWAY (number), FULL LENGTH, CLEARED FOR TAKEOFF.

**EXAMPLE—**
“American Four Eighty Two, Runway Three Zero full length, cleared for takeoff.”

**d.** The controller must ensure that all runways along the taxi route that lead to the departure runway are crossed before the takeoff clearance is issued, except as stated in para 3–9–9e.
3. When the succeeding aircraft is a helicopter, visual separation may be applied in lieu of using distance minima.

**WAKE TURBULENCE APPLICATION**

b. Issue wake turbulence advisories, and the position, altitude if known, and the direction of flight of:

1. The heavy jet/B757 to aircraft landing behind a departing/arriving heavy jet/B757 on the same or parallel runways separated by less than 2,500 feet.

2. The large aircraft to a small aircraft landing behind a departing/arriving large aircraft on the same or parallel runways separated by less than 2,500 feet.

**REFERENCE**—
AC 90–23, Aircraft Wake Turbulence, Para 12, Pilot Responsibility.

**EXAMPLE**—
1. “Runway two seven left cleared to land, caution wake turbulence, heavy Boeing 747 departing runway two seven right.”

2. “Number two follow Boeing 757 on two-mile final. Caution wake turbulence.”

**3–10–4. INTERSECTING RUNWAY/INTERSECTING FLIGHT PATH SEPARATION**

Issue traffic information to each aircraft operating on intersecting runways.

a. Separate an arriving aircraft using one runway from another aircraft using an intersecting runway or a nonintersecting runway when the flight paths intersect by ensuring that the arriving aircraft does not cross the landing threshold or flight path of the other aircraft until one of the following conditions exists:

**REFERENCE**—
FAAO JO 7110.65, Para 2–1–21 Traffic Advisories.

1. The preceding aircraft has departed and passed the intersection/flight path or is airborne and turning to avert any conflict.
(See FIG 3–10–6 and FIG 3–10–7.)
2. A preceding arriving aircraft is clear of the landing runway, completed landing roll and will hold short of the intersection/flight path, or has passed the intersection/flight path. (See FIG 3–10–8 and FIG 3–10–9.)

**NOTE**–
When visual separation is being applied by the tower, appropriate control instructions and traffic advisories must be issued to ensure go around or missed approaches avert any conflict with the flight path of traffic on the other runway.

**REFERENCE**–
FAAO JO 7110.65, Para 7–2–1 Visual Separation, subpara a2.

b. “USA/USAF/USN NOT APPLICABLE.” An aircraft may be authorized to takeoff from one runway while another aircraft lands simultaneously on an intersecting runway or an aircraft lands on one runway while another aircraft lands simultaneously on an intersecting runway, or an aircraft lands to hold short of an intersecting taxiway or some other predetermined point such as an approach/departure flight path using procedures specified in the current LAHSO directive. The procedure must be approved by the air traffic manager and be in accordance with a facility directive. The following conditions apply:

**NOTE**–
Application of these procedures does not relieve controllers from the responsibility of providing other appropriate separation contained in this order.

**REFERENCE**–

1. A simultaneous takeoff and landing operation must only be conducted in VFR conditions.

2. Instruct the landing aircraft to hold short of the intersecting runway being used by the aircraft taking off. In the case of simultaneous landings and no operational benefit is lost, restrict the aircraft of the lesser weight category (if known). LAHSO clearances must only be issued to aircraft that are
4–2–6. THROUGH CLEARANCES

You may clear an aircraft through intermediate stops.

**PHRASEOLOGY**–
CLEARED THROUGH (airport) TO (fix).

4–2–7. ALTRV CLEARANCE

Use the phrase “via approved altitude reservation flight plan,” if the aircraft will operate in an approved ALTRV.

**PHRASEOLOGY**–
VIA APPROVED ALTITUDE RESERVATION (mission name) FLIGHT PLAN.

**NOTE**–
An ALTRV normally includes the departure, climb, cruise, and arrival phases of flight up to and including holding pattern or point/time at which ATC provides separation between aircraft.

**REFERENCE**–
FAAO JO 7110.65, Para 4–3–3 Abbreviated Departure Clearance.

4–2–8. IFR–VFR AND VFR–IFR FLIGHTS

a. Clear an aircraft planning IFR operations for the initial part of flight and VFR for the latter part to the fix at which the IFR part ends.

b. Treat an aircraft planning VFR for the initial part of flight and IFR for the latter part as a VFR departure. Issue a clearance to this aircraft when it requests IFR clearance approaching the fix where it proposes to start IFR operations. The phraseology CLEARED TO (destination) AIRPORT AS FILED may be used with abbreviated departure clearance procedures.

**REFERENCE**–
FAAO JO 7110.65, Para 4–3–3 Abbreviated Departure Clearance.

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

d. When VFR aircraft operating below the minimum altitude for IFR operations requests an IFR clearance and the pilot informs you, or you are aware, that they are unable to climb in VFR conditions to the minimum IFR altitude:

1. Before issuing a clearance, ask if the pilot is able to maintain terrain and obstruction clearance during a climb to the minimum IFR altitude.

**PHRASEOLOGY**–
(Aircraft call sign), ARE YOU ABLE TO MAINTAIN YOUR OWN TERRAIN AND OBSTRUCTION CLEARANCE UNTIL REACHING (appropriate MVA/MIA/MEA/OROCA)

**NOTE**–
Pilots of pop–up aircraft are responsible for terrain and obstacle clearance until reaching minimum instrument altitude (MIA) or minimum en route altitude (MEA). Pilot compliance with an approved FAA procedure or an ATC instruction transfers that responsibility to the FAA; therefore, do not assign (or imply) specific course guidance that will (or could) be in effect below the MIA or MEA.

**EXAMPLE**–
“November Eight Seven Six, are you able to provide your own terrain and obstruction clearance between your present altitude and six thousand feet?”

2. If the pilot is able to maintain their own terrain and obstruction clearance, issue the appropriate IFR clearance as prescribed in Para 4–2–1, Clearance Items, and Para 4–5–6, Minimum En Route Altitudes.

3. If the pilot states that they are unable to maintain terrain and obstruction clearance, instruct the pilot to maintain VFR and to state intentions.

4. If appropriate, apply the provisions of Para 10–2–7, VFR Aircraft In Weather Difficulty, or Para 10–2–9, Radar Assistance Techniques, as necessary.

4–2–9. CLEARANCE ITEMS

The following guidelines must be utilized to facilitate the processing of airfile aircraft:

a. Ensure the aircraft is within your area of jurisdiction unless otherwise coordinated.

b. Obtain necessary information needed to provide IFR service.

c. Issue clearance to destination, short range clearance, or an instruction to the pilot to contact an FSS if the flight plan cannot be processed. If clearance is to destination airport, the phraseology CLEARED TO (destination) AIRPORT must be used. If clearance is to a NAVAID, state the name of the NAVAID followed by the type of NAVAID, if the type is known. If clearance is to an intersection or
waypoint and the type is known, the type must follow
the intersection or waypoint name.

NOTE-
These procedures do not imply that the processing of
airfiles has priority over another ATC duty to be
performed.

REFERENCE-
FAAO JO 7110.65, Para 2–2–1 Recording Information.

4–2–10. CANCELLATION OF IFR FLIGHT
PLAN

a. If necessary, before instructing an IFR aircraft
arriving at an airport not served by an air traffic
control tower or flight service station to change to the
common traffic advisory frequency, provide the pilot
with instructions on how to cancel his/her IFR flight
plan.

1. Airports with an air/ground communications
station:

PHRASEOLOGY-
(Call sign) REPORT CANCELLATION OF IFR ON
(frequency).

2. Airports without an air/ground communica-
tions station:

PHRASEOLOGY-
(Call sign) REPORT CANCELLATION OF IFR THIS
FREQUENCY OR WITH FLIGHT SERVICE.
Or
(Call sign) REPORT CANCELLATION OF IFR THIS
FREQUENCY OR WITH (FSS serving the area or the ATC
controlling facility).

EXAMPLE-
“N13WA report cancellation of IFR this frequency or with
McAlester Radio.”

b. Respond to a pilot’s cancellation of his/her IFR
flight plan as follows:

PHRASEOLOGY-
(Call sign) IFR CANCELLATION RECEIVED.
EXAMPLE–
2. “Proceed direct Rockr, cross Rockr at or above one-zero thousand, climb via the Bizee Two departure.”

NOTE–
In Example 2 the aircraft will join the Bizee Two departure at Rockr and will then comply with departure published lateral path, published speed and altitude restrictions.

2. A “descend via” clearance must not be used where procedures contain only published “expect” altitude and/or speed 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. “Descend via” may be used on procedures that contain both “expect” and required altitude and speed restrictions only if altitude and/or speed restrictions or alternate restrictions are issued for the fix/waypoint associated with all expect restrictions.

4. “Descend via” clearances may also be issued if an aircraft is past all fixes/waypoints that have expect restrictions.

5. If it is necessary to assign a crossing altitude which differs from the STAR or SID altitude, emphasize the change to the pilot.

PHRASEOLOGY–
DESCEND VIA (STAR name and number) 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.

PHRASEOLOGY–
CLIMB VIA SID, EXCEPT CROSS (fix, point, waypoint), (revised altitude information).

CLIMB VIA SID, EXCEPT CROSS (fix, point, waypoint), (revised altitude information).

EXAMPLE–
1. “Climb via SID except cross Mkala at or above seven thousand.”

NOTE–
In Example 2, the aircraft will join the Suzan Two departure at Dvine, at the published altitude, and then comply with the published lateral path and any published speed or altitude restrictions. The aircraft will climb so as to cross Mkala at or above 7,000; remainder of the departure must be flown as published.

PHRASEOLOGY–
CLIMB VIA SID.

EXAMPLE–
2. “Climb via SID except maintain flight level two six zero.”

NOTE–
In Example 1, the aircraft will track laterally and vertically on the Teddd One departure and initially climb to 10,000; once re-issued the “climb via” clearance to FL260 the aircraft will continue climb while complying with published restrictions.

7. If it is necessary to assign an interim altitude or assign a bottom or top altitude not contained on a STAR or SID, the provisions of subparagraph 4-5-7h
may be used in conjunction with subparagraph 4-5-7a.

**PHRASEOLOGY**–
DESCEND VIA THE (STAR name and number) ARRIVAL EXCEPT AFTER (fix) MAINTAIN (revised altitude information).

**EXAMPLE**–
"United 454 descend via the Eagul Five Arrival, except after Geeno maintain one zero thousand."

**NOTE**–
The aircraft should track laterally and vertically on the Eagul Five Arrival and should descend so as to comply with all speed and altitude restrictions until reaching Geeno 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) Procedures.

**PHRASEOLOGY**–
CLIMB VIA SID EXCEPT AFTER (waypoint name), MAINTAIN (altitude).

**EXAMPLE**–
“Climb via SID except after Baret, maintain flight level one niner zero.”

**NOTE**–
1. Considering the principle that the last ATC clearance issued has precedence over the previous, the phraseology “maintain (altitude)” alone cancels previously issued altitude restrictions, including SID/STAR altitude restrictions unless they are restated or modified, and authorizes an unrestricted climb or descent. Speed restrictions remain in effect unless the controller explicitly cancels the speed restrictions.

2. Restate “climb/descend via” and then use “except” or “except maintain” phraseology to modify published restrictions or assign a new top/bottom altitude. Use “resume” phraseology with “maintain” to rejoin a route and assign a new altitude where compliance with published altitude restrictions is not required.

**REFERENCE**–
FAAO JO 7110.65, Para 4–2–5, Route or Altitude Amendments
FAAO JO 7110.65, Para 5–6–2, Methods
AIM 4–4–10 Adherence to Clearance
AIM, Para 5–2–8, Instrument Departure Procedures (DP) – Obstacle Departure Procedures (ODP) and Standard Instrument Departures (SID).

i. When a pilot is unable to accept a clearance, issue revised instructions to ensure positive control and approved 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 approved 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).
authorization, or refuse to authorize practice approaches as traffic conditions require. Normally, approaches in progress should not be terminated.

**NOTE**—
The priority afforded other aircraft over practice instrument approaches is not intended to be so rigidly applied that it causes grossly inefficient application of services.

a. Separation.

1. IFR aircraft practicing instrument approaches must be afforded approved separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 minima until:
   
   (a) The aircraft lands, and the flight is terminated, or
   
   (b) The pilot cancels the flight plan.

2. Where procedures require application of IFR separation to VFR aircraft practicing instrument approaches, standard IFR separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 must be provided. Controller responsibility for separation begins at the point where the approach clearance becomes effective. Except for heavy aircraft/B757, 500 feet vertical separation may be applied between VFR aircraft and between a VFR and an IFR aircraft.

**REFERENCE**—
FAAO JO 7210.3, Para 6–4–4, Practice Instrument Approaches.
FAAO JO 7210.3, Para 10–4–5, Practice Instrument Approaches.

3. Where separation services are not provided to VFR aircraft practicing instrument approaches, the controller must;

   (a) Instruct the pilot to maintain VFR.
   
   (b) Advise the pilot that separation services are not provided.

**PHRASEOLOGY**—
“(Aircraft identification) MAINTAIN VFR, PRACTICE APPROACH APPROVED, NO SEPARATION SERVICES PROVIDED.”

   (c) Provide traffic information or advise the pilot to contact the appropriate facility.

4. If an altitude is assigned, including at or above/below altitudes, the altitude specified must meet MVA, minimum safe altitude, or minimum IFR altitude criteria.

**REFERENCE**—
FAAO JO 7110.65, Para 7–7–5 Altitude Assignments.

5. All VFR aircraft must be instructed to maintain VFR on initial contact or as soon as possible thereafter.

**NOTE**—
This advisory is intended to remind the pilot that even though ATC is providing IFR-type instructions, the pilot is responsible for compliance with the applicable parts of the CFR governing VFR flight.

b. Missed Approaches.

1. Unless alternate instructions have been issued, IFR aircraft are automatically authorized to execute the missed approach depicted for the instrument approach being flown.

**REFERENCE**—
FAAO JO 7110.65, Para 4–8–9 Missed Approach.

2. VFR aircraft are not automatically authorized to execute the missed approach procedure. This authorization must be specifically requested by the pilot and approved by the controller. When a missed approach has been approved, separation must be provided throughout the missed approach.

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

4–8–12. LOW APPROACH AND TOUCH-AND-GO

Consider an aircraft cleared for a touch-and-go, low approach, or practice approach as an arriving aircraft until that aircraft touches down or crosses the landing threshold; thereafter, consider the aircraft as a departing aircraft. Before the aircraft begins its final descent, issue the appropriate departure instructions the pilot is to follow upon completion of the approach (in accordance with para 4–3–2, Departure Clearances). Climb-out instructions must include a specific heading or a route of flight and altitude, except when the aircraft will maintain VFR and contact the tower.

**EXAMPLE**—
“After completing low approach, climb and maintain six thousand. Turn right, heading three six zero.”

“Maintain VFR, contact tower.”

(Issue other instructions as appropriate.)

**NOTE**—
Climb-out instructions may be omitted after the first approach if instructions remain the same.
NOTE—
Those en route facilities using host software that provides capability for passing interim altitude must include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.

c. Ensure that, prior to transferring communications:

1. Potential violations of adjacent airspace and potential conflicts between aircraft in their own area of jurisdiction are resolved.

2. Coordination has been accomplished with all controllers through whose area of jurisdiction the aircraft will pass prior to entering the receiving controller’s area of jurisdiction unless otherwise specified by a LOA or a facility directive.

3. Restrictions issued to ensure separation are passed to the receiving controller.

d. After transferring communications, continue to comply with the requirements of subparas c1 and 2.

e. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

f. Comply with the provisions of para 2–1–17, Radio Communications Transfer, subparas a and b. To the extent possible, transfer communications when the transfer of radar identification has been accepted.

NOTE—
Before the ARTS/STARS “modify/quick look” function is used to transfer radar identification, a facility directive which specifies communication transfer points is required.

g. Advise the receiving controller of pertinent information not contained in the data block or flight progress strip unless covered in a LOA or facility directive. Pertinent information includes:

1. Assigned heading.

2. Air speed restrictions.

3. Altitude information issued.

4. Observed track or deviation from the last route clearance.

5. The beacon code if different from that normally used or previously coordinated.

6. Any other pertinent information.

h. Ensure that the data block is associated with the appropriate target.

i. Initiate verbal coordination to verify the position of primary or nondiscrete targets when using the automated handoff functions except for intrafacility handoffs using single-sensor systems or multisensor systems operating in a mosaic RDP mode.

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

k. Advise the receiving controller if radar monitoring is required.

l. Issue restrictions to the receiving controller which are necessary to maintain separation from other aircraft within your area of jurisdiction before releasing control of the aircraft.

m. Consider the target being transferred as identified on the receiving controller’s display when the receiving controller acknowledges receipt verbally or has accepted an automated handoff.

n. Accomplish the necessary coordination with any intervening controllers whose area of jurisdiction is affected by the receiving controller’s delay in the climb or the descent of an aircraft through the vertical limits of your area of jurisdiction when the receiving controller advises you of that delay before accepting the transfer of radar identification unless otherwise specified by a LOA or a facility directive.

5–4–6. RECEIVING CONTROLLER HANDOFF

The receiving controller must:

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

REFERENCE—
FAAO JO 7110.65, Para 2–1–14 Coordinate Use of Airspace.
FAAO JO 7110.65, Para 2–1–15 Control Transfer.
FAAO JO 7110.65, Para 5–4–3 Transferring Controller Handoff.

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

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

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

REFERENCE—
FAAO JO 7110.65, Para 5–9–5 Approach Separation Responsibility.

e. When using appropriate equipment, consider a discrete beacon target’s identity to be confirmed when:

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

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

NOTE—
When the aircraft generated discrete beacon code does not match the computer assigned beacon code, the code generated will be displayed in the data block. When the aircraft changes to the assigned discrete code, the code disappears from the data block. In this instance, the observance of code removal from the data block satisfies confirmation requirements.

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

f. Initiate verbal coordination prior to accepting control of a track when “CST,” “NAT,” “NT,” “NONE,” “NB,” “NX,” “OLD,” “OL,” “AMB,” “AM,” “TU”, or “TRK” is displayed in the data block.

1. When an automated interfacility handoff action is initiated and “AMB” or “AM” is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS/PIDP/STARS system.

2. When an automated inter–facility handoff action is initiated and “NAT,” “NT,” “TU”, or “TRK” is displayed in the full data block, advise the other facility if a disparity exists between the position declared by their computer and the actual target position.

g. Advise the transferring controller, prior to accepting the transfer of radar identification, that you will delay the climb or the descent of an aircraft through the vertical limits of the transferring controller’s area of jurisdiction, unless otherwise specified in a LOA or a facility directive.

NOTE—
Those en route facilities using HOST software that provides capability for passing interim altitude must include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.

h. If you decide, after accepting the transfer of radar identification, to delay the aircraft’s climb or descent through the vertical limits of the transferring controller’s area of jurisdiction, advise the transferring controller of that decision as soon as possible.

NOTE—
Those en route facilities using HOST software that provides capability for passing interim altitude must include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.

5–4–7. POINT OUT

a. The transferring controller must:

1. Obtain verbal approval before permitting an aircraft to enter the receiving controller’s delegated airspace. TERMINAL. Automated approval may be utilized in lieu of verbal, provided the appropriate automation software is operational (automated point out function), and the procedures are specified in a facility directive/LOA.

2. Obtain the receiving controller’s approval before making any changes to an aircraft’s flight path, altitude, speed, or data block information after the point out has been approved.

NOTE—
Those en route facilities using HOST software that provides capability for passing interim altitude must include the specific operations and procedures for use of this procedure in a LOA between the appropriate facilities.

3. Comply with restrictions issued by the receiving controller unless otherwise coordinated.

4. Be responsible for subsequent radar handoffs and communications transfer, including flight data revisions and coordination, unless otherwise agreed to by the receiving controller or as specified in a LOA.

b. The receiving controller must:
1. Below FL 600- 5 miles.

2. At or above FL 600- 10 miles.

3. For areas meeting all of the following conditions – 3 miles:
   (a) Radar site adaptation is set to single sensor mode.
   NOTE–
   1. Single Sensor Mode displays information from the radar input of a single site.
   2. Procedures to convert MEARTS Mosaic Mode to MEARTS Single Sensor Mode at each PVD/MDM will be established by facility directive.
   (b) Significant operational advantages can be obtained.
   (c) Within 40 miles of the antenna.
   (d) Below FL 180.
   (e) Facility directives specifically define the area where the separation can be applied and define the requirements for displaying the area on the controller’s PVD/MDM.

4. MEARTS Mosaic Mode Utilizing Single Source Polygon (San Juan CERAP and Honolulu Control Facility only) when meeting all of the following conditions– 3 miles:
   (a) Less than 40 miles from the antenna, below FL180, and targets are from the adapted sensor.
   (b) The single source polygon must be displayed on the controller’s PVD/MDM.
   (c) Significant operational advantages can be obtained.
   (d) Facility directives specifically define the single source polygon area where the separation can be applied and specify procedures to be used.
   (e) Controller must commence a transition to achieve either vertical separation or 5 mile lateral separation in the event that either target is not from the adapted sensor.

e. 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

f. 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.
   4. Small/large behind heavy – 5 miles.

WAKE TURBULENCE APPLICATION

g. In addition to subpara f, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:
   NOTE–
   Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.
   1. Small behind large– 4 miles.
   2. Small behind B757– 5 miles.
If the landing threshold cannot be determined, apply the above minima as constant or increasing at the closest point that can be determined prior to the landing threshold.

h. TERMINAL. 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/C/G 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. In accordance with the following criteria, all other approved separation may be discontinued and passing or diverging separation applied when:

1. Single Site ASR or FUSION Mode
(a) Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 15 degrees.

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

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

**REFERENCE**–
FAAO JO 7110.65, Para 1–2–2 , Course Definitions.

2. Single Site ARSR or FUSION Mode when target refresh is only from an ARSR or when in FUSION Mode – ISR is displayed.

(a) Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 45 degrees.

**NOTE**–
Two aircraft, both assigned radar vectors with an angular difference of at least 45 degrees, is considered a correct application of this paragraph.

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

3. Although approved separation may be discontinued, the requirements of Para 5–5–4, Minima, subparas f and g 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 1–2–13, 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 Paragraph 5-5-8, Additional Separation for Formation Flights, is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).

REFERENCE--
FAA O 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 Paragraph 5-5-4, Minima, subparagraph c1.

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--
FAA O JO 7110.65, Para 2-1-14, Coordinate Use of 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:
   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.
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

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. FAA 8260.46, Departure Procedure (DP) Program, and FAA 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), Volume 4, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet above the departure end of runway (DER) elevation before a turn is commenced. TERPS criteria ensures obstacle clearance with a climb gradient of 200 feet per nautical mile from the DER. “Immediately after departure” is considered to be any turn that provides at least 15 degrees of divergence that commences no later than 2 miles from the DER.

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 by 15 degrees or more immediately after departure or 10 degrees or more when both aircraft are departing the same runway and both are flying an RNAV SID. (See FIG 5–8–1, FIG 5–8–2, and FIG 5–8–3.)

**NOTE**—
RNAV SIDs specific to this paragraph are those SIDs constructed with a specific lateral path that begins at the DER.
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.)

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.)

**NOTE**—This procedure does not apply when aircraft are 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 5–5–4 Minima.

**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.
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 or 10 degrees or more when both aircraft are flying an RNAV SID. (See FIG 5–8–7 and FIG 5–8–8.)

**NOTE**
RNAV SIDs specific to this paragraph are those SIDs constructed with a specific lateral path that begins at the DER.

---

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.)

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.)

**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/Intersecting Flight Path Operations, ensure that the heavy jet does not overtake or cross in front of an aircraft departing from the adjacent parallel runway.
Section 9. Radar Arrivals

5–9–1. VECTORS TO FINAL APPROACH COURSE

Except as provided in para 7–4–2, Vectors for Visual Approach, vector arriving aircraft to intercept the final approach course:

a. At least 2 miles outside the approach gate unless one of the following exists:
   
   1. When the reported ceiling is at least 500 feet above the MVA/MIA and the visibility is at least 3 miles (report may be a PIREP if no weather is reported for the airport), aircraft may be vectored to intercept the final approach course closer than 2 miles outside the approach gate but no closer than the approach gate.

2. If specifically requested by the pilot, aircraft may be vectored to intercept the final approach course inside the approach gate but no closer than the final approach fix.

EXCEPTION. Conditions 1 and 2 above do not apply to RNAV aircraft being vectored for a GPS or RNAV approach.

b. Provide a minimum of 1,000 feet vertical separation between aircraft on opposite base legs unless another form of approved separation is established during turn-on to final approach.

c. For a precision approach, at an altitude not above the glideslope/glidepath or below the minimum glideslope intercept altitude specified on the approach procedure chart.

b. For a nonprecision approach, at an altitude which will allow descent in accordance with the published procedure.

NOTE–
A pilot request for an “evaluation approach,” or a “coupled approach,” or use of a similar term, indicates the pilot desires the application of subparas a and b.

e. EN ROUTE. The following provisions are required before an aircraft may be vectored to the final approach course:

   1. The approach gate and a line (solid or broken), depicting the final approach course starting at or passing through the approach gate and extending away from the airport, be displayed on the radar scope; for a precision approach, the line length must extend at least the maximum range of the localizer; for a nonprecision approach, the line length must extend at least 10NM outside the approach gate; and

   2. The maximum range selected on the radar display is 150 NM; or

   3. An adjacent radar display is set at 125 NM or less, configured for the approach in use, and is utilized for the vector to the final approach course.

4. If unable to comply with subparas 1, 2, or 3 above, issue the clearance in accordance with para 4–8–1, Approach Clearance.

REFERENCE–
FAAO JO 7110.65, Para 4–8–1 Approach Clearance.
FAAO JO 7110.65, Para 5–9–2 Final Approach Course Interception.

5–9–2. FINAL APPROACH COURSE INTERCEPTION

a. Assign headings that will permit final approach course interception on a track that does not exceed the interception angles specified in TBL 5–9–1.

TBL 5–9–1

<table>
<thead>
<tr>
<th>Distance from interception point to approach gate</th>
<th>Maximum interception angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 miles or triple simultaneous ILS/MLS approaches in use</td>
<td>20 degrees</td>
</tr>
<tr>
<td>2 miles or more</td>
<td>30 degrees (45 degrees for helicopters)</td>
</tr>
</tbody>
</table>

b. If deviations from the final approach course are observed after initial course interception, apply the following:

1. Outside the approach gate: apply procedures in accordance with subpara a, if necessary, vector the aircraft for another approach.

2. Inside the approach gate: inform the pilot of the aircraft’s position and ask intentions.

PHRASEOLOGY–
(Ident) (distance) MILE(S) FROM THE AIRPORT, (distance) MILE(S) RIGHT/LEFT OF COURSE, SAY INTENTIONS.

NOTE–
The intent is to provide for a track course intercept angle judged by the controller to be no greater than specified by this procedure.
c. **EN ROUTE.** When using a radar scope range above 125 NM, the controller must solicit and receive a pilot report that the aircraft is established on the final approach course. If the pilot has not reported established by the final approach gate, inform the pilot of his/her observed position and ask intentions.

**NOTE—** It may be difficult to accurately determine small distances when using very large range settings.

### 5–9–3. VECTORS ACROSS FINAL APPROACH COURSE

Inform the aircraft whenever a vector will take it across the final approach course and state the reason for such action.

**NOTE—** In the event you are unable to so inform the aircraft, the pilot is not expected to turn inbound on the final approach course unless approach clearance has been issued.

**PHRASEOLOGY—**

*EXPECT VECTORS ACROSS FINAL FOR (purpose).*

**EXAMPLE—**

"EXPECT VECTORS ACROSS FINAL FOR SPACING."

**REFERENCE—** FAAO JO 7110.65, Para 5–9–2 Final Approach Course Interception.

### 5–9–4. ARRIVAL INSTRUCTIONS

Issue all of the following to an aircraft before it reaches the approach gate:

a. Position relative to a fix on the final approach course. If none is portrayed on the radar display or if none is prescribed in the procedure, issue position information relative to the navigation aid which provides final approach guidance or relative to the airport.

b. Vector to intercept the final approach course if required.

c. Approach clearance except when conducting a radar approach. Issue approach clearance only after the aircraft is:

1. Established on a segment of a published route or instrument approach procedure, or see FIG 5–9–1 Example 1.

**FIG 5–9–1**

Arrival Instructions

---

**REFERENCE—**

FAAO JO 7110.65, Chapter 5, Section 9, Radar Arrivals, and Section 10, Radar Approaches—Terminal.
EXAMPLE—

1. Aircraft 1 was vectored to the final approach course but clearance was withheld. It is now at 4,000 feet and established on a segment of the instrument approach procedure. “Seven miles from X-RAY. Cleared I–L–S runway three six approach.” (See FIG 5–9–1.)

2. Aircraft 2 is being vectored to a published segment of the final approach course, 4 miles from LIMA at 2,000 feet. The MVA for this area is 2,000 feet. “Four miles from LIMA. Turn right heading three four zero. Maintain two thousand until established on the localizer. Cleared I–L–S runway three six approach.” (See FIG 5–9–1.)

3. Aircraft 3 is being vectored to intercept the final approach course beyond the approach segments, 5 miles from Alpha at 5,000 feet. The MVA for this area is 4,000 feet. “Five miles from Alpha. Turn right heading three three zero. Cross Alpha at or above four thousand. Cleared I–L–S runway three six approach.” (See FIG 5–9–1.)

4. Aircraft 4 is established on the final approach course beyond the approach segments, 8 miles from Alpha at 6,000 feet. The MVA for this area is 4,000 feet. “Eight miles from Alpha. Cross Alpha at or above four thousand. Cleared I–L–S runway three six approach.” (See FIG 5–9–1.)

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure. (See FIG 5–9–2 thru FIG 5–9–4.)

EXAMPLE—
The aircraft is being vectored to a published segment of the MLS final approach course, 3 miles from Alpha at 4,000 feet. The MVA for this area is 4,000 feet. “Three miles from Alpha. Turn left heading two one zero. Maintain four thousand until established on the azimuth course. Cleared M–L–S runway one eight approach.” (See FIG 5–9–2.)
EXAMPLE—
The aircraft is en route to Delta waypoint at 6,000 feet. The MVA for this area is 4,000 feet. “Cross Delta at or above four thousand. Cleared M–L–S runway one eight approach.” (See FIG 5–9–3.)

EXAMPLE—
The aircraft is being vectored to an MLS curved approach, 3 miles from X-ray at 3,000 feet. “Three miles from X-ray. Turn right heading three three zero. Maintain three thousand until established on the azimuth course. Cleared M–L–S runway one eight approach.” (See FIG 5–9–4.)

EXAMPLE—
The aircraft is being vectored to the intermediate fix FORRE for an RNAV approach. “Seven miles from FOORE, cleared direct FORRE, cross FORRE at or above four thousand, cleared RNAV runway one eight approach.”

NOTE—
1. The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

2. If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

3. Aircraft being vectored to the intermediate fix in FIG 5–9–5 must meet all the provisions described in subpara 4–8–b4.
d. Instructions to do one of the following:

**NOTE**—
The principal purpose of this paragraph is to ensure that frequency changes are made prior to passing the final approach fix. However, at times it will be desirable to retain an aircraft on the approach control frequency to provide a single-frequency approach or other radar services. When this occurs, it will be necessary to relay tower clearances or instructions to preclude changing frequencies prior to landing or approach termination.

1. Monitor local control frequency, reporting to the tower when over the approach fix.

2. Contact the tower on local control frequency.

**REFERENCE**—
FAAO JO 7110.65, Para 4−8−8 Communications Release.

3. Contact the final controller on the appropriate frequency if radar service will be provided on final on a different frequency.

**REFERENCE**—
FAAO JO 7110.65, Para 5−10−8 Final Controller Changeover.

4. When radar is used to establish the final approach fix, inform the pilot that after being advised that he/she is over the fix he/she is to contact the tower on local control frequency.

**EXAMPLE**—
“Three miles from final approach fix. Turn left heading zero one zero. Maintain two thousand until established on the localizer. Cleared I−L−S runway three six approach. I will advise when over the fix.”

“Over final approach fix. Contact tower one one eight point one.”

**NOTE**—
ARSR may be used for establishment of initial approach and intermediate approach fixes only. ASR must be used to establish the final approach fix.

**REFERENCE**—
FAAO JO 7110.65, Para 5−9−2 Final Approach Course Interception. FAAO JO 7110.65, Para 5−9−7 Simultaneous Independent ILS/MLS Approaches− Dual & Triple.

e. Where a Terminal Arrival Area (TAA) has been established to support RNAV approaches, inform the aircraft of its position relative to the appropriate IAF and issue the approach clearance. (See FIG 5−9−6.)

**EXAMPLE**—
1. Aircraft 1: The aircraft is in the straight in area of the TAA. “Seven miles from CENTR, Cleared R−NAV Runway One Eight Approach.”

2. Aircraft 2: The aircraft is in the left base area of the TAA. “One five miles from LEFTT, Cleared R−NAV Runway One Eight Approach.”

3. Aircraft 3: The aircraft is in the right base area of the TAA. “Four miles from RIGHT, Cleared R−NAV Runway One Eight Approach.”

**5−9−5. APPROACH SEPARATION RESPONSIBILITY**

a. The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course.

**NOTE**—
The radar controller may be a controller in an ARTCC, a terminal facility, or a tower controller when authorized to perform the approach control function in a terminal area.
**REFERENCE--**
FAAO JO 7110.65, Para 2−1−19 Wake Turbulence.
FAAO JO 7110.65, Section 5, Radar Separation, Para 5−5−1
Application.
FAAO JO 7110.65, Para 7−2−1 Visual Separation.
FAAO JO 7110.65, Para 5−5−4 Minima.
FAAO JO 7210.3, Para 2−1−15, Authorization for Separation Services by Towers.

b. When timed approaches are being conducted, the radar controller must maintain the radar separation specified in para 6−7−5, Interval Minima, until the aircraft is observed to have passed the final approach fix inbound (nonprecision approaches) or the OM or the fix used in lieu of the outer marker (precision approaches) and is within 5 miles of the runway on the final approach course or until visual separation can be provided by the tower.

**REFERENCE--**
FAAO JO 7110.65, Para 5−4−6 Receiving Controller Handoff.
FAAO JO 7110.65, Para 5−9−2 Final Approach Course Interception.
FAAO JO 7110.65, Para 5−9−6 Parallel Dependent ILS/MLS Approaches.
FAAO JO 7110.65, Para 6−7−2 Approach Sequence.

### 5−9−6. SIMULTANEOUS DEPENDENT APPROACHES

**TERMINAL**

a. Apply the following minimum separation when conducting simultaneous dependent approaches:

1. Provide a minimum of 1,000 feet vertical or a minimum of 3 miles radar separation between aircraft during turn on.

2. Provide a minimum of 1.5 miles radar separation diagonally between successive aircraft on adjacent final approach courses when runway centerlines are at least 2,500 feet but no more than 4,300 feet apart.

3. Provide a minimum of 2 miles radar separation diagonally between successive aircraft on adjacent final approach courses where runway centerlines are more than 4,300 feet but no more than 9,000 feet apart.

**EXAMPLE--**
In FIG 5−9−7, Aircraft 2 is 1.5 miles from Aircraft 1, and Aircraft 3 is 1.5 miles or more from Aircraft 2. *The resultant separation between Aircraft 1 and 3 is at least 2.5 miles.*
Section 15. Automated Radar Terminal Systems (ARTS)– Terminal

5–15–1. APPLICATION

ARTS/STARS may be used for identifying aircraft assigned a discrete beacon code, maintaining identity of targets, and performing handoffs of these targets between controllers.

NOTE–
USAF/USN. Where PIDP/DAIR equipment is capable of performing the functions described in this section, it may be used accordingly.

5–15–2. RESPONSIBILITY

This equipment does not relieve the controller of the responsibility to ensure proper identification, maintenance of identity, handoff of the correct target associated with the alphanumeric data, and separation of aircraft.

5–15–3. FUNCTIONAL USE

In addition to other uses specified herein, terminal automation may be used for the following functions:

a. Tracking.
b. Tagging.
c. Handoff.
d. Altitude information.

REFERENCE–
FAAO JO 7110.65, Para 5–2–23 Altitude Filters.
e. Coordination.
f. Ground speed.
g. Identification.

5–15–4. SYSTEM REQUIREMENTS

Use terminal automation systems as follows:

NOTE–
Locally developed procedures, operating instructions, and training material are required because of differences in equipment capability. Such locally developed procedures must be supplemental to those contained in this section and must be designed to make maximum use of the ARTS equipment.

a. Inform all appropriate positions before terminating or reinstating use of the terminal automation system at a control position. When terminating the use of terminal automation systems, all pertinent flight data of that position must be transferred or terminated.

b. Inform other interfaced facilities of scheduled and unscheduled shutdowns.

c. Initiate a track/tag on all aircraft to the maximum extent possible. As a minimum, aircraft identification should be entered, and automated handoff functions should be used.

d. Assigned altitude, if displayed, must be kept current at all times. Climb and descent arrows, where available, must be used to indicate other than level flight.

e. When operating in FUSION mode, the assigned or pilot reported altitude must be displayed and kept current when the aircraft is in level flight.

f. The automatic altitude readout of an aircraft under another controller’s jurisdiction may be used for vertical separation purposes without verbal coordination provided:

1. Operation is conducted using single-site radar coverage or when operating in FUSION mode.

2. Prearranged coordination procedures are contained in a facility directive in accordance with para 5–4–10, Prearranged Coordination, and FAAO 7210.3, para 3–7–7, Prearranged Coordination.

3. Do not use Mode C to effect vertical separation within a Mosaic radar configuration.

5–15–5. INFORMATION DISPLAYED

a. Two-letter ICAO designators or three-letter designators, as appropriate, must be used unless program limitations dictate the use of a single letter alpha prefix.

b. Use of the inhibit/select functions to remove displayed information no longer required must be in accordance with local directives, which should ensure maximum required use of the equipment.
c. Information displayed must be in accordance with national orders and specified in local directives.

5–15–6. CA/MCI

a. When a CA or MCI alert is displayed, evaluate the reason for the alert without delay and take appropriate action.

REFERENCE—
FAAO JO 7110.65, Para 2–1–6 Safety Alert.

b. If another controller is involved in the alert, initiate coordination to ensure an effective course of action. Coordination is not required when immediate action is dictated.

c. Suppressing/Inhibiting CA/MCI alert.

1. The suppress function may be used to suppress the display of a specific CA/MCI alert.

2. The inhibit function must only be used to inhibit the display of CA for aircraft routinely engaged in operations where approved separation criteria do not apply.

NOTE—
Examples of operations where approved separation criteria do not apply are ADC practice intercept operations and air shows.

3. Computer entry of a message suppressing a CA/MCI alert constitutes acknowledgment for the alert and signifies that appropriate action has or will be taken.

4. CA/MCI alert may not be suppressed or inhibited at or for another control position without being coordinated.

5–15–7. INHIBITING MINIMUM SAFE ALTITUDE WARNING (MSAW)

a. Inhibit MSAW processing of VFR aircraft and aircraft that cancel instrument flight rules (IFR) flight plans unless the pilot specifically requests otherwise.

REFERENCE—
FAAO JO 7110.65, Para 10–2–7 VFR Aircraft in Weather Difficulty,
FAAO JO 7110.65, Para 10–2–8 Radar Assistance to VFR Aircraft in Weather Difficulty.

b. A low altitude alert may be suppressed from the control position. Computer entry of the suppress message constitutes an acknowledgment for the alert and indicates that appropriate action has or will be taken.

5–15–8. TRACK SUSPEND FUNCTION

Use the track suspend function only when data block overlap in holding patterns or in proximity of the final approach create an unworkable situation. If necessary to suspend tracks, those which are not displaying automatic altitude readouts must be suspended. If the condition still exists, those displaying automatic altitude readouts may then be suspended.
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—
(Iden) 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 7−4−1, 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 approved 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) Approved 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, 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.”

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 another form of approved 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 approved 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) Approved 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, 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.

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

(a) When aircraft flight paths do not intersect, visual approaches may be conducted simultaneously, provided approved 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.

(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.”

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

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

(b) When aircraft flight paths intersect, another form of approved separation must be maintained until visual separation is provided.

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

REFERENCE—
FAAO 7110.79, Charted Visual Flight Procedures.
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.
1. The aircraft is being provided radar service; and

2. The aircraft will be cleared for descent and approach to an airport within the facility’s domestic FIR; and

3. There is an operational advantage.

c. Aircraft operating on unidirectional routes or traffic flows may be assigned altitudes other than the appropriate altitude for direction of flight provided that 2,000 feet vertical separation is maintained between aircraft operating on the same route.

8–9–7. COMPOSITE SEPARATION APPLICATION

Provide composite separation in the CEP and the North Pacific (NOPAC) composite route systems and where designated by facility directive in the Pacific Organized Track System (PACOTS) as follows:

a. Clear an aircraft to join an outer route of the composite route system at other than the normal entry point provided:

   1. Longitudinal or noncomposite vertical separation exists between that aircraft and any other aircraft on that route; and
   
   2. Composite separation exists between that aircraft and any other aircraft on the next adjacent route.

b. Clear an aircraft to leave an outer route of the composite route system at other than the normal exit point provided its course diverges so that lateral spacing from the route system increases until noncomposite separation exists between that aircraft and any other aircraft in the composite route system.

c. Clear an aircraft to change from one route to an adjacent route within the composite route system provided:

   1. Longitudinal or noncomposite vertical separation is maintained between that aircraft and any other aircraft on the route being vacated until that aircraft is established on the route to which it is proceeding; and
   
   2. Longitudinal or noncomposite vertical separation exists between that aircraft and any other aircraft on the route to which that aircraft is proceeding; and
   
   3. Composite separation exists between that aircraft and any other aircraft on the next adjacent route.

d. Clear an aircraft to cross the composite route system provided longitudinal or noncomposite vertical or lateral separation exists between that aircraft and any other aircraft in the composite route system.

e. Clear aircraft to transition to or from the composite route system from an Oceanic Transition Route (OTR) provided:

   1. The OTR is charted on aeronautical charts; and
   
   2. Composite separation is maintained between that aircraft and any other aircraft within the composite route system; and

   NOTE—
An aircraft is within the confines of a composite route system when the aircraft joins or crosses the outer route of the composite route system or passes a composite route entry point.

   3. Composite separation is maintained between that aircraft and any other aircraft on adjacent OTRs.

f. Clear an aircraft to change altitude on a route if noncomposite separation exists between that aircraft and others operating on that route regardless of other aircraft operating on adjacent routes in the system. Pilot’s discretion climbs and descents are not authorized when applying composite separation.

   NOTE—
Although composite separation is not applied between aircraft on different tracks at FL 280 and FL 290, this paragraph applies to climbs and descents between FL 280 and altitudes within the composite altitude stratum (FL 300 and above).
8–9–8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC CONTROLLED AIRSPACE

Aircraft must request an ATC clearance to deviate. Since aircraft will not fly into known areas of weather, weather deviation requests should take priority over routine requests. If there is no traffic in the horizontal dimension, ATC must issue clearance to deviate from track; or if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation. If there is conflicting traffic and ATC is unable to establish approved separation, ATC must:

a. Advise the pilot unable to issue clearance for requested deviation;
b. Advise the pilot of conflicting traffic; and
c. Request pilot’s intentions.

PHRASEOLOGY—
UNABLE (requested deviation), TRAFFIC IS (call sign, position, altitude, direction), SAY INTENTIONS.

NOTE—
1. The pilot will advise ATC of intentions by the most expeditious means available.
2. In the event that pilot/controller communications cannot be established or a revised AT clearance is not available, pilots will follow the procedures outlined in the Regional Supplementary Procedures, ICAO Doc 7030 and Chart Supplements.
hazardous material contamination). Honor inflight clearance requests for altitude and route changes to the maximum extent possible. Other IFR aircraft may be recleared so that requests by SAMPLER aircraft are honored. Separation standards as outlined in this order must be applied in all cases.

**REFERENCE**

FAAO JO 7110.65, Para 2–1–4 Operational Priority.
FAAO JO 7110.65, Para 2–4–20 Aircraft Identification.
FAAO JO 7610.4, Para 4–4–4, Avoidance of Hazardous Radiation Areas.

9–2–18. AWACS/NORAD SPECIAL FLIGHTS

Do not delay E–3 AWACS aircraft identified as “AWACS/NORAD Special” flights. The following control actions are acceptable while expediting these aircraft to the destination orbit.

a. En route altitude changes +/– 2,000 feet from the requested flight level.

b. Radar vectors or minor route changes that do not impede progress towards the destination orbit.

**NOTE**

NORAD has a requirement to position E–3 AWACS aircraft at selected locations on a time-critical basis. To the extent possible these flights will utilize routes to the destination orbit that have been precoordinated with the impacted ATC facilities. To identify these flights, the words “AWACS/ NORD SPECIAL” will be included as the first item in the remarks section of the flight plan.

9–2–19. WEATHER RECONNAISSANCE FLIGHTS

TEAL and NOAA mission aircraft fly reconnaissance flights to gather meteorological data on winter storms, (NWSOP missions), hurricanes and tropical cyclones (NHOP missions). The routes and timing of these flights are determined by movement of the storm areas and not by traffic flows.

a. When a dropsonde release time is received from a TEAL or NOAA mission aircraft, workload and priorities permitting, controllers must advise the mission aircraft of any traffic estimated to pass through the area of the drop at altitudes below that of the mission aircraft. This traffic advisory must include:

1. Altitude.
2. Direction of flight.

3. ETA at the point closest to drop area (or at the fix/intersection where drop will occur).

**NOTE**

A dropsonde is a 14–inch long cardboard cylinder about 2.75 inches in diameter, that weighs approximately 14 ounces (400 grams), and has a parachute attached. When released from the aircraft it will fall at a rate of approximately 2,500 feet per minute. Controllers should recognize that a dropsonde released at FL 310 will be a factor for traffic at FL 210 four minutes later. It is the aircraft commanders responsibility to delay release of dropsondes if traffic is a factor. Aircraft commanders will delay release of dropsondes based solely upon traffic as issued by ATC.

b. When advised that an airborne TEAL or NOAA aircraft is requesting a clearance via CARCAH, issue the clearance in accordance with Chapter 4, IFR, Section 2, Clearances.

**REFERENCE**

FAAO JO 7110.65, Para 4–2–1 Clearance Items.
FAAO JO 7110.65, Para 4–2–2 Clearance Prefix.
FAAO JO 7110.65, Para 4–2–3 Delivery Instructions.

9–2–20. EVASIVE ACTION MANEUVER

Approve a pilot request to conduct an evasive action maneuver only on the basis of a permissible traffic situation. Specify the following items, as necessary, when issuing approval:

**NOTE**

The “evasive action” maneuver is performed by a bomber/fighter bomber aircraft at or above FL 250 along a 60 NM long segment of the flight plan route overlying a RBS or other site and includes:

1. Flying a zigzag pattern on both the left and right side of the flight plan route centerline. Altitude deviations are made in conjunction with the lateral maneuvering.
2. Lateral deviations from the route centerline will not normally exceed 12 miles. Altitude variations must not exceed plus or minus 1,000 feet of the assigned flight level; i.e., confined within a 2,000 foot block.

a. Specific route segment on which the maneuver will take place.

b. Distance of maximum route deviation from the centerline in miles.

c. Altitude.
**PHRASEOLOGY**

CLEARED TO CONDUCT EVASIVE ACTION
MANEUVER FROM (fix) TO (fix),

and

(number of miles) EITHER SIDE OF CENTERLINE,

and

MAINTAIN (altitude) THROUGH (altitude),

and

COMPLETE MANEUVER AT (fix) AT (altitude).

**9–2–21. NONSTANDARD FORMATION/CELL OPERATIONS**

Occasionally the military is required to operate in a nonstandard cell formation and controllers should be knowledgeable of the various tactics employed and the procedures used.

**REFERENCE**—
FAAO JO 7610.4, Chapter 12, Section 12, Formation Flight.

a. Formation leaders are responsible for obtaining ATC approval to conduct nonstandard formation/cell operations.

b. When nonstandard formation/cell operations have been approved, controllers must assign sufficient altitudes to allow intra-cell vertical spacing of 500 feet between each aircraft in the formation.

c. Control nonstandard formation/cell operations on the basis that MARSA is applicable between the participating aircraft until they establish approved separation which is acknowledged by ATC.

d. Apply approved separation criteria between the approved nonstandard formation/cell envelope and nonparticipating aircraft.

e. Clear aircraft operating in a nonstandard formation/cell to the breakup fix as the clearance limit. Forward data pertaining to route or altitude beyond the breakup point to the center concerned as a part of the routine flight plan information.

f. **EN ROUTE.** If the breakup occurs in your area, issue appropriate clearances to authorize transition from formation to individual routes or altitudes. If a breakup cannot be approved, issue an appropriate clearance for the flight to continue as a formation.

**9–2–22. OPEN SKIES TREATY AIRCRAFT**

a. OPEN SKIES aircraft will be identified by the call sign “OSY” (OPEN SKIES) followed by the flight number and a one-letter mission suffix.

**EXAMPLE**—

OSY123D

Mission suffixes:

*F = Observation Flights (Priority).

*D = Demonstration Flights (Priority).

*T = Transit Flights (Nonpriority).

**NOTE**—

1. Observation/Demonstration flights are conducted under rigid guidelines outlined in the Treaty of OPEN SKIES that govern sensor usage, maximum flight distances, altitudes and priorities.

2. Transit flights are for the sole purpose of moving an OPEN SKIES aircraft from airport to airport in preparation for an actual OPEN SKIES “F” or “D” mission.

b. Provide priority and special handling to expedite the movement of an OPEN SKIES observation or demonstration flight.

**REFERENCE**—


c. OPEN SKIES (F and D) Treaty aircraft, while maintaining compliance with ATC procedures, must have priority over activities in special use airspace (SUA) and must be allowed to transit such airspace as filed after appropriate and timely coordination has been accomplished between the using agency and controlling agency. A letter of agreement is required between the using agency and the controlling agency for Open Skies F and D aircraft to transit active SUA. When Open Skies F and D aircraft transit SUA, an ATC facility must provide approved separation services at all times.

**REFERENCE**—

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

1. F and D Treaty flights transiting SUA will be handled in the following manner:

   a. The ATC facility controlling the F and D Treaty flight must advise the using/scheduling
agency or appropriate ATC facility upon initial notification and when the aircraft is 15 minutes from the SUA boundary; and

(1) For SUA that has an ATC facility providing services to the area, provide approved separation. If the ATC facility is unable to provide approved separation from the activities in the SUA, the using agency must confirm that all operations in the SUA have ceased.

(2) For SUA not associated with an ATC facility, the using/scheduling agency must return the SUA to the controlling agency and confirm that all operations in the SUA have ceased.

(b) If the controlling facility/using agency is unable to confirm that all conflicting activities in the SUA have ceased, the OPEN SKIES aircraft must not be permitted access to the SUA.

2. Return SUA to the using agency, if appropriate, within (15) minutes after the F and D Treaty aircraft clears the SUA.

d. Clear the aircraft according to the filed flight plan.

1. Do not ask the pilot to deviate from the planned action or route of flight except to preclude an emergency situation or other higher priority aircraft.

2. Do not impose air traffic control delays except to preclude emergency situations or other higher priority aircraft.

NOTE—
If for reasons of flight safety the route or altitude must be changed, return the aircraft to the filed flight plan route as soon as practical.
Section 3. Overdue Aircraft

10–3–1. OVERDUE AIRCRAFT/OTHER SITUATIONS

a. Consider an aircraft to be overdue and initiate the procedures stated in this section to issue an ALNOT when neither communications nor radar contact can be established and 30 minutes have passed since:

NOTE—
The procedures in this section also apply to an aircraft referred to as “missing” or “unreported.”

1. Its ETA over a specified or compulsory reporting point or at a clearance limit in your area.

2. Its clearance void time.

3. A VFR or IFR aircraft arriving at an airport not served by an air traffic control tower or flight service station fails to cancel a flight plan after receiving instructions on how to cancel.

NOTE—
If you have reason to believe that an aircraft is overdue prior to 30 minutes, take the appropriate action immediately.

b. Consider an aircraft to be in an emergency status and initiate ALNOT procedures in this section immediately when there is an abnormal simultaneous loss of radar and communications with an IFR aircraft or VFR/SVFR aircraft receiving flight following services. This situation may be applicable to an aircraft operating in a non-radar environment and an unexpected/abnormal loss of communications occurs.

c. The ARTCC in whose area the aircraft is reported as overdue, missing or lost will make these determinations and takes any subsequent action required.

d. If you have reason to believe that an aircraft is overdue prior to 30 minutes, take the appropriate action immediately.

e. The center in whose area the aircraft is first unreported or overdue will make these determinations and takes any subsequent action required.

REFERENCE—
FAAO JO 7110.65, Para 10–1–4 Responsibility.
FAAO JO 7110.65, Para 10–2–5 Emergency Situations.

NOTE—
FSSs serve as the central points for collecting and disseminating information on an overdue or missing aircraft which is not on an IFR flight plan. Non–FSS ATC facilities that receive telephone calls or other inquiries regarding these flights must refer these calls and inquiries to the appropriate AFSS/FSS.

10–3–2. INFORMATION TO BE FORWARDED TO ARTCC

TERMINAL

When an aircraft is considered to be in emergency status that may require SAR procedures, or an IFR aircraft is overdue, the terminal facility must alert the appropriate ARTCC and forward the following information, as available:

a. Flight plan, including color of aircraft, if known.

b. Time of last transmission received, by whom, and frequency used.

c. Last position report and how determined.

d. Aircraft beacon code.

e. Number of persons on board.

f. Fuel status.

g. Facility working aircraft and frequency.

h. Last known position, how determined, time, estimated present position, and maximum range of flight of the aircraft based on remaining fuel and airspeed.

i. Position of other aircraft near aircraft’s route of flight, when requested.

j. Whether or not an ELT signal has been heard or reported in the vicinity of the last known position.

k. Other pertinent information.

REFERENCE—

EN ROUTE

When an aircraft is considered to be in emergency status or an IFR aircraft is overdue, the ARTCC must
alert the RCC and forward the following information, as available:

a. Facility and person calling.

b. Flight plan, including color of aircraft, if known.

c. Time of last transmission received, by whom, and frequency used.

d. Last position report and how determined.

e. Aircraft beacon code.

f. Action taken by reporting facility and proposed action.

g. Number of persons on board.

h. Fuel status.

i. Facility working aircraft and frequency.

j. Last known position, how determined, time, estimated present position, and maximum range of flight of the aircraft based on remaining fuel and airspeed.

k. Position of other aircraft near aircraft’s route of flight, when requested.

l. Whether or not an ELT signal has been heard or reported in the vicinity of the last known position.

m. Other pertinent information.

**REFERENCE**
FAAO JO 7110.65, Para 10–1–4 Responsibility. 
FAAO JO 7110.65, Para 10–2–5 Emergency Situations.

**NOTE**
FSSs serve as the central points for collecting and disseminating information on an overdue or missing aircraft which is not on an IFR flight plan. Non–FSS ATC facilities that receive telephone calls or other inquiries regarding these flights must refer these calls and inquiries to the appropriate FSS.

**10–3–4. ALNOT**

**EN ROUTE**

a. In addition to routing to the regional office operations center for the area in which the facility is located, issue an ALNOT to all centers and Area B circuits, generally 50 miles on either side of the route of flight from the last reported position to destination. Include the original or amended flight plan, as appropriate, and the last known position of the aircraft. At the recommendation of the RCC or at your discretion, the ALNOT may be issued to cover the maximum range of the aircraft.

**NOTE**
1. An ALNOT must be issued before the RCC can begin search and rescue procedures.

2. Flight plan information on military aircraft is available at the FSS serving as a tie-in station for the departure or destination airport. FAA tie-in stations for airports in the continental U.S. are listed in FAAO JO 7350.8, Location Identifiers. In the West Flight Services Area Office, tie-in stations are listed in service area publications entitled, “Flight Plan Routing and Airport Search Directory.” For flights with overseas departure points, the information is available through the destination FSS or the appropriate IFSS.

b. Upon receipt of an INREQ or ALNOT, check the position records to determine whether the aircraft has contacted your facility. Notify the originator of the results or status of this check within one hour of the time the alert was received. Retain the alert in an active status, and immediately notify the originator of subsequent contact, until cancellation is received.

c. Include pertinent information in the ALNOT that will aid the RCC and SAR Teams in conducting the SAR mission. When known, include:

1. Last known position.

2. Time.

3. Aircraft beacon code.

d. When information is obtained not previously contained in the ALNOT, issue an amended ALNOT to update information that will assist the SAR providers.

**10–3–5. RESPONSIBILITY TRANSFER TO RCC**

**EN ROUTE**

Transfer responsibility for further search to the RCC when one of the following occurs:

a. Thirty minutes have elapsed after the estimated aircraft fuel exhaustion time.

b. The aircraft has not been located within one hour after ALNOT issuance.

c. The ALNOT search has been completed with negative results.
### ADAM AIRCRAFT (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>A–500, CarbonAero</td>
<td>A500</td>
<td>2P/S</td>
<td></td>
</tr>
</tbody>
</table>

### AERMACCHI SpA (Italy)
(Also AGUSTA, SIAI–MARCHETTI)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>AMX</td>
<td>AMX*</td>
<td>1J/S+</td>
<td></td>
</tr>
<tr>
<td>FN–333 Riviera***</td>
<td>FN33</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>MB–290TP Redigo</td>
<td>L90</td>
<td>1T/S</td>
<td></td>
</tr>
<tr>
<td>MB–326</td>
<td>M326</td>
<td>1J/S</td>
<td></td>
</tr>
<tr>
<td>MB–339</td>
<td>M339*</td>
<td>1J/S</td>
<td></td>
</tr>
<tr>
<td>SF–205–18F/20F</td>
<td>S05F</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>SF–205–18R/20R/22R</td>
<td>S05R</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>S–208</td>
<td>S208</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>S–211</td>
<td>S211</td>
<td>1J/S</td>
<td></td>
</tr>
<tr>
<td>SF–260 A/B/C/D/E/F/M/W, Warrior</td>
<td>F260</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>SF–260TP</td>
<td>F26T</td>
<td>1T/S</td>
<td></td>
</tr>
<tr>
<td>SF–600A, SF–600TP Canguero</td>
<td>F600</td>
<td>2T/S</td>
<td></td>
</tr>
</tbody>
</table>

### AERONCA (USA– see Bellanca)

### AERO SPACELINES (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>Super Guppy, Super Turbine Guppy</td>
<td>SGUP</td>
<td>4T/L</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>ATR–42–200/300/320</td>
<td>AT43</td>
<td>2T/L</td>
<td></td>
</tr>
<tr>
<td>ATR–42–400</td>
<td>AT44</td>
<td>2T/L</td>
<td></td>
</tr>
<tr>
<td>ATR–42–500</td>
<td>AT45</td>
<td>2T/L</td>
<td></td>
</tr>
<tr>
<td>ATR–72</td>
<td>AT72</td>
<td>2T/L</td>
<td></td>
</tr>
</tbody>
</table>
### Aircraft Information

#### Fixed-Wing Aircraft

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>Rallye, Rallye Club, Super Rallye, Rallye Commodore, Minerva (MS–880 to 894)</td>
<td>RALL</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>SE–210 Caravelle</td>
<td>S210</td>
<td>2J/L</td>
<td>2,300</td>
</tr>
<tr>
<td>SN–601 Corvette</td>
<td>S601</td>
<td>2J/S+</td>
<td>2,500</td>
</tr>
<tr>
<td>Tampico TB–9</td>
<td>TAMP</td>
<td>1P/S</td>
<td>600</td>
</tr>
<tr>
<td>TBM TB–700</td>
<td>TBM7</td>
<td>1T/S</td>
<td>1,700</td>
</tr>
<tr>
<td>Tabago TB10C/200</td>
<td>TOBA</td>
<td>1P/S</td>
<td>700</td>
</tr>
<tr>
<td>Trinidad TB–20/21</td>
<td>TRIN</td>
<td>1P/S</td>
<td>850</td>
</tr>
</tbody>
</table>

#### AIRBUS INDUSTRIES (International)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>A–300B4 – 600</td>
<td>A306</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>A–310 (CC–150 Polaris)</td>
<td>A310</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>A–318</td>
<td>A318</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>A–319, ACJ</td>
<td>A319</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>A–320</td>
<td>A320</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>A–321</td>
<td>A321</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>A–300ST Super Transporter, Beluga</td>
<td>A3ST</td>
<td>2J/H</td>
<td></td>
</tr>
<tr>
<td>A–330–200</td>
<td>A332</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>A–330–300</td>
<td>A333</td>
<td>2J/H</td>
<td></td>
</tr>
<tr>
<td>A–340–300</td>
<td>A343</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>A–340–500</td>
<td>A345</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>A–340–600</td>
<td>A346</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>A–380–800</td>
<td>A388</td>
<td>4J/H</td>
<td></td>
</tr>
</tbody>
</table>

#### AIRCRAFT HYDRO–FORMING (USA)

(Also BUSHMASTER)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>Bushmaster 2000</td>
<td>BU20</td>
<td>3P/S+</td>
<td>2,000</td>
</tr>
</tbody>
</table>
## Appendix A
### Aircraft Information Fixed-Wing Aircraft

#### BELLANCA AIRCRAFT (USA)
*(Also AERONCA, CHAMPION, DOWNER, HINDUSTAN, NORTHERN)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronca Chief/Super Chief, Pushpak</td>
<td>AR11</td>
<td>1P/S</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>Aeronca Sedan</td>
<td>AR15</td>
<td>1P/S</td>
<td>Descent Rate (fpm)</td>
</tr>
<tr>
<td>14 Junior, Cruiseair,</td>
<td>B14A</td>
<td>1P/S</td>
<td>SRS Cat. LAHSO Group</td>
</tr>
<tr>
<td>Cruiseair Senior Cruisemaster</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Bellanca 260/A/B/C</td>
<td>B14C</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>17 Viking, Super Viking,</td>
<td>BL17</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>Turbo Viking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 Skyrocket</td>
<td>BL19</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>8 Decathlon, Scout</td>
<td>BL8</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>Champion Lancer 402</td>
<td>CH40</td>
<td>2P/S</td>
<td></td>
</tr>
<tr>
<td>7 ACA/ECA Champ, Citabria,</td>
<td>CH7A</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>7 GCBC/KCAB Citabria</td>
<td>CH7B</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>T−250 Aries</td>
<td>T250</td>
<td>1P/S</td>
<td></td>
</tr>
</tbody>
</table>

#### BOEING COMPANY (USA)
*(Also GRUMMAN, IAI, LOCKHEED–BOEING, MCDONNELL DOUGLAS, NORTHRoP–GRUMMAN, ROHR)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>B−52 Stratofortress</td>
<td>B52</td>
<td>8J/H</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>B747−800</td>
<td>B748</td>
<td>4J/H</td>
<td>Descent Rate (fpm)</td>
</tr>
<tr>
<td>707−100 (C−137B)</td>
<td>B701</td>
<td>4J/L</td>
<td>SRS Cat. LAHSO Group</td>
</tr>
<tr>
<td>707−300(C−18, C−137C, E−8J–Stars,</td>
<td>B703</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>EC−18, EC−137, KC−137, T−17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>717−200</td>
<td>B712</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>720</td>
<td>B720</td>
<td>4J/L</td>
<td></td>
</tr>
<tr>
<td>727−100 (C−22)</td>
<td>B721</td>
<td>3J/L</td>
<td></td>
</tr>
<tr>
<td>727−200</td>
<td>B722</td>
<td>3J/L</td>
<td></td>
</tr>
<tr>
<td>727−100RE Super 27</td>
<td>R721</td>
<td>3J/L</td>
<td></td>
</tr>
<tr>
<td>727−200RE Super 27</td>
<td>R722</td>
<td>3J/L</td>
<td></td>
</tr>
<tr>
<td>737−100</td>
<td>B731</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−200 (Surveiller, CT−43, VC−96)</td>
<td>B732</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−300</td>
<td>B733</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−400</td>
<td>B734</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−500</td>
<td>B735</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−600</td>
<td>B736</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−700, BBJ, C−40</td>
<td>B737</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−800, BBJ2</td>
<td>B738</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>737−900</td>
<td>B739</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>747−100</td>
<td>B741</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>747−200 (E−4, VC−25)</td>
<td>B742</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>747−300</td>
<td>B743</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>747−400 (Domestic, no winglets)</td>
<td>B74D</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>747−400 (International, winglets)</td>
<td>B744</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Type Designator</td>
<td>Description</td>
<td>Performance Information</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
<td>-------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>747–400 LCF Dreamlifter</td>
<td>BLCF</td>
<td>4J/H</td>
<td>III</td>
</tr>
<tr>
<td>747 SCA Shuttle Carrier</td>
<td>BSCA</td>
<td>4J/H</td>
<td>III</td>
</tr>
<tr>
<td>747SR</td>
<td>B74R</td>
<td>4J/H</td>
<td>3,000</td>
</tr>
<tr>
<td>767–200 (C–32)</td>
<td>B752</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>757–300</td>
<td>B753</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>767–200</td>
<td>B762</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>767–300</td>
<td>B763</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>767–400</td>
<td>B764</td>
<td>2J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>777–200, 777–200ER</td>
<td>B772</td>
<td>2J/H</td>
<td>2,500</td>
</tr>
<tr>
<td>777–200LR, B777–F</td>
<td>B77L</td>
<td>2J/H</td>
<td>2,500</td>
</tr>
<tr>
<td>777–300ER</td>
<td>B77W</td>
<td>2J/H</td>
<td>2,500</td>
</tr>
<tr>
<td>787–3 Dreamliner, Dreamliner (Srs. 3)</td>
<td>B783</td>
<td>2J/H</td>
<td>III</td>
</tr>
<tr>
<td>787–8 Dreamliner, Dreamliner (Srs. 8)</td>
<td>B788</td>
<td>2J/H</td>
<td>III</td>
</tr>
<tr>
<td>787–9 Dreamliner, Dreamliner (Srs. 9)</td>
<td>B789</td>
<td>2J/H</td>
<td>III</td>
</tr>
<tr>
<td>C–135</td>
<td>C135</td>
<td>4J/H</td>
<td>2,000</td>
</tr>
<tr>
<td>C–17 Globemaster 3</td>
<td>C97</td>
<td>4P/L</td>
<td>2,500</td>
</tr>
<tr>
<td>C–97 Stratotanker</td>
<td>K35</td>
<td>4J/H</td>
<td>5,000</td>
</tr>
<tr>
<td>C–135</td>
<td>K35E</td>
<td>4J/H</td>
<td>5,000</td>
</tr>
<tr>
<td>75 Kaydet (PT–13, PT–17, PT–18, PT–27, N2S)</td>
<td>ST75</td>
<td>1P/S</td>
<td>840</td>
</tr>
</tbody>
</table>

**BOMBARDIER (Canada)**
*(Also CANADAIR)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/Weight Class</td>
</tr>
<tr>
<td>BD–100 Challenger 300</td>
<td>CL30</td>
<td>2J/S+</td>
<td>3,500</td>
</tr>
<tr>
<td>BD–700 Global 5000</td>
<td>GL5T</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td>BD–700 Global Express, Sentinel</td>
<td>GLEX</td>
<td>2J/L</td>
<td>III</td>
</tr>
</tbody>
</table>
### EXTRA (FRG)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weight Class</td>
</tr>
<tr>
<td>200</td>
<td>E200</td>
<td>1P/S</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Descent Rate (fpm)</td>
</tr>
<tr>
<td>230</td>
<td>E230</td>
<td>1P/S</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>300, 350</td>
<td>E300</td>
<td>1P/S</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>400</td>
<td>E400</td>
<td>1P/S</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>500</td>
<td>E500</td>
<td>1T/S</td>
<td>1,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,800</td>
</tr>
</tbody>
</table>

### FAIRCHILD DORNIER (USA/FRG)

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weight Class</td>
</tr>
<tr>
<td>228</td>
<td>D228</td>
<td>2T/S+</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Descent Rate (fpm)</td>
</tr>
<tr>
<td>328</td>
<td>D328</td>
<td>2T/S+</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>328JET, Envoy 3</td>
<td>J328</td>
<td>2J/S+</td>
<td>III</td>
</tr>
<tr>
<td>728JET, Envoy 7</td>
<td>J728</td>
<td>2J/L</td>
<td>III</td>
</tr>
</tbody>
</table>

### FAIRCHILD INDUSTRIES (USA)

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

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

### FOKKER BV (Netherlands)

(Also FAIRCHILD, FAIRCHILD–HILLER)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weight Class</td>
</tr>
<tr>
<td>F–27 Friendship, Troopship, Maritime (C–31, D–2)</td>
<td>F27</td>
<td>2T/L</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Descent Rate (fpm)</td>
</tr>
<tr>
<td>F–28, Fellowship</td>
<td>F28</td>
<td>2J/L</td>
<td>4,650</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>50, Maritime Enforcer</td>
<td>F50</td>
<td>2T/L</td>
<td>3,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,500</td>
</tr>
<tr>
<td>60</td>
<td>F60</td>
<td>2T/L</td>
<td>3,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,500</td>
</tr>
<tr>
<td>70</td>
<td>F70</td>
<td>2J/L</td>
<td>4,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,000</td>
</tr>
<tr>
<td>100</td>
<td>F100</td>
<td>2J/L</td>
<td>3,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,500</td>
</tr>
</tbody>
</table>

Aircraft Information Fixed-Wing Aircraft
### GAF (Australia)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2/22/24 Nomad, Floatmaster, Missionmaster, Searchmaster</td>
<td>NOMA</td>
<td>2T/S</td>
<td>1,300 1,100 II 2</td>
</tr>
</tbody>
</table>

### GATES LEARJET CORP. (USA)

*(Also LEAR JET, LEARJET, SHIN MEIWA)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>LJ23</td>
<td>2J/S</td>
<td>4,500 4,000 III 8</td>
</tr>
<tr>
<td>24</td>
<td>LJ24</td>
<td>2J/S+</td>
<td>4,500 4,000 III 7</td>
</tr>
<tr>
<td>25</td>
<td>LJ25</td>
<td>2J/S+</td>
<td>4,500 4,000 III 9</td>
</tr>
<tr>
<td>28, 29</td>
<td>LJ28</td>
<td>2J/S+</td>
<td>4,500 4,000 III 7</td>
</tr>
<tr>
<td>31</td>
<td>LJ31</td>
<td>2J/S+</td>
<td>4,500 4,000 III 7</td>
</tr>
<tr>
<td>40</td>
<td>LJ40</td>
<td>2J/S+</td>
<td>III</td>
</tr>
<tr>
<td>45</td>
<td>LJ45</td>
<td>2J/S+</td>
<td>III 4</td>
</tr>
<tr>
<td>55</td>
<td>LJ55</td>
<td>2J/S+</td>
<td>5,000 4,000 III 8</td>
</tr>
<tr>
<td>60</td>
<td>LJ60</td>
<td>2J/S+</td>
<td>5,000 4,000 III 10</td>
</tr>
</tbody>
</table>

### GENERAL DYNAMICS CORP. (USA)

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canso/Catalina***</td>
<td>CAT</td>
<td>2P/S+</td>
<td>600 600 III 7</td>
</tr>
<tr>
<td>Convair 240/340/440, Liner, HC–131</td>
<td>CVLP</td>
<td>2P/L</td>
<td>1,000 800 III 7</td>
</tr>
<tr>
<td>Convair 540/580/600/640</td>
<td>CVLT</td>
<td>2T/L</td>
<td>1,500 1,500 III 7</td>
</tr>
<tr>
<td>F–111, EF–111, (RF–111 Aardvark, Raven)</td>
<td>F111*</td>
<td>2J/L</td>
<td>5,000 5,000 III</td>
</tr>
<tr>
<td>F–16 A/B/C/D/N, NF–16, TF–16 Fighting Falcon, Netz, Barak, Brakeet</td>
<td>F16*</td>
<td>1J/L</td>
<td>8,000 5,000 III</td>
</tr>
<tr>
<td>F–16XL Fighting Falcon</td>
<td>F16X*</td>
<td>1J/L</td>
<td>III</td>
</tr>
<tr>
<td>Valiant</td>
<td>VALI</td>
<td>1P/S</td>
<td>600 750 I</td>
</tr>
</tbody>
</table>

### GREAT LAKES (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>2T–1 Sport Trainer, Sport</td>
<td>G2T1</td>
<td>1P/S</td>
<td>1,000 800 I</td>
</tr>
</tbody>
</table>
### HOWARD (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>250, 350</td>
<td>L18</td>
<td>2P/L</td>
<td>1,800</td>
</tr>
<tr>
<td>DGA–15 (GH Nightingale, NH)</td>
<td>DG15</td>
<td>1P/S</td>
<td>1,000</td>
</tr>
</tbody>
</table>

### IAI (Israel)
*(Also ISRAEL AIRCRAFT INDUSTRIES, ASTRA, GULFSTREAM)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>101 Avara, 102, 201, 202</td>
<td>ARVA</td>
<td>2T/S+</td>
<td>1,300</td>
</tr>
<tr>
<td>1123 Westwind</td>
<td>WW23</td>
<td>2J/S+</td>
<td>4,000</td>
</tr>
<tr>
<td>1124 Westwind</td>
<td>WW24</td>
<td>2J/S+</td>
<td>4,000</td>
</tr>
<tr>
<td>1125 Gulfstream 100, (C–38)</td>
<td>ASTR</td>
<td>2J/S+</td>
<td>4,000</td>
</tr>
<tr>
<td>1126 Gulfstream 200</td>
<td>GALX</td>
<td>2J/S+</td>
<td></td>
</tr>
<tr>
<td>Gulfstream 150</td>
<td>G150</td>
<td>2J/S+</td>
<td></td>
</tr>
</tbody>
</table>

### ILYUSHIN (Russia)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>A–50, Be–976</td>
<td>A50</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>Il–14</td>
<td>IL14</td>
<td>2P/S+</td>
<td></td>
</tr>
<tr>
<td>Il–18/20/22/24, Bizon, Zebra</td>
<td>IL18</td>
<td>4T/L</td>
<td></td>
</tr>
<tr>
<td>Il–28</td>
<td>IL28</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>Il–38</td>
<td>IL38</td>
<td>4T/L</td>
<td></td>
</tr>
<tr>
<td>Il–62</td>
<td>IL62</td>
<td>4J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>Il–76/78/82, Gajaraj</td>
<td>IL76</td>
<td>4J/H</td>
<td>3,000</td>
</tr>
<tr>
<td>Il–86/87</td>
<td>IL86</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>Il–96</td>
<td>IL96</td>
<td>4J/H</td>
<td></td>
</tr>
<tr>
<td>Il–103</td>
<td>I103</td>
<td>1P/S</td>
<td></td>
</tr>
<tr>
<td>Il–114</td>
<td>I114</td>
<td>2T/L</td>
<td></td>
</tr>
</tbody>
</table>

### JETSTREAM (UK – see British Aerospace)

### LAKE AIRCRAFT (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
<td>Climb Rate (fpm)</td>
</tr>
<tr>
<td>LA–250/270 (Turbo) Renegade, Seawolf, SeaFury***</td>
<td>LA25</td>
<td>1P/S</td>
<td>700</td>
</tr>
<tr>
<td>LA–4/200, Buccaneer***</td>
<td>LA4</td>
<td>1P/S</td>
<td>1,100</td>
</tr>
</tbody>
</table>
LOCKHEED CORP. (USA)
(Also AERITALIA, CANADAIR, FIAT, FOKKER, HOWARD, LEAR, LOCKHEED–BOEING, LOCKHEED–MARTIN, MBB, MESSERSCHMITT, MITSUBISHI, PACAERO, ROCKWELL, SABCA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
</tr>
<tr>
<td>B–34, PV Venture, Harpoon (L–15/137/237)</td>
<td>L37</td>
<td>2P/S+</td>
<td>III</td>
</tr>
<tr>
<td>C–5 Galaxy (L–500)</td>
<td>C5</td>
<td>4J/H</td>
<td>2,500</td>
</tr>
<tr>
<td>C=141 Starlifter (L–300)</td>
<td>C141</td>
<td>4J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>L–049/749/1049 Constellation, Super Constellation, Starliner (C–121, RC–121, EC–121, VC–121, WV, R7V, Warning Star)</td>
<td>CONI</td>
<td>4P/L</td>
<td>1,700</td>
</tr>
<tr>
<td>F–22 Raptor (L–645)</td>
<td>F22*</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>F–104, RF–104, TF–104 Starfighter (L583/683)</td>
<td>F104*</td>
<td>1J/L</td>
<td>5,000</td>
</tr>
<tr>
<td>F–117 Nighthawk</td>
<td>F117*</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>L–1011 Tri–Star (all series)</td>
<td>L101</td>
<td>3J/H</td>
<td>3,500</td>
</tr>
<tr>
<td>L–18 Lodestar (C–56/57/59/60, R50, XR50)</td>
<td>L18</td>
<td>2P/S</td>
<td>1,800</td>
</tr>
<tr>
<td>L–188 Electra</td>
<td>L188</td>
<td>4T/L</td>
<td>1,850</td>
</tr>
<tr>
<td>L–1329 Jetstar 6/8</td>
<td>L29A</td>
<td>4J/L</td>
<td>4,000</td>
</tr>
<tr>
<td>L–1329–5 Jetstar 2/731</td>
<td>L29B</td>
<td>4J/L</td>
<td>4,000</td>
</tr>
<tr>
<td>P–2D to H, SP–2, P2V Neptune (L–426/726/826)</td>
<td>P2</td>
<td>2P/L</td>
<td></td>
</tr>
<tr>
<td>P–38, F–5 Lightning (L–222/322/422)</td>
<td>P38</td>
<td>2P/S+</td>
<td></td>
</tr>
<tr>
<td>S–3, ES–3, US–3 Viking (L–394)</td>
<td>S3</td>
<td>2J/L</td>
<td>2,000</td>
</tr>
<tr>
<td>SR–71 Blackbird</td>
<td>SR71</td>
<td>2J/L</td>
<td></td>
</tr>
<tr>
<td>T–33, AT–33, NT–33, RT–33 Shooting Star, T–Bird (L–580)</td>
<td>T33*</td>
<td>2J/L</td>
<td>2,000</td>
</tr>
<tr>
<td>U–2, ER–2</td>
<td>U2*</td>
<td>1J/S+</td>
<td>6,000</td>
</tr>
</tbody>
</table>

MARTIN COMPANY (USA)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type Designator</th>
<th>Description</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number &amp; Type Engines/ Weight Class</td>
</tr>
<tr>
<td>404</td>
<td>M404</td>
<td>2P/L</td>
<td>1,600</td>
</tr>
<tr>
<td>B–26 Marauder (179)</td>
<td>B26M</td>
<td>2P/S+</td>
<td></td>
</tr>
<tr>
<td>WB–57 (272)</td>
<td>WB57</td>
<td>2J/L</td>
<td></td>
</tr>
</tbody>
</table>
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

d. Terms Added:
   - COLLABORATIVE TRAJECTORY OPTIONS PROGRAM (CTOP)
   - TRAJECTORY OPTIONS SET (TOS)

e. Terms Deleted:
   - MICROWAVE LANDING SYSTEM (MLS)
   - MLS CATEGORIES

f. Terms Modified:
   - COURSE
   - DECISION HEIGHT
   - GLIDESLOPE
   - PREARRANGED COORDINATION
   - PREARRANGED COORDINATION PROCEDURES
   - SIMULTANEOUS ILS APPROACHES

g. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes.
aircraft are held short of the applicable runway holding position marking.

b. A pilot or controller may consider an aircraft, which is exiting or crossing a runway, to be clear of the runway when all parts of the aircraft are beyond the runway edge and there are no restrictions to its continued movement beyond the applicable runway holding position marking.

c. Pilots and controllers shall exercise good judgement to ensure that adequate separation exists between all aircraft on runways and taxiways at airports with inadequate runway edge lines or holding position markings.

CLEARANCE–
(See AIR TRAFFIC CLEARANCE.)

CLEARANCE LIMIT– The fix, point, or location to which an aircraft is cleared when issued an air traffic clearance.
(See ICAO term CLEARANCE LIMIT.)

CLEARANCE LIMIT [ICAO]– The point to which an aircraft is granted an air traffic control clearance.

CLEARANCE VOID IF NOT OFF BY (TIME)– Used by ATC to advise an aircraft that the departure clearance is automatically canceled if takeoff is not made prior to a specified time. The pilot must obtain a new clearance or cancel his/her IFR flight plan if not off by the specified time.
(See ICAO term CLEARANCE VOID TIME.)

CLEARANCE VOID TIME [ICAO]– A time specified by an air traffic control unit at which a clearance ceases to be valid unless the aircraft concerned has already taken action to comply therewith.

CLEARED APPROACH– ATC authorization for an aircraft to execute any standard or special instrument approach procedure for that airport. Normally, an aircraft will be cleared for a specific instrument approach procedure.
(See CLEARED (Type of) APPROACH.)
(See INSTRUMENT APPROACH PROCEDURE.)
(Refer to 14 CFR Part 91.)
(Refer to AIM.)

CLEARED (Type of) APPROACH– ATC authorization for an aircraft to execute a specific instrument approach procedure to an airport; e.g., “Cleared ILS Runway Three Six Approach.”
(See APPROACH CLEARANCE.)
(See INSTRUMENT APPROACH PROCEDURE.)
(Refer to 14 CFR Part 91.)
(Refer to AIM.)

CLEARED AS FILED– Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, DP, or DP Transition.
(See REQUEST FULL ROUTE CLEARANCE.)
(Refer to AIM.)

CLEARED FOR TAKEOFF– ATC authorization for an aircraft to depart. It is predicated on known traffic and known physical airport conditions.

CLEARED FOR THE OPTION– ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It is normally used in training so that an instructor can evaluate a student’s performance under changing situations.
(See OPTION APPROACH.)
(Refer to AIM.)

CLEARED THROUGH– ATC authorization for an aircraft to make intermediate stops at specified airports without refiling a flight plan while en route to the clearance limit.

CLEARED TO LAND– ATC authorization for an aircraft to land. It is predicated on known traffic and known physical airport conditions.

CLEARWAY– An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.
(Refer to 14 CFR Part 1.)

CLIMB TO VFR– ATC authorization for an aircraft to climb to VFR conditions within Class B, C, D, and E surface areas when the only weather limitation is restricted visibility. The aircraft must remain clear of clouds while climbing to VFR.
(See SPECIAL VFR CONDITIONS.)
(Refer to AIM.)

CLIMBOUT– That portion of flight operation between takeoff and the initial cruising altitude.
CLIMB VIA– An abbreviated ATC clearance that requires compliance with the procedure lateral path, associated speed restrictions, and altitude restrictions along the cleared route or procedure.

CLOSE PARALLEL RUNWAYS– Two parallel runways whose extended centerlines are separated by less than 4,300 feet and at least 3000 feet (750 feet for SOIA operations) that are authorized to conduct simultaneous independent approach operations. PRM and simultaneous close parallel appear in approach title. Dual communications, special pilot training, an Attention All Users Page (AAUP), NTZ monitoring by displays that have aural and visual alerting algorithms are required. A high update rate surveillance sensor is required for certain runway or approach course spacing.

CLOSED RUNWAY– A runway that is unusable for aircraft operations. Only the airport management/military operations office can close a runway.

CLOSED TRAFFIC– Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern.

CLOUD– A cloud is a visible accumulation of minute water droplets and/or ice particles in the atmosphere above the Earth’s surface. Cloud differs from ground fog, fog, or ice fog only in that the latter are, by definition, in contact with the Earth’s surface.

CLT–
(See CALCULATED LANDING TIME.)

CLUTTER– In radar operations, clutter refers to the reception and visual display of radar returns caused by precipitation, chaff, terrain, numerous aircraft targets, or other phenomena. Such returns may limit or preclude ATC from providing services based on radar.

(See CHAFF.)
(See GROUND CLUTTER.)
(See PRECIPITATION.)
(See TARGET.)
(See ICAO term RADAR CLUTTER.)

CMNPS–
(See CANADIAN MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE.)

COASTAL FIX– A navigation aid or intersection where an aircraft transitions between the domestic route structure and the oceanic route structure.

CODES– The number assigned to a particular multiple pulse reply signal transmitted by a transponder.

(See DISCRETE CODE.)

COLLABORATIVE TRAJECTORY OPTIONS PROGRAM (CTOP)- CTOP is a traffic management program administered by the Air Traffic Control System Command Center (ATCSCC) that manages demand through constrained airspace, while considering operator preference with regard to both route and delay as defined in a Trajectory Options Set (TOS).

COMBINED CENTER-RAPCON– An air traffic facility which combines the functions of an ARTCC and a radar approach control facility.

(See AIR ROUTE TRAFFIC CONTROL CENTER.)
(See RADAR APPROACH CONTROL FACILITY.)

COMMON POINT– A significant point over which two or more aircraft will report passing or have reported passing before proceeding on the same or diverging tracks. To establish/maintain longitudinal separation, a controller may determine a common point not originally in the aircraft’s flight plan and then clear the aircraft to fly over the point.

(See SIGNIFICANT POINT.)

COMMON PORTION–
(See COMMON ROUTE.)

COMMON ROUTE– That segment of a North American Route between the inland navigation facility and the coastal fix.

OR

COMMON ROUTE– Typically the portion of a RNAV STAR between the en route transition end point and the runway transition start point; however, the common route may only consist of a single point that joins the en route and runway transitions.

COMMON TRAFFIC ADVISORY FREQUENCY (CTAF)– A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating
control tower. The CTAF may be a UNICOM, Multicom, FSS, or tower frequency and is identified in appropriate aeronautical publications.

(See DESIGNATED COMMON TRAFFIC ADVISORY FREQUENCY (CTAF) AREA.)
(Refer to AC 90-42, Traffic Advisory Practices at Airports Without Operating Control Towers.)

COMPASS LOCATOR—A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

a. Outer Compass Locator (LOM)—A compass locator installed at the site of the outer marker of an instrument landing system.

(See OUTER MARKER.)

b. Middle Compass Locator (LMM)—A compass locator installed at the site of the middle marker of an instrument landing system.

(See MIDDLE MARKER.)

(See ICAO term LOCATOR.)

COMPASS ROSE—A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

COMPLY WITH RESTRICTIONS—An ATC instruction that requires an aircraft being vectored back onto an arrival or departure procedure to comply with all altitude and/or speed restrictions depicted on the procedure. This term may be used in lieu of repeating each remaining restriction that appears on the procedure.

COMPOSITE FLIGHT PLAN—A flight plan which specifies VFR operation for one portion of flight and IFR for another portion. It is used primarily in military operations.

(Refer to AIM.)

COMPOSITE ROUTE SYSTEM—An organized oceanic route structure, incorporating reduced lateral spacing between routes, in which composite separation is authorized.

COMPOSITE SEPARATION—A method of separating aircraft in a composite route system where, by management of route and altitude assignments, a combination of half the lateral minimum specified for the area concerned and half the vertical minimum is applied.

COMPULSORY REPORTING POINTS—Reporting points which must be reported to ATC. They are designated on aeronautical charts by solid triangles or filed in a flight plan as fixes selected to define direct routes. These points are geographical locations which are defined by navigation aids/fixes. Pilots should discontinue position reporting over compulsory reporting points when informed by ATC that their aircraft is in “radar contact.”

CONFIDENCE MANEUVER—A confidence maneuver consists of one or more turns, a climb or descent, or other maneuver to determine if the pilot in command (PIC) is able to receive and comply with ATC instructions.

CONFLICT ALERT—A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending situations between tracked targets (known IFR or VFR aircraft) that require his/her immediate attention/action.

(See MODE C INTRUDER ALERT.)

CONFLICT RESOLUTION—The resolution of potential conflictions between aircraft that are radar identified and in communication with ATC by ensuring that radar targets do not touch. Pertinent traffic advisories shall be issued when this procedure is applied.

Note: This procedure shall not be provided utilizing mosaic radar systems.

CONFORMANCE—The condition established when an aircraft’s actual position is within the conformance region constructed around that aircraft at its position, according to the trajectory associated with the aircraft’s Current Plan.

CONFORMANCE REGION—A volume, bounded laterally, vertically, and longitudinally, within which an aircraft must be at a given time in order to be in conformance with the Current Plan Trajectory for that aircraft. At a given time, the conformance region is determined by the simultaneous application of the lateral, vertical, and longitudinal conformance bounds for the aircraft at the position defined by time and aircraft’s trajectory.

CONSOLAN—A low frequency, long-distance NAVAID used principally for transoceanic navigations.
CONTACT—

a. Establish communication with (followed by the name of the facility and, if appropriate, the frequency to be used).

b. A flight condition wherein the pilot ascertains the attitude of his/her aircraft and navigates by visual reference to the surface.

(See CONTACT APPROACH.)
(See RADAR CONTACT.)

CONTACT APPROACH—An approach wherein an aircraft on an IFR flight plan, having an air traffic control authorization, operating clear of clouds with at least 1 mile flight visibility and a reasonable expectation of continuing to the destination airport in those conditions, may deviate from the instrument approach procedure and proceed to the destination airport by visual reference to the surface. This approach will only be authorized when requested by the pilot and the reported ground visibility at the destination airport is at least 1 statute mile.

(Refer to AIM.)

CONTAMINATED RUNWAY—A runway is considered contaminated whenever standing water, ice, snow, slush, frost in any form, heavy rubber, or other substances are present. A runway is contaminated with respect to rubber deposits or other friction-degrading substances when the average friction value for any 500-foot segment of the runway within the ALD fails below the recommended minimum friction level and the average friction value in the adjacent 500-foot segments falls below the maintenance planning friction level.

CONTERMINOUS U.S.—The 48 adjoining States and the District of Columbia.

CONTINENTAL UNITED STATES—The 49 States located on the continent of North America and the District of Columbia.

CONTINUE—When used as a control instruction should be followed by another word or words clarifying what is expected of the pilot. Example: “continue taxi,” “continue descent,” “continue inbound,” etc.

CONTROL AREA [ICAO]—A controlled airspace extending upwards from a specified limit above the earth.

CONTROL SECTOR—An airspace area of defined horizontal and vertical dimensions for which a controller or group of controllers has air traffic control responsibility, normally within an air traffic control center or an approach control facility. Sectors are established based on predominant traffic flows, altitude strata, and controller workload. Pilot-communications during operations within a sector are normally maintained on discrete frequencies assigned to the sector.

(See DISCRETE FREQUENCY.)

CONTROL SLASH—A radar beacon slash representing the actual position of the associated aircraft. Normally, the control slash is the one closest to the interrogating radar beacon site. When ARTCC radar is operating in narrowband (digitized) mode, the control slash is converted to a target symbol.

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

a. Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E airspace.

b. Controlled airspace is also that airspace within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements in 14 CFR Part 91 (for specific operating requirements, please refer to 14 CFR Part 91). For IFR operations in any class of controlled airspace, a pilot must file an IFR flight plan and receive an appropriate ATC clearance. Each Class B, Class C, and Class D airspace area designated for an airport contains at least one primary airport around which the airspace is designated (for specific designations and descriptions of the airspace classes, please refer to 14 CFR Part 71).

c. Controlled airspace in the United States is designated as follows:

1. CLASS A—Generally, that airspace from 18,000 feet MSL up to and including FL 600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.

2. CLASS B—Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation’s busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers.
(some Class B airspaces areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is “clear of clouds.”

3. CLASS C—Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area with a 5 nautical mile (NM) radius, a circle with a 10NM radius that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation and an outer area that is not charted. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.

(See OUTER AREA.)

4. CLASS D—Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. No separation services are provided to VFR aircraft.

(See OUTER AREA.)

5. CLASS E—Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska, up to, but not including 18,000 feet MSL, and the airspace above FL 600.

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

Note: Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D, and E.

CONTROLLED TIME OF ARRIVAL—Arrival time assigned during a Traffic Management Program. This time may be modified due to adjustments or user options.

CONTROLLER—

(See AIR TRAFFIC CONTROL SPECIALIST.)

CONTROLLER [ICAO]—A person authorized to provide air traffic control services.

CONTROLLER PILOT DATA LINK COMMUNICATIONS (CPDLC)—A two-way digital communications system that conveys textual air traffic control messages between controllers and pilots using ground or satellite-based radio relay stations.

CONVECTIVE SIGMET—A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMETS are issued for tornadoes, lines of thunderstorms, embedded thunderstorms of any intensity level, areas of thunderstorms greater than or equal to VIP level 4 with an area coverage of $\frac{3}{10}$ (30%) or more, and hail $\frac{3}{4}$ inch or greater.

(See AIRMET.)
(See AWW.)
(See CWA.)
(See SIGMET.)
(Refer to AIM.)

CONVECTIVE SIGNIFICANT METEOROLOGICAL INFORMATION—

(See CONVECTIVE SIGMET.)

COORDINATES—The intersection of lines of reference, usually expressed in degrees/minutes/
seconds of latitude and longitude, used to determine position or location.

COORDINATION FIX– The fix in relation to which facilities will handoff, transfer control of an aircraft, or coordinate flight progress data. For terminal facilities, it may also serve as a clearance for arriving aircraft.

COPTER–
(See HELICOPTER.)

CORRECTION– An error has been made in the transmission and the correct version follows.

COUPLED APPROACH– An instrument approach performed by the aircraft autopilot, and/or visually depicted on the flight director, which is receiving position information and/or steering commands from onboard navigational equipment. In general, coupled non-precision approaches must be flown manually (autopilot disengaged) at altitudes lower than 50 feet AGL below the minimum descent altitude, and coupled precision approaches must be flown manually (autopilot disengaged) below 50 feet AGL unless authorized to conduct autoland operations. Coupled instrument approaches are commonly flown to the allowable IFR weather minima established by the operator or PIC, or flown VFR for training and safety.

COURSE–
a. The intended direction of flight in the horizontal plane measured in degrees from north.
b. The ILS localizer signal pattern usually specified as the front course or the back course.
(See BEARING.)
(See INSTRUMENT LANDING SYSTEM.)
(See RADIAL.)

CPDLC–
(See CONTROLLER PILOT DATA LINK COMMUNICATIONS.)

CPL [ICAO]–
(See ICAO term CURRENT FLIGHT PLAN.)

CRITICAL ENGINE– The engine which, upon failure, would most adversely affect the performance or handling qualities of an aircraft.

CROSS (FIX) AT (ALTITUDE)– Used by ATC when a specific altitude restriction at a specified fix is required.

CROSS (FIX) AT OR ABOVE (ALTITUDE)– Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.
(See ALTITUDE RESTRICTION.)
(Refer to AIM.)

CROSS (FIX) AT OR BELOW (ALTITUDE)– Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude.
(See ALTITUDE RESTRICTION.)
(See MINIMUM IFR ALTITUDES.)
(Refer to 14 CFR Part 91.)

CROSSWIND–
a. When used concerning the traffic pattern, the word means “crosswind leg.”
(See TRAFFIC PATTERN.)
b. When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft.
(See CROSSWIND COMPONENT.)

CROSSWIND COMPONENT– The wind component measured in knots at 90 degrees to the longitudinal axis of the runway.

CRUISE– Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediate altitude within this block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and verbally reports leaving an altitude in the block, he/she may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:
a. An airport clearance limit at locations with a standard/special instrument approach procedure. The CFRs require that if an instrument letdown to an airport is necessary, the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or
An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in Class G airspace; however, it provides a means for the aircraft to proceed to destination airport, descend, and land in accordance with applicable CFRs governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed.

(See INSTRUMENT APPROACH PROCEDURE.)

CRUISE CLIMB—A climb technique employed by aircraft, usually at a constant power setting, resulting in an increase of altitude as the aircraft weight decreases.

CRUISING ALTITUDE—An altitude or flight level maintained during en route level flight. This is a constant altitude and should not be confused with a cruise clearance.

(See ALTITUDE.)
(See ICAO term CRUISING LEVEL.)

CRUISING LEVEL—
(See CRUISING ALTITUDE.)

CRUISING LEVEL [ICAO]—A level maintained during a significant portion of a flight.

CT MESSAGE—An EDCT time generated by the ATCSCC to regulate traffic at arrival airports. Normally, a CT message is automatically transferred from the traffic management system computer to the NAS en route computer and appears as an EDCT. In the event of a communication failure between the traffic management system computer and the NAS, the CT message can be manually entered by the TMC at the en route facility.

CTA—
(See CONTROLLED TIME OF ARRIVAL.)
(See ICAO term CONTROL AREA.)

CTAF—
(See COMMON TRAFFIC ADVISORY FREQUENCY.)

CTAS—
(See CENTER TRACON AUTOMATION SYSTEM.)

CTOP—
(See COLLABORATIVE TRAJECTORY OPTIONS PROGRAM)

CTRD—
(See CERTIFIED TOWER RADAR DISPLAY.)

CURRENT FLIGHT PLAN [ICAO]—The flight plan, including changes, if any, brought about by subsequent clearances.

CURRENT PLAN—The ATC clearance the aircraft has received and is expected to fly.

CVFP APPROACH—
(See CHARTED VISUAL FLIGHT PROCEDURE APPROACH.)

CWA—
(See CENTER WEATHER ADVISORY and WEATHER ADVISORY.)
D

D-ATIS-
(See DIGITAL-AUTOMATIC TERMINAL INFORMATION SERVICE.)

DA [ICAO]--
(See ICAO Term DECISION ALTITUDE/DECISION HEIGHT.)

DAIR--
(See DIRECT ALTITUDE AND IDENTITY READOUT.)

DANGER AREA [ICAO]-- An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.
Note: The term "Danger Area" is not used in reference to areas within the United States or any of its possessions or territories.

DAS--
(See DELAY ASSIGNMENT.)

DATA BLOCK--
(See ALPHANUMERIC DISPLAY.)

DEAD RECKONING-- Dead reckoning, as applied to flying, is the navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, and speed, groundspeed, and elapsed time.

DECISION ALTITUDE/DECISION HEIGHT [ICAO Annex 6]- A specified altitude or height (A/H) in the precision approach at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.
1. Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.
2. Category II and III minima are expressed as a DH and not a DA. Minima is assessed by reference to a radio altimeter and not a barometric altimeter, which makes the minima a DH.
3. The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path.
Decision altitude (DA) - A specified altitude (mean sea level (MSL)) on an instrument approach procedure (ILS, GLS, vertically guided RNAV) at which the pilot must decide whether to continue the approach or initiate an immediate missed approach if the pilot does not see the required visual references.

DECISION HEIGHT-- With respect to the operation of aircraft, means the height at which a decision must be made during an ILS or PAR instrument approach to either continue the approach or to execute a missed approach.
(See ICAO term DECISION ALTITUDE/DECISION HEIGHT.)

DECODER-- The device used to decipher signals received from ATCRBS transponders to effect their display as select codes.
(See CODES.)
(See RADAR.)

DEFENSE AREA- Any airspace of the contiguous United States that is not an ADIZ in which the control of aircraft is required for reasons of national security.

DEFENSE VISUAL FLIGHT RULES-- Rules applicable to flights within an ADIZ conducted under the visual flight rules in 14 CFR Part 91.
(See AIR DEFENSE IDENTIFICATION ZONE.)
(Refer to 14 CFR Part 91.)
(Refer to 14 CFR Part 99.)

DELAY ASSIGNMENT (DAS)-- Delays are distributed to aircraft based on the traffic management program parameters. The delay assignment is calculated in 15–minute increments and appears as a table in Traffic Flow Management System (TFMS).

DELAY INDEFINITE (REASON IF KNOWN)
EXPECT FURTHER CLEARANCE (TIME)-- Used by ATC to inform a pilot when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; e.g., a disabled aircraft on the runway, terminal or center area saturation, weather below landing minimums, etc.
(See EXPECT FURTHER CLEARANCE (TIME).)

DELAY TIME-- The amount of time that the arrival must lose to cross the meter fix at the assigned meter fix time. This is the difference between ACLT and VTA.
DEPARTURE CENTER— The ARTCC having jurisdiction for the airspace that generates a flight to the impacted airport.

DEPARTURE CONTROL— A function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft.
(See APPROACH CONTROL FACILITY.)
(Refer to AIM.)

DEPARTURE SEQUENCING PROGRAM— A program designed to assist in achieving a specified interval over a common point for departures.

DEPARTURE TIME— The time an aircraft becomes airborne.

DESCEND VIA— An abbreviated ATC clearance that requires compliance with a published procedure lateral path and associated speed restrictions and provides a pilot-discretion descent to comply with published altitude restrictions.

DESCENT SPEED ADJUSTMENTS— Speed deceleration calculations made to determine an accurate VTA. These calculations start at the transition point and use arrival speed segments to the vertex.

DESIGNATED COMMON TRAFFIC ADVISORY FREQUENCY (CTAF) AREA— In Alaska, in addition to being designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating airport traffic control tower, a CTAF may also be designated for the purpose of carrying out advisory practices for operations in and through areas with a high volume of VFR traffic.

DESIZED COURSE—
 a. True— A predetermined desired course direction to be followed (measured in degrees from true north).
 b. Magnetic— A predetermined desired course direction to be followed (measured in degrees from local magnetic north).

DESIZED TRACK— The planned or intended track between two waypoints. It is measured in degrees from either magnetic or true north. The instantaneous angle may change from point to point along the great circle track between waypoints.

DETRESFA (DISTRESS PHASE) [ICAO]— The code word used to designate an emergency phase wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

DEVIA TIONS—
 a. A departure from a current clearance, such as an off course maneuver to avoid weather or turbulence.
 b. Where specifically authorized in the CFRs and requested by the pilot, ATC may permit pilots to deviate from certain regulations.

DH—
(See DECISION HEIGHT.)

DH [ICAO]—
(See ICAO Term DECISION ALTITUDE/DECISION HEIGHT.)

DIGITAL AUTOMATIC TERMINAL INFORMATION SERVICE (D-ATIS)— The service provides text messages to aircraft, airlines, and other users outside the standard reception range of conventional ATIS via landline and data link communications to the cockpit. Also, the service provides a computer-synthesized voice message that can be transmitted to all aircraft within range of existing transmitters. The Terminal Data Link System (TDLS) D-ATIS application uses weather inputs from local automated weather sources or manually entered meteorological data together with preprogrammed menus to provide standard information to users. Airports with D-ATIS capability are listed in the Airport/Facility Directory.

DIGITAL TARGET— A computer-generated symbol representing an aircraft’s position, based on a primary return or radar beacon reply, shown on a digital display.

DIGITAL TERMINAL AUTOMATION SYSTEM (DTAS)— A system where digital radar and beacon data is presented on digital displays and the operational program monitors the system performance on a real-time basis.

DIGITIZED TARGET— A computer-generated indication shown on an analog radar display resulting from a primary radar return or a radar beacon reply.

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

DIRECT ALTITUDE AND IDENTITY READ-OUT— The DAIR System is a modification to the
G

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

GBT—
(See GROUND-BASED TRANSCEIVER.)

GCA—
(See GROUND CONTROLLED APPROACH.)

GDP—
(See GROUND DELAY PROGRAM.)

GENERAL AVIATION—That portion of civil aviation that does not include scheduled or unscheduled air carriers or commercial space operations.
(See ICAO term GENERAL AVIATION.)

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

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

GLIDEPATH—
(See GLIDESLOPE.)

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

GLIDEPATH INTERCEPT ALTITUDE—
(See GLIDESLOPE INTERCEPT ALTITUDE.)

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

a. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS or b. Visual ground aids, such as VASI, which provide vertical guidance for a VFR approach or for the visual portion of an instrument approach and landing.

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

GLIDESLOPE INTERCEPT ALTITUDE—The published minimum altitude to intercept the glideslope in the intermediate segment of an instrument approach. Government charts use the lightning bolt symbol to identify this intercept point. This intersection is called the Precise Final Approach fix (PFAF). ATC directs a higher altitude, the resultant intercept becomes the PFAF.
(See FINAL APPROACH FIX.)
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) [ICAO]—GNSS refers collectively to the worldwide positioning, navigation, and timing determination capability available from one or more satellite constellation in conjunction with a network of ground stations.

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

GLOBAL POSITIONING SYSTEM (GPS)—GPS refers to the worldwide positioning, navigation and timing determination capability available from the U.S. satellite constellation. The service provided by GPS for civil use is defined in the GPS Standard Positioning System Performance Standard. GPS is composed of space, control, and user elements.

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

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

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

GPD—
(See GRAPHIC PLAN DISPLAY.)

GPS—
(See GLOBAL POSITIONING SYSTEM.)

GRAPHIC PLAN DISPLAY (GPD)—A view available with 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.)

GROSS NAVIGATION ERROR (GNE)—A lateral deviation from a cleared track, normally in excess of 25 Nautical Miles (NM). More stringent standards (for example, 10NM in some parts of the North Atlantic region) may be used in certain regions to support reductions in lateral separation.

GROUND–BASED 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.
MAA—
(See MAXIMUM AUTHORIZED ALTITUDE.)

MACH NUMBER— The ratio of true airspeed to the speed of sound; e.g., MACH .82, MACH 1.6.
(See AIRSPEED.)

MACH TECHNIQUE [ICAO]— Describes a control technique used by air traffic control whereby turbojet aircraft operating successively along suitable routes are cleared to maintain appropriate MACH numbers for a relevant portion of the en route phase of flight. The principle objective is to achieve improved utilization of the airspace and to ensure that separation between successive aircraft does not decrease below the established minima.

MAHWP— Missed Approach Holding Waypoint

MAINTAIN—

a. Concerning altitude/flight level, the term means to remain at the altitude/flight level specified. The phrase “climb and” or “descend and” normally precedes “maintain” and the altitude assignment; e.g., “descend and maintain 5,000.”

b. Concerning other ATC instructions, the term is used in its literal sense; e.g., maintain VFR.

MAINTENANCE PLANNING FRICTION LEVEL— The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, which represents the friction value below which the runway pavement surface remains acceptable for any category or class of aircraft operations but which is beginning to show signs of deterioration. This value will vary depending on the particular friction measurement equipment used.

MAKE SHORT APPROACH— Used by ATC to inform a pilot to alter his/her traffic pattern so as to make a short final approach.
(See TRAFFIC PATTERN.)

MAN PORTABLE AIR DEFENSE SYSTEMS (MANPADS)— MANPADS are lightweight, shoulder-launched, missile systems used to bring down aircraft and create mass casualties. The potential for MANPADS use against airborne aircraft is real and requires familiarity with the subject. Terrorists choose MANPADS because the weapons are low cost, highly mobile, require minimal set-up time, and are easy to use and maintain. Although the weapons have limited range, and their accuracy is affected by poor visibility and adverse weather, they can be fired from anywhere on land or from boats where there is unrestricted visibility to the target.

MANDATORY ALTITUDE— An altitude depicted on an instrument Approach Procedure Chart requiring the aircraft to maintain altitude at the depicted value.

MANPADS—
(See MAN PORTABLE AIR DEFENSE SYSTEMS.)

MAP—
(See MISSED APPROACH POINT.)

MARKER BEACON— An electronic navigation facility transmitting a 75 MHz vertical fan or boneshaped radiation pattern. Marker beacons are identified by their modulation frequency and keying code, and when received by compatible airborne equipment, indicate to the pilot, both aurally and visually, that he/she is passing over the facility.
(See INNER MARKER.)
(See MIDDLE MARKER.)
(See OUTER MARKER.)
(Refer to AIM.)

MARSA—
(See MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT.)

MAWP— Missed Approach Waypoint

MAXIMUM AUTHORIZED ALTITUDE— A published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment. It is the highest altitude on a Federal airway, jet route, area navigation low or high route, or other direct route for which an MEA is designated in 14 CFR Part 95 at which adequate reception of navigation aid signals is assured.

MAYDAY— The international radiotelephony distress signal. When repeated three times, it indicates
imminent and grave danger and that immediate assistance is requested.

(See PAN-PAN.)
(Refer to AIM.)

MCA–
(See MINIMUM CROSSING ALTITUDE.)

MDA–
(See MINIMUM DESCENT ALTITUDE.)

MEA–
(See MINIMUM EN ROUTE IFR ALTITUDE.)

MEARTS–
(See MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM.)

METEOROLOGICAL IMPACT STATEMENT–An unscheduled planning forecast describing conditions expected to begin within 4 to 12 hours which may impact the flow of air traffic in a specific center’s (ARTCC) area.

METER FIX ARC– A semicircle, equidistant from a meter fix, usually in low altitude relatively close to the meter fix, used to help CTAS/HOST calculate a meter time, and determine appropriate sector meter list assignments for aircraft not on an established arrival route or assigned a meter fix.

METER FIX TIME/SLOT TIME– A calculated time to depart the meter fix in order to cross the vertex at the ACLT. This time reflects descent speed adjustment and any applicable time that must be absorbed prior to crossing the meter fix.

METER LIST–
(See ARRIVAL SECTOR ADVISORY LIST.)

METER LIST DISPLAY INTERVAL– A dynamic parameter which controls the number of minutes prior to the flight plan calculated time of arrival at the meter fix for each aircraft, at which time the TCLT is frozen and becomes an ACLT; i.e., the VTA is updated and consequently the TCLT modified as appropriate until frozen at which time updating is suspended and an ACLT is assigned. When frozen, the flight entry is inserted into the arrival sector’s meter list for display on the sector PVD/MDM. MLDi is used if filed true airspeed is less than or equal to freeze speed parameters (FSPD).

METERING– A method of time-regulating arrival traffic flow into a terminal area so as not to exceed a predetermined terminal acceptance rate.

METERING AIRPORTS– Airports adapted for metering and for which optimum flight paths are defined. A maximum of 15 airports may be adapted.

METERING FIX– A fix along an established route from over which aircraft will be metered prior to entering terminal airspace. Normally, this fix should be established at a distance from the airport which will facilitate a profile descent 10,000 feet above airport elevation (AAE) or above.

METERING POSITION(S)– Adapted PVDs/MDMs and associated “D” positions eligible for display of a metering position list. A maximum of four PVDs/MDMs may be adapted.

METERING POSITION LIST– An ordered list of data on arrivals for a selected metering airport displayed on a metering position PVD/MDM.

MFT–
(See METER FIX TIME/SLOT TIME.)

MHA–
(See MINIMUM HOLDING ALTITUDE.)

MIA–
(See MINIMUM IFR ALTITUDES.)

MICROBURST– A small downburst with outbursts of damaging winds extending 2.5 miles or less. In spite of its small horizontal scale, an intense microburst could induce wind speeds as high as 150 knots
(Refer to AIM.)

MICRO-EN ROUTE AUTOMATED RADAR TRACKING SYSTEM (MEARTS)– An automated radar and radar beacon tracking system capable of employing both short-range (ASR) and long-range (ARSR) radars. This microcomputer driven system provides improved tracking, continuous data recording, and use of full digital radar displays.

MID RVR–
(See VISIBILITY.)

MIDDLE COMPASS LOCATOR–
(See COMPASS LOCATOR.)

MIDDLE MARKER– A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95 dot/dash combinations per minute on a
1300 Hz tone, which is received aurally and visually by compatible airborne equipment.

(See INSTRUMENT LANDING SYSTEM.)
(See MARKER BEACON.)
(Refer to AIM.)

MILES-IN-TRAIL—A specified distance between aircraft, normally, in the same stratum associated with the same destination or route of flight.

MILITARY AUTHORITY ASSUMES RESPONSIBILITY FOR SEPARATION OF AIRCRAFT—A condition whereby the military services involved assume responsibility for separation between participating military aircraft in the ATC system. It is used only for required IFR operations which are specified in letters of agreement or other appropriate FAA or military documents.

MILITARY LANDING ZONE—A landing strip used exclusively by the military for training. A military landing zone does not carry a runway designation.

MILITARY OPERATIONS AREA—
(See SPECIAL USE AIRSPACE.)

MILITARY TRAINING ROUTES—Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots IAS.

(See IFR MILITARY TRAINING ROUTES.)
(See VFR MILITARY TRAINING ROUTES.)

MINIMA—
(See MINIMUMS.)

MINIMUM CROSSING ALTITUDE—The lowest altitude at certain fixes at which an aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude (MEA).

(See MINIMUM EN ROUTE IFR ALTITUDE.)

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

(See NONPRECISION APPROACH PROCEDURE.)

MINIMUM EN ROUTE IFR ALTITUDE (MEA)—The lowest published altitude between radio fixes which assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment thereof, area navigation low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

(Refer to 14 CFR Part 91.)
(Refer to 14 CFR Part 95.)
(Refer to AIM.)

MINIMUM FRICTION LEVEL—The friction level specified in AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, that represents the minimum recommended wet pavement surface friction value for any turbojet aircraft engaged in LAHSO. This value will vary with the particular friction measurement equipment used.

MINIMUM FUEL—Indicates that an aircraft’s fuel supply has reached a state where, upon reaching the destination, it can accept little or no delay. This is not an emergency situation but merely indicates an emergency situation is possible should any undue delay occur.

(Refer to AIM.)

MINIMUM HOLDING ALTITUDE—The lowest altitude prescribed for a holding pattern which assures navigational signal coverage, communications, and meets obstacle clearance requirements.

MINIMUM IFR ALTITUDES (MIA)—Minimum altitudes for IFR operations as prescribed in 14 CFR Part 91. These altitudes are published on aeronautical charts and prescribed in 14 CFR Part 95 for airways and routes, and in 14 CFR Part 97 for standard instrument approach procedures. If no applicable minimum altitude is prescribed in 14 CFR Part 95 or 14 CFR Part 97, the following minimum IFR altitude applies:

a. In designated mountainous areas, 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or

b. Other than mountainous areas, 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or
c. As otherwise authorized by the Administrator or assigned by ATC.

   (See MINIMUM CROSSING ALTITUDE.)
   (See MINIMUM EN ROUTE IFR ALTITUDE.)
   (See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE.)
   (See MINIMUM SAFE ALTITUDE.)
   (See MINIMUM VECTORING ALTITUDE.)
   (Refer to 14 CFR Part 91.)

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION—A set of standards which require aircraft to have a minimum navigation performance capability in order to operate in MNPS designated airspace. In addition, aircraft must be certified by their State of Registry for MNPS operation.

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE—Designated airspace in which MNPS procedures are applied between MNPS certified and equipped aircraft. Under certain conditions, non-MNPS aircraft can operate in MNPSA. However, standard oceanic separation minima is provided between the non-MNPS aircraft and other traffic. Currently, the only designated MNPSA is described as follows:

   a. Between FL 285 and FL 420;
   b. Between latitudes 27°N and the North Pole;
   c. In the east, the eastern boundaries of the CTAs Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik;
   d. In the west, the western boundaries of CTAs Reykjavik and Gander Oceanic and New York Oceanic excluding the area west of 60°W and south of 38°30’N.

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

   (Refer to 14 CFR Part 91.)
   (Refer to 14 CFR Part 95.)

MINIMUM RECEPTION ALTITUDE—The lowest altitude at which an intersection can be determined.

   (Refer to 14 CFR Part 95.)

MINIMUM SAFE ALTITUDE—

   a. The minimum altitude specified in 14 CFR Part 91 for various aircraft operations.
   b. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance for emergency use within a specified distance from the navigation facility upon which a procedure is predicated. These altitudes will be identified as Minimum Sector Altitudes or Emergency Safe Altitudes and are established as follows:

      1. Minimum Sector Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance within a 25-mile radius of the navigation facility upon which the procedure is predicated. Sectors depicted on approach charts must be at least 90 degrees in scope. These altitudes are for emergency use only and do not necessarily assure acceptable navigational signal coverage.

         (See ICAO term Minimum Sector Altitude.)

      2. Emergency Safe Altitudes. Altitudes depicted on approach charts which provide at least 1,000 feet of obstacle clearance in nonmountainous areas and 2,000 feet of obstacle clearance in designated mountainous areas within a 100-mile radius of the navigation facility upon which the procedure is predicated and normally used only in military procedures. These altitudes are identified on published procedures as “Emergency Safe Altitudes.”

MINIMUM SAFE ALTITUDE WARNING—A function of the ARTS III computer that aids the controller by alerting him/her when a tracked Mode C equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.

   (Refer to AIM.)

MINIMUM SECTOR ALTITUDE [ICAO]—The lowest altitude which may be used under emergency conditions which will provide a minimum clearance of 300 m (1,000 feet) above all obstacles located in an area contained within a sector of a circle of 46 km (25 NM) radius centered on a radio aid to navigation.
MINIMUMS—Weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.

(See IFR CONDITIONS.)
(See IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES.)
(See LANDING MINIMUMS.)
(See VFR CONDITIONS.)
(Refer to 14 CFR Part 91.)
(Refer to AIM.)

MINIMUM VECTORING ALTITUDE (MVA)—The lowest MSL altitude at which an IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures, and missed approaches. The altitude meets IFR obstacle clearance criteria. It may be lower than the published MEA along an airway or J-route segment. It may be utilized for radar vectoring only upon the controller’s determination that an adequate radar return is being received from the aircraft being controlled. Charts depicting minimum vectoring altitudes are normally available only to the controllers and not to pilots.

(Refer to AIM.)

MINUTES-IN-TRAIL—A specified interval between aircraft expressed in time. This method would more likely be utilized regardless of altitude.

MIS—
(See METEOROLOGICAL IMPACT STATEMENT.)

MISSED APPROACH—

a. A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP.

b. A term used by the pilot to inform ATC that he/she is executing the missed approach.

c. At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

(See MISSED APPROACH POINT.)
(Refer to AIM.)

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

(See MISSED APPROACH.)
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

MISSED APPROACH PROCEDURE [ICAO]—The procedure to be followed if the approach cannot be continued.

MISSED APPROACH SEGMENT—
(See SEGMENTS OF AN INSTRUMENT APPROACH PROCEDURE.)

MLDI—
(See METER LIST DISPLAY INTERVAL.)

MM—
(See MIDDLE MARKER.)

MNPS—
(See MINIMUM NAVIGATION PERFORMANCE SPECIFICATION.)

MNPSA—
(See MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE.)

MOA—
(See MILITARY OPERATIONS AREA.)

MOCA—
(See MINIMUM OBSTRUCTION CLEARANCE ALTITUDE.)

MODE—The letter or number assigned to a specific pulse spacing of radio signals transmitted or received by ground interrogator or airborne transponder components of the Air Traffic Control Radar Beacon System (ATCRBS). Mode A (military Mode 3) and Mode C (altitude reporting) are used in air traffic control.

(See INTERROGATOR.)
(See RADAR.)
(See TRANSPONDER.)
(See ICAO term MODE.)
(Refer to AIM.)

MODE (SSR MODE) [ICAO]—The letter or number assigned to a specific pulse spacing of the interrogation signals transmitted by an interrogator. There are 4 modes, A, B, C and D specified in Annex 10, corresponding to four different interrogation pulse spacings.

MODE C INTRUDER ALERT—A function of certain air traffic control automated systems designed to alert radar controllers to existing or pending
situations between a tracked target (known IFR or VFR aircraft) and an untracked target (unknown IFR or VFR aircraft) that requires immediate attention/action.

(See CONFLICT ALERT.)

MONITOR– (When used with communication transfer) listen on a specific frequency and stand by for instructions. Under normal circumstances do not establish communications.

MONITOR ALERT (MA)– A function of the TFMS that provides traffic management personnel with a tool for predicting potential capacity problems in individual operational sectors. The MA is an indication that traffic management personnel need to analyze a particular sector for actual activity and to determine the required action(s), if any, needed to control the demand.

MONITOR ALERT PARAMETER (MAP)– The number designated for use in monitor alert processing by the TFMS. The MAP is designated for each operational sector for increments of 15 minutes.

MOSAIC/MULTI–SENSOR MODE– Accepts positional data from multiple radar or ADS–B sites. Targets are displayed from a single source within a radar sort box according to the hierarchy of the sources assigned.

MOVEMENT AREA– The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

(See ICAO term MOVEMENT AREA.)

MOVEMENT AREA [ICAO]– That part of an aerodrome to be used for the takeoff, landing and taxiing of aircraft, consisting of the maneuvering area and the apron(s).

MOVING TARGET INDICATOR– An electronic device which will permit radar scope presentation only from targets which are in motion. A partial remedy for ground clutter.

MRA–
(See MINIMUM RECEPTION ALTITUDE.)

MSA–
(See MINIMUM SAFE ALTITUDE.)

MSAW–
(See MINIMUM SAFE ALTITUDE WARNING.)

MTI–
(See MOVING TARGET INDICATOR.)

MTR–
(See MILITARY TRAINING ROUTES.)

MULTICOM– A mobile service not open to public correspondence used to provide communications essential to conduct the activities being performed by or directed from private aircraft.

MULTIPLE RUNWAYS– The utilization of a dedicated arrival runway(s) for departures and a dedicated departure runway(s) for arrivals when feasible to reduce delays and enhance capacity.

MVA–
(See MINIMUM VECTORING ALTITUDE.)
P TIME—
(See PROPOSED DEPARTURE TIME.)

P-ACP—
(See PREARRANGED COORDINATION PROCEDURES.)

PAN-PAN—The international radio-telephony urgency signal. When repeated three times, indicates uncertainty or alert followed by the nature of the urgency.
(See MAYDAY.)
(Refer to AIM.)

PAR—
(See PRECISION APPROACH RADAR.)

PAR [ICAO]—
(See ICAO Term PRECISION APPROACH RADAR.)

PARALLEL ILS APPROACHES—Approaches to parallel runways by IFR aircraft which, when established inbound toward the airport on the adjacent final approach courses, are radar-separated by at least 2 miles.
(See FINAL APPROACH COURSE.)
(See SIMULTANEOUS ILS APPROACHES.)

PARALLEL OFFSET ROUTE—A parallel track to the left or right of the designated or established airway/route. Normally associated with Area Navigation (RNAV) operations.
(See AREA NAVIGATION.)

PARALLEL RUNWAYS—Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).

PBCT—
(See PROPOSED BOUNDARY CROSSING TIME.)

PBN
(See ICAO Term PERFORMANCE-BASED NAVIGATION.)

PDC—
(See PRE-DEPARTURE CLEARANCE.)

PERFORMANCE-BASED NAVIGATION (PBN) [ICAO]—Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note: Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability, and functionality needed for the proposed operation in the context of a particular airspace concept.

PERMANENT ECHO—Radar signals reflected from fixed objects on the earth’s surface; e.g., buildings, towers, terrain. Permanent echoes are distinguished from “ground clutter” by being definable locations rather than large areas. Under certain conditions they may be used to check radar alignment.

PHOTO RECONNAISSANCE—Military activity that requires locating individual photo targets and navigating to the targets at a preplanned angle and altitude. The activity normally requires a lateral route width of 16 NM and altitude range of 1,500 feet to 10,000 feet AGL.

PILOT BRIEFING—A service provided by the FSS to assist pilots in flight planning. Briefing items may include weather information, NOTAMS, military activities, flow control information, and other items as requested.
(Refer to AIM.)

PILOT IN COMMAND—The pilot responsible for the operation and safety of an aircraft during flight time.
(Refer to 14 CFR Part 91.)

PILOT WEATHER REPORT—A report of meteorological phenomena encountered by aircraft in flight.
(Refer to AIM.)

PILOT’S DISCRETION—When used in conjunction with altitude assignments, means that ATC has offered the pilot the option of starting climb or descent whenever he/she wishes and conducting the climb or descent at any rate he/she wishes. He/she may temporarily level off at any intermediate altitude. However, once he/she has vacated an altitude, he/she may not return to that altitude.
PIREP—
(See PILOT WEATHER REPORT.)

PITCH POINT— A fix/waypoint that serves as a transition point from a departure procedure or the low altitude ground-based navigation structure into the high altitude waypoint system.

PLANS DISPLAY— A display available in URET that provides detailed flight plan and predicted conflict information in textual format for requested Current Plans and all Trial Plans.
(See USER REQUEST EVALUATION TOOL.)

POFZ—
(See PRECISION OBSTACLE FREE ZONE.)

POINT OUT—
(See RADAR POINT OUT.)

POINT—TO—POINT (PTP)— A level of NRR service for aircraft that is based on traditional waypoints in their FMSs or RNAV equipage.

POLAR TRACK STRUCTURE— A system of organized routes between Iceland and Alaska which overlie Canadian MNPS Airspace.

POSITION REPORT— A report over a known location as transmitted by an aircraft to ATC.
(Refer to AIM.)

POSITION SYMBOL— A computer-generated indication shown on a radar display to indicate the mode of tracking.

POSITIVE CONTROL— The separation of all air traffic within designated airspace by air traffic control.

PRACTICE INSTRUMENT APPROACH— An instrument approach procedure conducted by a VFR or an IFR aircraft for the purpose of pilot training or proficiency demonstrations.

PRE—DEPARTURE CLEARANCE— An application with the Terminal Data Link System (TDLS) that provides clearance information to subscribers, through a service provider, in text to the cockpit or gate printer.

PREARRANGED COORDINATION— A standardized procedure which permits an air traffic controller to enter the airspace assigned to another air traffic controller without verbal coordination. The procedures are defined in a facility directive which ensures approved separation between aircraft.

PREARRANGED COORDINATION PROCEDURES— A facility’s standardized procedure that describes the process by which one controller shall allow an aircraft to penetrate or transit another controller’s airspace in a manner that assures approved separation without individual coordination for each aircraft.

PRECIPITATION— Any or all forms of water particles (rain, sleet, hail, or snow) that fall from the atmosphere and reach the surface.

PRECIPITATION RADAR WEATHER DESCRIPTIONS — Existing radar systems cannot detect turbulence. However, there is a direct correlation between the degree of turbulence and other weather features associated with thunderstorms and the weather radar precipitation intensity. Controllers will issue (where capable) precipitation intensity as observed by radar when using weather and radar processor (WARP) or NAS ground based digital radars with weather capabilities. When precipitation intensity information is not available, the intensity will be described as UNKNOWN. When intensity levels can be determined, they shall be described as:

a. LIGHT (< 30 dBZ)

b. MODERATE (30 to 40 dBZ)

c. HEAVY (> 40 to 50 dBZ)

d. EXTREME (> 50 dBZ)
(Refer to AC 00–45, Aviation Weather Services.)

PRECISION APPROACH—
(See PRECISION APPROACH PROCEDURE.)

PRECISION APPROACH PROCEDURE— A standard instrument approach procedure in which an electronic glideslope/or other type of glidepath is provided; e.g., ILS, PAR, and GLS.
(See INSTRUMENT LANDING SYSTEM.)
(See PRECISION APPROACH RADAR.)
point where the aircraft is established on the intermediate course or final approach course.

(See ICAO term INITIAL APPROACH SEGMENT.)

b. Intermediate Approach– The segment between the intermediate fix or point and the final approach fix.

(See ICAO term INTERMEDIATE APPROACH SEGMENT.)

c. Final Approach– The segment between the final approach fix or point and the runway, airport, or missed approach point.

(See ICAO term FINAL APPROACH SEGMENT.)

d. Missed Approach– The segment between the missed approach point or the point of arrival at decision height and the missed approach fix at the prescribed altitude.

(Refer to 14 CFR Part 97.)

(See ICAO term MISSED APPROACH PROCEDURE.)

SEPARATION– In air traffic control, the spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.

(See SEPARATION MINIMA.)

(See ICAO term SEPARATION.)

SEPARATION [ICAO]– Spacing between aircraft, levels or tracks.

SEPARATION MINIMA– The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

(See SEPARATION.)

SERVICE– A generic term that designates functions or assistance available from or rendered by air traffic control. For example, Class C service would denote the ATC services provided within a Class C airspace area.

SEVERE WEATHER AVOIDANCE PLAN– An approved plan to minimize the affect of severe weather on traffic flows in impacted terminal and/or ARTCC areas. SWAP is normally implemented to provide the least disruption to the ATC system when flight through portions of airspace is difficult or impossible due to severe weather.

SEVERE WEATHER FORECAST ALERTS– Preliminary messages issued in order to alert users that a Severe Weather Watch Bulletin (WW) is being issued. These messages define areas of possible severe thunderstorms or tornado activity. The messages are unscheduled and issued as required by the Storm Prediction Center (SPC) at Norman, Oklahoma.

(See AIRMET.)

(See CONVective SIGMET.)

(See CWA.)

(See SIGMET.)

SFA–

(See SINGLE FREQUENCY APPROACH.)

SFO–

(See SIMULATED FLAMEOUT.)

SHF–

(See SUPER HIGH FREQUENCY.)

SHORT RANGE CLEARANCE– A clearance issued to a departing IFR flight which authorizes IFR flight to a specific fix short of the destination while air traffic control facilities are coordinating and obtaining the complete clearance.

SHORT TAKEOFF AND LANDING AIRCRAFT– An aircraft which, at some weight within its approved operating weight, is capable of operating from a runway in compliance with the applicable STOL characteristics, airworthiness, operations, noise, and pollution standards.

(See VERTICAL TAKEOFF AND LANDING AIRCRAFT.)

SIAP–

(See STANDARD INSTRUMENT APPROACH PROCEDURE.)

SID–

(See STANDARD INSTRUMENT DEPARTURE.)

SIDESTEP MANEUVER– A visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than 1,200 feet to either side of the runway to which the instrument approach was conducted.

(Refer to AIM.)

SIGMET– A weather advisory issued concerning weather significant to the safety of all aircraft.
SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles. 
(See AIRMET.)
(See AWW.)
(See CONVECTIVE SIGMET.)
(See CWA.)
(See ICAO term SIGMET INFORMATION.)
(Refer to AIM.)

SIGMET INFORMATION [ICAO]—Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

SIGNIFICANT METEOROLOGICAL INFORMATION—
(See SIGMET.)

SIGNIFICANT POINT—A point, whether a named intersection, a NAVAID, a fix derived from a NAVAID(s), or geographical coordinate expressed in degrees of latitude and longitude, which is established for the purpose of providing separation, as a reporting point, or to delineate a route of flight.

SIMPILIFIED DIRECTIONAL FACILITY—A NAVAID used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.
(Refer to AIM.)

SIMULATED FLAMEOUT—A practice approach by a jet aircraft (normally military) at idle thrust to a runway. The approach may start at a runway (high key) and may continue on a relatively high and wide downwind leg with a continuous turn to final. It terminates in landing or low approach. The purpose of this approach is to simulate a flameout.
(See FLAMEOUT.)

SIMULTANEOUS CLOSE PARALLEL APPROACHES—A simultaneous, independent approach operation permitting ILS/RNAV/GLS approaches to airports having parallel runways separated by at least 3,000 feet and less than 4300 feet between centerlines. Aircraft are permitted to pass each other during these simultaneous operations. Integral parts of a total system are radar, NTZ monitoring with enhanced FMA color displays that include aural and visual alerts and predictive aircraft position software, communications override, ATC procedures, an Attention All Users Page (AAUP), PRM in the approach name, and appropriate ground based and airborne equipment. High update rate surveillance sensor required for certain runway or approach course separations.

SIMULTANEOUS (CONVERGING) DEPENDENT APPROACHES—An approach operation permitting ILS/RNAV/GLS approaches to runways or missed approach courses that intersect where required minimum spacing between the aircraft on each final approach course is required.

SIMULTANEOUS (CONVERGING) INDEPENDENT APPROACHES—An approach operation permitting ILS/RNAV/GLS approaches to non-parallel runways where approach procedure design maintains the required aircraft spacing throughout the approach and missed approach and hence the operations may be conducted independently.

SIMULTANEOUS ILS APPROACHES—An approach system permitting simultaneous ILS approaches to airports having parallel runways separated by at least 4,300 feet between centerlines. Integral parts of a total system are ILS, radar, communications, ATC procedures, and appropriate airborne equipment.
(See PARALLEL RUNWAYS.)
(Refer to AIM.)

SIMULTANEOUS OFFSET INSTRUMENT APPROACH (SOIA)—An instrument landing system comprised of an ILS PRM, RNAV PRM or GLS PRM approach to one runway and an offset LDA PRM with glideslope or an RNAV PRM or GLS PRM approach utilizing vertical guidance to another where parallel runway spaced less than 3,000 feet and at least 750 feet apart. The approach courses converge by 2.5 to 3 degrees. Simultaneous close parallel PRM approach procedures apply up to the point where the approach course separation becomes 3,000 feet, at the offset MAP. From the offset MAP to the runway threshold, visual separation by the aircraft conducting the offset approach is utilized.
(Refer to AIM)

SIMULTANEOUS (PARALLEL) DEPENDENT APPROACHES—An approach operation permitting ILS/RNAV/GLS approaches to adjacent parallel runways where prescribed diagonal spacing must be
maintained. Aircraft are not permitted to pass each other during simultaneous dependent operations. Integral parts of a total system ATC procedures, and appropriate airborne and ground based equipment.

SINGLE DIRECTION ROUTES—Preferred IFR Routes which are sometimes depicted on high altitude en route charts and which are normally flown in one direction only.
(See PREFERRED IFR ROUTES.)
(Refer to AIRPORT/FACILITY DIRECTORY.)

SINGLE FREQUENCY APPROACH—A service provided under a letter of agreement to military single-piloted turbojet aircraft which permits use of a single UHF frequency during approach for landing. Pilots will not normally be required to change frequency from the beginning of the approach to touchdown except that pilots conducting an en route descent are required to change frequency when control is transferred from the air route traffic control center to the terminal facility. The abbreviation “SFA” in the DOD FLIP IFR Supplement under “Communications” indicates this service is available at an aerodrome.

SINGLE-PILOTED AIRCRAFT—A military turbojet aircraft possessing one set of flight controls, tandem cockpits, or two sets of flight controls but operated by one pilot is considered single-piloted by ATC when determining the appropriate air traffic service to be applied.
(See SINGLE FREQUENCY APPROACH.)

SKYSPOTTER—A pilot who has received specialized training in observing and reporting inflight weather phenomena.

SLASH—A radar beacon reply displayed as an elongated target.

SLDI—
(See SECTOR LIST DROP INTERVAL.)

SLOT TIME—
(See METER FIX TIME/SLOT TIME.)

SLOW TAXI—To taxi a float plane at low power or low RPM.

SN—
(See SYSTEM STRATEGIC NAVIGATION.)

SPEAK SLOWER—Used in verbal communications as a request to reduce speech rate.

SPECIAL ACTIVITY AIRSPACE (SAA)—Any airspace with defined dimensions within the National Airspace System wherein limitations may be imposed upon aircraft operations. This airspace may be restricted areas, prohibited areas, military operations areas, air ATC assigned airspace, and any other designated airspace areas. The dimensions of this airspace are programmed into URET and can be designated as either active or inactive by screen entry. Aircraft trajectories are constantly tested against the dimensions of active areas and alerts issued to the applicable sectors when violations are predicted.
(See USER REQUEST EVALUATION TOOL.)

SPECIAL EMERGENCY—A condition of air piracy or other hostile act by a person(s) aboard an aircraft which threatens the safety of the aircraft or its passengers.

SPECIAL INSTRUMENT APPROACH PROCEDURE—
(See INSTRUMENT APPROACH PROCEDURE.)

SPECIAL USE AIRSPACE—Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Types of special use airspace are:

a. Alert Area—Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations, and pilots of participating aircraft as well as pilots transiting the area are equally responsible for collision avoidance.

b. Controlled Firing Area—Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.

c. Military Operations Area (MOA)—A MOA is airspace established outside of Class A airspace area to separate or segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.
(Refer to AIM.)

d. Prohibited Area—Airspace designated under 14 CFR Part 73 within which no person may operate
an aircraft without the permission of the using agency.
(Refer to AIM.)
(Refer to En Route Charts.)

e. Restricted Area—Airspace designated under 14 CFR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown.
(Refer to 14 CFR Part 73.)
(Refer to AIM.)

f. Warning Area—A warning area is airspace of defined dimensions extending from 3 nautical miles outward from the coast of the United States, that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning area is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

SPECIAL VFR CONDITIONS—Meteorological conditions that are less than those required for basic VFR flight in Class B, C, D, or E surface areas and in which some aircraft are permitted flight under visual flight rules.
(See SPECIAL VFR OPERATIONS.)
(Refer to 14 CFR Part 91.)

SPECIAL VFR FLIGHT [ICAO]—A VFR flight cleared by air traffic control to operate within Class B, C, D, and E surface areas in metrological conditions below VMC.

SPECIAL VFR OPERATIONS—Aircraft operating in accordance with clearances within Class B, C, D, and E surface areas in weather conditions less than the basic VFR weather minima. Such operations must be requested by the pilot and approved by ATC.
(See SPECIAL VFR CONDITIONS.)
(See ICAO term SPECIAL VFR FLIGHT.)

SPEED—
(See AIRSPEED.)
(See GROUND SPEED.)

SPEED ADJUSTMENT—An ATC procedure used to request pilots to adjust aircraft speed to a specific value for the purpose of providing desired spacing. Pilots are expected to maintain a speed of plus or minus 10 knots or 0.02 Mach number of the specified speed. Examples of speed adjustments are:
a. “Increase/reduce speed to Mach point (number)”
b. “Increase/reduce speed to (speed in knots)” or “Increase/reduce speed (number of knots) knots.”

SPEED BRAKES—Moveable aerodynamic devices on aircraft that reduce airspeed during descent and landing.

SPEED SEGMENTS—Portions of the arrival route between the transition point and the vertex along the optimum flight path for which speeds and altitudes are specified. There is one set of arrival speed segments adapted from each transition point to each vertex. Each set may contain up to six segments.

SQUAWK (Mode, Code, Function) —Activate specific modes/codes/functions on the aircraft transponder; e.g., “Squawk three/alpha, two one zero five, low.”
(See TRANSPONDER.)

STA—
(See SCHEDULED TIME OF ARRIVAL.)

STAGING/QUEUING—The placement, integration, and segregation of departure aircraft in designated movement areas of an airport by departure fix, EDCT, and/or restriction.

STAND BY—Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in “stand by for clearance.” The caller should reestablish contact if a delay is lengthy. “Stand by” is not an approval or denial.

STANDARD INSTRUMENT APPROACH PROCEDURE (SIAP)—
(See INSTRUMENT APPROACH PROCEDURE.)

STANDARD INSTRUMENT DEPARTURE (SID)—A preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement to expedite traffic flow and to reduce pilot/controller
radio frequency and also, for subscribers, in a text message via data link to the cockpit or to a gate printer. TDLS also provides Pre-departure Clearances (PDC), at selected airports, to subscribers, through a service provider, in text to the cockpit or to a gate printer. In addition, TDLS will emulate the Flight Data Input/Output (FDIO) information within the control tower.

TERMINAL RADAR SERVICE AREA—Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. The AIM contains an explanation of TRSA. TRSAs are depicted on VFR aeronautical charts. Pilot participation is urged but is not mandatory.

TERMINAL VFR RADAR SERVICE—A national program instituted to extend the terminal radar services provided instrument flight rules (IFR) aircraft to visual flight rules (VFR) aircraft. The program is divided into four types service referred to as basic radar service, terminal radar service area (TRSA) service, Class B service and Class C service. The type of service provided at a particular location is contained in the Airport/Facility Directory.

a. Basic Radar Service—These services are provided for VFR aircraft by all commissioned terminal radar facilities. Basic radar service includes safety alerts, traffic advisories, limited radar vectoring when requested by the pilot, and sequencing at locations where procedures have been established for this purpose and/or when covered by a letter of agreement. The purpose of this service is to adjust the flow of arriving IFR and VFR aircraft into the traffic pattern in a safe and orderly manner and to provide traffic advisories to departing VFR aircraft.

b. TRSA Service—This service provides, in addition to basic radar service, sequencing of all IFR and participating VFR aircraft to the primary airport and separation between all participating VFR aircraft. The purpose of this service is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the area defined as a TRSA.

c. Class C Service—This service provides, in addition to basic radar service, approved separation between IFR and VFR aircraft, and sequencing of VFR aircraft, and sequencing of VFR arrivals to the primary airport.

d. Class B Service—This service provides, in addition to basic radar service, approved separation of aircraft based on IFR, VFR, and/or weight, and sequencing of VFR arrivals to the primary airport(s).

(See CONTROLLED AIRSPACE.)
(See TERMINAL RADAR SERVICE AREA.)
(Refer to AIM.)
(Refer to AIRPORT/FACILITY DIRECTORY.)

TERMINAL-VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE STATION—A very high frequency terminal omnirange station located on or near an airport and used as an approach aid.

(See NAVIGATIONAL AID.)
(See VOR.)

TERRAIN AWARENESS WARNING SYSTEM (TAWS)—An on-board, terrain proximity alerting system providing the aircrew ‘Low Altitude warnings’ to allow immediate pilot action.

TERRAIN FOLLOWING—The flight of a military aircraft maintaining a constant AGL altitude above the terrain or the highest obstruction. The altitude of the aircraft will constantly change with the varying terrain and/or obstruction.

TETRAHEDRON—A device normally located on uncontrolled airports and used as a landing direction indicator. The small end of a tetrahedron points in the direction of landing. At controlled airports, the tetrahedron, if installed, should be disregarded because tower instructions supersede the indicator.

(See SEGMENTED CIRCLE.)
(Refer to AIM.)

TF—
(See TERRAIN FOLLOWING.)

THAT IS CORRECT—The understanding you have is right.

THREE-HOUR TARMAC RULE—Rule that relates to Department of Transportation (DOT) requirements placed on airlines when tarmac delays are anticipated to reach 3 hours.

360 OVERHEAD—
(See OVERHEAD MANEUVER.)

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

(See AIRPORT LIGHTING.)
(See DISPLACED THRESHOLD.)

THRESHOLD CROSSING HEIGHT—The theoretical height above the runway threshold at
which the aircraft’s glideslope antenna would be if the aircraft maintains the trajectory established by the mean ILS glideslope or the altitude at which the calculated glidepath of an RNAV or GPS approaches.

(See GLIDESLOPE.)
(See THRESHOLD.)

THRESHOLD LIGHTS—
(See AIRPORT LIGHTING.)

TIBS—
(See TELEPHONE INFORMATION BRIEFING SERVICE.)

TIE-IN FACILITY— The FSS primarily responsible for providing FSS services, including telecommunications services for landing facilities or navigational aids located within the boundaries of a flight plan area (FPA). Three-letter identifiers are assigned to each FSS/FPA and are annotated as tie-in facilities in A/FDs, the Alaska Supplement, the Pacific Supplement, and FAA Order JO 7350.8, Location Identifiers. Large consolidated FSS facilities may have many tie-in facilities or FSS sectors within one facility.

(See FLIGHT PLAN AREA.)
(See FLIGHT SERVICE STATION.)

TIME GROUP— Four digits representing the hour and minutes from the Coordinated Universal Time (UTC) clock. FAA uses UTC for all operations. The term “ZULU” may be used to denote UTC. The word “local” or the time zone equivalent shall be used to denote local when local time is given during radio and telephone communications. When written, a time zone designator is used to indicate local time; e.g. “0205M” (Mountain). The local time may be based on the 24-hour clock system. The day begins at 0000 and ends at 2359.

TIS—B—
(See TRAFFIC INFORMATION SERVICE—BROADCAST.)

TMA—
(See TRAFFIC MANAGEMENT ADVISOR.)

TMPA—
(See TRAFFIC MANAGEMENT PROGRAM ALERT.)

TMU—
(See TRAFFIC MANAGEMENT UNIT.)

TODA—
(See TAKEOFF DISTANCE AVAILABLE.)
(See ICAO term TAKEOFF DISTANCE AVAILABLE.)

TOI—
(See TRACK OF INTEREST.)

TORA—
(See TAKEOFF RUN AVAILABLE.)
(See ICAO term TAKEOFF RUN AVAILABLE.)

TORCHING— The burning of fuel at the end of an exhaust pipe or stack of a reciprocating aircraft engine, the result of an excessive richness in the fuel air mixture.

TOS—
(See TRAJECTORY OPTIONS SET)

TOTAL ESTIMATED ELAPSED TIME [ICAO]— For IFR flights, the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from take-off to arrive over the destination aerodrome.

(See ICAO term ESTIMATED ELAPSED TIME.)

TOUCH-AND-GO— An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

TOUCH-AND-GO LANDING—
(See TOUCH-AND-GO.)

TOUCHDOWN—

a. The point at which an aircraft first makes contact with the landing surface.

b. Concerning a precision radar approach (PAR), it is the point where the glide path intercepts the landing surface.

(See ICAO term TOUCHDOWN.)

TOUCHDOWN [ICAO]— The point where the nominal glide path intercepts the runway.

Note: Touchdown as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.
TOUCHDOWN RVR–
(See VISIBILITY.)

TOUCHDOWN ZONE– The first 3,000 feet of the runway beginning at the threshold. The area is used for determination of Touchdown Zone Elevation in the development of straight-in landing minimums for instrument approaches.
(See ICAO term TOUCHDOWN ZONE.)

TOUCHDOWN ZONE [ICAO]– The portion of a runway, beyond the threshold, where it is intended landing aircraft first contact the runway.

TOUCHDOWN ZONE ELEVATION– The highest elevation in the first 3,000 feet of the landing surface. TDZE is indicated on the instrument approach procedure chart when straight-in landing minimums are authorized.
(See TOUCHDOWN ZONE.)

TOUCHDOWN ZONE LIGHTING–
(See AIRPORT LIGHTING.)

TOWER– A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).
(See AIRPORT TRAFFIC CONTROL SERVICE.)
(See APPROACH CONTROL FACILITY.)
(See APPROACH CONTROL SERVICE.)
(See MOVEMENT AREA.)
(See TOWER EN ROUTE CONTROL SERVICE.)
(See ICAO term AERODROME CONTROL TOWER.)
(Refer to AIM.)

TOWER EN ROUTE CONTROL SERVICE– The control of IFR en route traffic within delegated airspace between two or more adjacent approach control facilities. This service is designed to expedite traffic and reduce control and pilot communication requirements.

TOWER TO TOWER–
(See TOWER EN ROUTE CONTROL SERVICE.)

TPX-42– A numeric beacon decoder equipment/system. It is designed to be added to terminal radar systems for beacon decoding. It provides rapid target identification, reinforcement of the primary radar target, and altitude information from Mode C.
(See AUTOMATED RADAR TERMINAL SYSTEMS.)
(See TRANSPONDER.)

TRACEABLE PRESSURE STANDARD– The facility station pressure instrument, with certification/calibration traceable to the National Institute of Standards and Technology. Traceable pressure standards may be mercurial barometers, commissioned ASOS/AWSS or dual transducer AWOS, or portable pressure standards or DASI.

TRACK– The actual flight path of an aircraft over the surface of the earth.
(See COURSE.)
(See FLIGHT PATH.)
(See ROUTE.)
(See ICAO term TRACK.)

TRACK [ICAO]– The projection on the earth’s surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (True, Magnetic, or Grid).

TRACK OF INTEREST (TOI)– Displayed data representing an airborne object that threatens or has the potential to threaten North America or National Security. Indicators may include, but are not limited to: noncompliance with air traffic control instructions or aviation regulations; extended loss of communications; unusual transmissions or unusual flight behavior; unauthorized intrusion into controlled airspace or an ADIZ; noncompliance with issued flight restrictions/security procedures; or unlawful interference with airborne flight crews, up to and including hijack. In certain circumstances, an object may become a TOI based on specific and credible intelligence pertaining to that particular aircraft/object, its passengers, or its cargo.

TRACK OF INTEREST RESOLUTION– A TOI will normally be considered resolved when: the aircraft/object is no longer airborne; the aircraft complies with air traffic control instructions, aviation regulations, and/or issued flight restrictions/security procedures; radio contact is re-established and authorized control of the aircraft is verified; the aircraft is intercepted and intent is verified to be nonthreatening/nonhostile; TOI was identified based
on specific and credible intelligence that was later determined to be invalid or unreliable; or displayed data is identified and characterized as invalid.

TRAFFIC—

a. A term used by a controller to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued:

1. In response to a handoff or point out,
2. In anticipation of a handoff or point out, or
3. In conjunction with a request for control of an aircraft.

b. A term used by ATC to refer to one or more aircraft.

TRAFFIC ADVISORIES—Advisories issued to alert pilots to other known or observed air traffic which may be in such proximity to the position or intended route of flight of their aircraft to warrant their attention. Such advisories may be based on:

a. Visual observation.

b. Observation of radar identified and nonidentified aircraft targets on an ATC radar display, or

c. Verbal reports from pilots or other facilities.

Note 1: The word “traffic” followed by additional information, if known, is used to provide such advisories; e.g., “Traffic, 2 o’clock, one zero miles, southbound, eight thousand.”

Note 2: Traffic advisory service will be provided to the extent possible depending on higher priority duties of the controller or other limitations; e.g., radar limitations, volume of traffic, frequency congestion, or controller workload. Radar/nonradar traffic advisories do not relieve the pilot of his/her responsibility to see and avoid other aircraft. Pilots are cautioned that there are many times when the controller is not able to give traffic advisories concerning all traffic in the aircraft’s proximity; in other words, when a pilot requests or is receiving traffic advisories, he/she should not assume that all traffic will be issued.

(Refer to AIM.)

TRAFFIC ALERT (aircraft call sign), TURN (left/right) IMMEDIATELY, (climb/descend) AND MAINTAIN (altitude).

(See SAFETY ALERT.)

TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM—An airborne collision avoidance system based on radar beacon signals which operates independent of ground-based equipment. TCAS-I generates traffic advisories only. TCAS-II generates traffic advisories, and resolution (collision avoidance) advisories in the vertical plane.

TRAFFIC INFORMATION—

(See TRAFFIC ADVISORIES.)

TRAFFIC INFORMATION SERVICE—BROADCAST (TIS-B)—The broadcast of ATC derived traffic information to ADS-B equipped (1090ES or UAT) aircraft. The source of this traffic information is derived from ground-based air traffic surveillance sensors, typically from radar targets. TIS–B service will be available throughout the NAS where there are both adequate surveillance coverage (radar) and adequate broadcast coverage from ADS–B ground stations. Loss of TIS–B will occur when an aircraft enters an area not covered by the GBT network. If this occurs in an area with adequate surveillance coverage (radar), nearby aircraft that remain within the adequate broadcast coverage (ADS–B) area will view the first aircraft. TIS–B may continue when an aircraft enters an area with inadequate surveillance coverage (radar); nearby aircraft that remain within the adequate broadcast coverage (ADS–B) area will not view the first aircraft.

TRAFFIC IN SIGHT—Used by pilots to inform a controller that previously issued traffic is in sight.

(See NEGATIVE CONTACT.)

(See TRAFFIC ADVISORIES.)

TRAFFIC MANAGEMENT ADVISOR (TMA)—A computerized tool which assists Traffic Management Coordinators to efficiently schedule arrival traffic to a metered airport, by calculating meter fix times and delays then sending that information to the sector controllers.

TRAFFIC MANAGEMENT PROGRAM ALERT—A term used in a Notice to Airmen (NOTAM) issued in conjunction with a special traffic management program to alert pilots to the existence of the program and to refer them to either the Notices to Airmen publication or a special traffic management program advisory message for program details. The contraction TMPA is used in NOTAM text.

TRAFFIC MANAGEMENT UNIT—The entity in ARTCCs and designated terminals directly involved in the active management of facility traffic. Usually under the direct supervision of an assistant manager for traffic management.
**TRAFFIC NO FACTOR**—Indicates that the traffic described in a previously issued traffic advisory is no factor.

**TRAFFIC NO LONGER OBSERVED**—Indicates that the traffic described in a previously issued traffic advisory is no longer depicted on radar, but may still be a factor.

**TRAFFIC PATTERN**—The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

  a. **Upwind Leg**—A flight path parallel to the landing runway in the direction of landing.

  b. **Crosswind Leg**—A flight path at right angles to the landing runway off its upwind end.

  c. **Downwind Leg**—A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

  d. **Base Leg**—A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

  e. **Final Approach**. A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

  (See **STRAIGHT-IN APPROACH VFR**.)

  (See **TAXI PATTERNS**.)

  (See **ICAO term AERODROME TRAFFIC CIRCUIT**.)

  (Refer to 14 CFR Part 91.)

  (Refer to **AIM**.)

**TRAJECTORY**—A URET representation of the path an aircraft is predicted to fly based upon a Current Plan or Trial Plan.

(See USER REQUEST EVALUATION TOOL.)

**TRAJECTORY MODELING**—The automated process of calculating a trajectory.

**TRAJECTORY OPTIONS SET (TOS)**—A TOS is an electronic message, submitted by the operator, that is used by the Collaborative Trajectory Options Program (CTOP) to manage the airspace captured in the traffic management program. The TOS will allow the operator to express the route and delay trade-off options that they are willing to accept.

**TRANSCRIBED WEATHER BROADCAST**—A continuous recording of meteorological and aeronautical information that is broadcast on L/MF and VOR facilities for pilots. (Provided only in Alaska.)

(Refer to **AIM**.)

**TRANSFER OF CONTROL**—That action whereby the responsibility for the separation of an aircraft is transferred from one controller to another.

(See **ICAO term TRANSFER OF CONTROL**.)

**TRANSFER OF CONTROL [ICAO]**—Transfer of responsibility for providing air traffic control service.

**TRANSFERRING CONTROLLER**—A controller/facility transferring control of an aircraft to another controller/facility.

(See **ICAO term TRANSFERRING UNIT/CONTROLLER**.)

**TRANSFERRING FACILITY**—(See TRANSFERRING CONTROLLER.)

**TRANSFERRING UNIT/CONTROLLER [ICAO]**—Air traffic control unit/air traffic controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.

Note: See definition of accepting unit/controller.

**TRANSITION**—

  a. The general term that describes the change from one phase of flight or flight condition to another; e.g., transition from en route flight to the approach or transition from instrument flight to visual flight.

  b. A published procedure (DP Transition) used to connect the basic DP to one of several en route
airways/jet routes, or a published procedure (STAR Transition) used to connect one of several en route airways/jet routes to the basic STAR.
(Refer to DP/STAR Charts.)

TRANSITION POINT – A point at an adapted number of miles from the vertex at which an arrival aircraft would normally commence descent from its en route altitude. This is the first fix adapted on the arrival speed segments.

TRANSITION WAYPOINT – The waypoint that defines the beginning of a runway or en route transition on an RNAV SID or STAR.

TRANSITIONAL AIRSPACE – That portion of controlled airspace wherein aircraft change from one phase of flight or flight condition to another.

TRANSMISSOMETER – An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV).
(See VISIBILITY.)

TRANSMITTING IN THE BLIND – A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

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

TRANSPOUNDER [ICAO] – A receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.

TRANSPONDER CODES –
(See CODES.)

TRANSPONDER OBSERVED – Phraseology used to inform a VFR pilot the aircraft’s assigned beacon code and position have been observed. Specifically, this term conveys to a VFR pilot the transponder reply has been observed and its position correlated for transit through the designated area.

TRIAL PLAN – A proposed amendment which utilizes automation to analyze and display potential conflicts along the predicted trajectory of the selected aircraft.

TRSA –
(See TERMINAL RADAR SERVICE AREA.)

TSD –
(See TRAFFIC SITUATION DISPLAY.)

TURBOJET AIRCRAFT – An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

TURBOPROP AIRCRAFT – An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

TURN ANTICIPATION – (maneuver anticipation).

TVOR –
(See TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION.)

TWEB –
(See TRANSCRIBED WEATHER BROADCAST.)

TWO-WAY RADIO COMMUNICATIONS FAILURE –
(See LOST COMMUNICATIONS.)
INDEX

[References are to page numbers]

A
Abbreviated Departure Clearance, 4–3–4
Abbreviated Transmissions, 2–4–3
Abbreviations, 1–2–3
Additional Separation for Formation Flights, 5–5–5
Adjacent Airspace, 5–5–6
Adjusted Minimum Flight Level, 4–5–2
Advance Descent Clearance, 4–7–1
Aerial Refueling, 9–2–6
Air Defense Exercise Beacon Code Assignment, 5–2–4
Air Traffic Service (ATS) Routes, 2–5–1
Air Traffic Services Interfacility Data Communications (AIDC), 8–2–1
Airborne Military Flights, 2–2–4
Aircraft Bomb Threats, 10–2–4
Aircraft Carrying Dangerous Materials, 9–2–1
Aircraft Equipment Suffix (Strips), 2–3–10
Aircraft Identification, 2–4–9
Aircraft Identity (Strips), 2–3–9
Aircraft Information (Experimental), Appendix C–1
Aircraft Information (Helicopters), Appendix B–1
Aircraft Information (Homebuilt), Appendix C–1
Aircraft Information (Rotorcraft), Appendix B–1
Aircraft Orientation, 10–2–1
Aircraft Type (Strips), 2–3–10
Aircraft Types, 2–4–12
Airport Conditions, 3–3–1, 4–7–5
Airport Ground Emergency, 10–1–2
Airport Lighting, 3–4–1
Airport Surface Detection Procedures, 3–6–1
Radar–Only Mode, 3–6–2
Airspace Classes, 2–4–12
AIT, 5–4–5
Alignment Accuracy Check (Radar), 5–1–1
ALNOT, 10–3–2
ALNOT Cancellation, 10–3–3
ALS Intensity Settings, 3–4–2
ALSF–2/SSALR, 3–4–3
Alternative Routes, 4–4–3
Altimeter Setting (Oceanic), 8–1–1
Altitude Amendments, 4–2–1
Altitude and Distance Limitations, 4–1–1
Altitude Assignment and Verification, 4–5–1
Altitude Assignment for Military High Altitude Instrument Approaches, 4–8–7
Altitude Confirmation – Mode C, 5–2–7
Altitude Confirmation – Non–Mode C, 5–2–7
Altitude Confirmation – Nonradar, 4–5–8
Altitude Filters (Beacon), 5–2–9
Altitude for Direction of Flight (IFR), 4–5–1
Altitude for Direction of Flight (OTP), 7–3–2
Altitude Instructions, 4–5–3
Altitude Restricted Low Approach, 3–10–8
ALTRV Clearance, 4–2–3
ALTRV Information, 2–2–2
Annotations, 1–2–3
Anticipated Altitude Changes, 4–5–8
Anticipating Separation (ATCT – Arrival), 3–10–7
Anticipating Separation (ATCT – Departure), 3–9–4
Approach Clearance Information, 4–8–8
Approach Clearance Procedures, 4–8–1
Approach Control Service for VFR Arriving Aircraft, 7–1–1
Approach Information (Arrivals), 4–7–4
Approach Lights, 3–4–2
Approach Separation Responsibility, 5–9–5
Approaches to Multiple Runways (Visual), 7–4–2
Arctic CTA, 8–10–1
Arresting System Operations, 3–3–3
Arrival Information, 4–7–3
Arrival Information by Approach Control Facilities, 4–7–5
Arrival Instructions (Radar), 5–9–2
Arrival Procedures, 4–7–1
Arrival Procedures and Separation (ATCT), 3–10–1
Arrivals on Parallel or Nonintersecting Diverging

[References are to page numbers]

ATC Assigned Airspace, 9–3–1
ATC Service, 2–1–1
ATIS Application, 2–9–1
ATIS Content, 2–9–2
ATIS Procedures, 2–9–1
Authorized Interruptions, 2–4–1
Authorized Relays, 2–4–3
Authorized Transmissions, 2–4–1
Automated Information Transfer, 5–4–5
Automated Radar Terminal Systems – Terminal, 5–15–1
Automatic Altitude Reporting, 5–2–8
Automation – En Route, 5–14–1
Avoidance of Areas of Nuclear Radiation, 9–2–8
AWACS Special Flights, 9–2–9

B

Balloons, Unmanned Free, 9–6–1
Beacon Code for Pressure Suit Flights and Flights Above FL 600, 5–2–4
Beacon Code Monitor, 5–2–5
Beacon Identification Methods, 5–3–1
Beacon Range Accuracy, 5–1–2
Beacon Systems, 5–2–1
Beacon Target Displacement, 5–5–7
Beacon Termination, 5–2–8
Below Minima Report by Pilot, 4–7–4
Braking Action, 3–3–2
Braking Action Advisories, 3–3–2

C

Calm Wind Conditions, 2–6–5
Canadian Airspace Procedures, 12–1–1
Cancellation of Takeoff Clearance, 3–9–12
Caribbean ICAO Region, 8–8–1

Celestial Navigation Training, 9–2–1
Charted Visual Flight Procedures, 7–4–3
Circling Approach, 4–8–7
Class A Airspace Restrictions, 7–1–1
Class B Separation, 7–9–2
Class B Service Area (Terminal), 7–9–1
Class C Separation, 7–8–1
Class C Service (Terminal), 7–8–1
Clearance Beyond Fix, 4–6–2
Clearance Delivery Instructions, 4–2–1
Clearance for Visual Approach, 7–4–1
Clearance Information (Arrivals), 4–7–1
Clearance Items, 4–2–1
Clearance Items (Airfile), 4–2–3
Clearance Limit, 4–8–7
Clearance Prefix, 4–2–1
Clearance Relay, 4–2–1
Clearance Status (Strips), 2–3–10
Clearance to Holding Fix, 4–6–1
Clearance Void Times, 4–3–6
Closed Runway Information, 3–3–1
Closed Traffic, 3–10–9
Coast Tracks, 5–14–2
Communications Failure, 10–4–1
Communications Release (Approaches), 4–8–8
Composite Separation Minima (Oceanic), 8–9–2
Computer Entry of Assigned Altitude, 5–14–2
Computer Message Verification, 2–2–2
Conflict Alert (Host), 5–14–1
Conflict Alert/Mode C Intruder (MCI) (ARTS), 5–15–2
Constraints Governing Supplements and Procedural Deviations, 1–1–2
Contact Approach, 7–4–3
Control Estimates, 8–1–1
Control Symbology (Strip), 2–3–12
Control Transfer, 2–1–7
Controller Initiated Coast Tracks, 5–14–2
Controller Pilot Data Link Communications (CPDLC), 2–4–5, 4–5–4, 13–2–3
Coordinate Use of Airspace, 2–1–6

[References are to page numbers]

Coordination with Receiving Facility (Departures), 4–3–8
Course Definitions, 1–2–2
Crossing Altitude, 4–1–2
CVFP, 7–4–3

D
Decision Support Tools, 13–1–1
Degree – Distance Route Definition for Military Operations, 4–4–3
Delay Sequencing (Departures), 4–3–8
Department of Energy Special Flights, 9–2–1
Departure and Arrival (Radar Separation), 5–8–3
Departure Clearances, 4–3–1
Departure Control Instructions (ATCT), 3–9–2
Departure Delay Information (ATCT), 3–9–1
Departure Information (ATCT), 3–9–1
Departure Procedures, 4–3–1
Departure Procedures and Separation (ATCT), 3–9–1
Departure Restrictions, 4–3–6
Departure Terminology, 4–3–1
Departures on Parallel or Nonintersecting Diverging Runways (Radar), 5–8–3
Deviation Advisories (Protected Airspace), 5–1–4
Discrete Environment (Beacon), 5–2–1
Disseminating Weather Information, 2–6–5
DOE, 9–2–1
Duty Priority, 2–1–1

E
E–MSAW, 5–14–1
Edge of Scope, 5–5–6
Electronic Attack (EA) Activity, 5–1–2
Electronic Cursor, 5–1–3
ELP Operations, 3–10–10

E–MSAW, 5–14–1
Edge of Scope, 5–5–6
Electronic Attack (EA) Activity, 5–1–2
Electronic Cursor, 5–1–3
ELP Operations, 3–10–10

Coordination Between Local and Ground Controllers, 3–1–2
ELT, 10–2–3
Emergencies, 10–1–1
Emergencies Involving Military Fighter–Type Aircraft, 10–1–2
Emergency Airport Recommendation, 10–2–6
Emergency Assistance, 10–2–1
Emergency Code Assignment, 5–2–3
Emergency Control Actions, 10–4–1
Emergency Landing Pattern (ELP) Operations, 3–10–10
Emergency Lighting, 3–4–1
Emergency Locator Transmitter Signals, 10–2–3
Emergency Obstruction Video Map, 10–2–6
Emergency Procedures (Oceanic), 10–6–1
Emergency Situations, 10–2–1
Emphasis for Clarity, 2–4–5
En Route Data Entries (Strips), 2–3–3
En Route Fourth Line Data Block Usage, 5–4–5
En Route Minimum Safe Altitude Warning, 5–14–1
En Route Sector Team Responsibilities, 2–10–1
Entry of Reported Altitude, 5–14–2
EOVM, 10–2–6
Equipment on Runways, 3–1–2
Establishing Two–Way Communications (Class D), 3–1–6
Evasive Action Maneuvers, 9–2–9
Expeditious Compliance, 2–1–3
Experimental Aircraft Operations, 9–2–2
Explosive Cargo, 10–5–1
Explosive Detection K–9 Teams, 10–2–5

F
FAA Research and Development Flights, 9–2–2
Facility Identification, 2–4–9
Failed Transponder in Class A Airspace, 5–2–6
Failure to Display Assigned Beacon Code, 5–2–5
False or Deceptive Communications, 2–4–2

Index
Far Field Monitor (FFM) Remote Status Unit, 3–3–4

Final Approach Course Interception, 5–9–1

[References are to page numbers]

Flight Check Aircraft, 9–1–1
Flight Direction Exceptions, 4–5–1
Flight Plans and Control Information, 2–2–1
Flight Progress Strips, 2–3–1
FLYNET, 9–2–2
Formation Flight Additional Separation, 5–5–5
Formation Flights, 2–1–6
Forward Departure Delay Information, 4–3–8
Forwarding Amended and UTM Data, 2–2–3
Forwarding Approach Information by Nonapproach Control Facilities, 3–10–1
Forwarding Departure Times, 4–3–8
Forwarding Flight Plan Data Between U.S. ARTCCs and Canadian ACCs, 2–2–4
Forwarding Information, 2–2–1
Forwarding VFR Data, 2–2–1
Fuel Dumping, 9–4–1
Function Code Assignments, 5–2–2

G

Ground Missile Emergencies, 10–7–1
Ground Operations, 3–7–4
Ground Operations When Volcanic Ash is Present, 3–1–6
Ground Stop, 4–3–8
Ground Traffic Movement, 3–7–1

H

Helicopter Arrival Separation, 3–11–3
Helicopter Departure Separation, 3–11–2
Helicopter Landing Clearance, 3–11–4
Helicopter Operations, 3–11–1
Helicopter Takeoff Clearance, 3–11–1
High Intensity Runway Lights, 3–4–4
High Speed Turnoff Lights, 3–4–5

I

Hijacked Aircraft, 10–2–2
HIRL, 3–4–4
HIRL Associated with MALSR, 3–4–4
HIRL Changes Affecting RVR, 3–4–4
HIWAS, 2–6–1
Hold for Release, 4–3–6
Holding Aircraft, 4–6–1
Holding Delays, 4–6–2
Holding Flight Path Deviation, 4–6–3
Holding Instructions, 4–6–3
Holding Pattern Surveillance, 5–1–4
Holding Points (Visual), 4–6–3

ICAO Phonetics, 2–4–6
IFR – VFR Flights, 4–2–3
IFR Flight Progress Data, 2–2–1
IFR to VFR Flight Plan Change, 2–2–1
ILS Protection/Critical Areas (Holding), 4–6–3
Inflight Deviations from Transponder/Mode C Requirements Between 10,000 Feet and 18,000 Feet, 5–2–8
Inflight Equipment Malfunctions, 2–1–4
Inhibiting Low Altitude Alert System (TPX–42), 5–16–1
Inhibiting Minimum Safe Altitude Warning (ARTS), 5–15–2
Initial Heading, 5–8–1
Inoperative Interrogator, 5–2–6
Inoperative/Malfunctioning Transponder, 5–2–5
Interceptor Operations, 9–2–4
Interfacility Automated Information Transfer, 5–4–5
Interphone Message Format, 2–4–4
Interphone Message Termination, 2–4–5
Interphone Transmission Priorities, 2–4–3
Intersecting Runway Separation (Arrival), 3–10–3
Intersecting Runway Separation (Departure), 3–9–7
J
Jettisoning of External Stores, 9–5–1

[References are to page numbers]

K
K–9 Teams, 10–2–5

L
LAAS, 5–16–1
Landing Area Condition, 3–3–1
Landing Clearance, 3–10–6
Landing Clearance Without Visual Observation, 3–10–7
Landing Information (ATCT), 3–10–1
Lateral Separation (Nonradar), 6–5–1
Lateral Separation (Oceanic), 8–4–1
Law Enforcement Operations by Civil and Military Organizations, 9–2–5
Light Signals (ATCT), 3–2–1
Line Up and Wait (LUAW), 3–9–2
Longitudinal Separation (Nonradar), 6–4–1
Longitudinal Separation (Oceanic), 8–3–1
Low Approach, 4–8–9
Low Level Wind Shear/Microburst Advisories, 3–1–3
Lowest Usable Flight Level, 4–5–2

M
Mach Number Technique, 8–3–2
Malfunctioning Interrogator, 5–2–6
MALSR/ODALS, 3–4–2
Man–Portable Air Defense Systems (MANPADS) Alert, 10–2–5
Manual Input of Computer Assigned Beacon Codes, 2–2–2
Medium Intensity Runway Lights, 3–4–4
Merging Target Procedures, 5–1–3
Military DVFR Departures, 2–2–1
Military Operations above FL 600, 9–2–7
Military Procedures, 2–1–6
Military Single Frequency Approaches, 5–10–5
Military Special Use Frequencies, 9–2–8
Military Training Routes, 9–2–2
Minimum En Route Altitudes, 4–5–2
Minimum Fuel, 2–1–4
MIRL, 3–4–4
Missed Approach, 4–8–8
Missed Approach (Radar Approach), 5–10–4
Mixed Environment (Beacon), 5–2–1
Mode C Intruder Alert (Host), 5–14–1
Monitoring Radios, 2–4–1
MSAW, 5–15–2

N
NAVAID Fixes, 2–5–2
NAVAID Malfunctions, 2–1–5
NAVAID Terms, 2–5–1
NAVAID Use Limitations, 4–1–1
No–Gyro Approach, 5–10–2
Nondiscrete Environment (Beacon), 5–2–1
Nonradar, 6–1–1
Nonradar Initial Separation of Departing and Arriving Aircraft, 6–3–1
Nonradar Initial Separation of Successive Departing Aircraft, 6–2–1
Nonradar Timed Approaches, 6–7–1
Nonstandard Formation/Cell Operations, 9–2–10
NORAD Special Flights, 9–2–9
North American ICAO Region, 8–10–1
North American Route Program (NRP), 2–2–5
North Atlantic ICAO Region, 8–7–1
Notes, 1–2–2
Number Clarification, 2–4–8
Numbers Usage, 2–4–6
Observed Abnormalities, 3–1–5

Oceanic Data Entries, 2–3–5
Oceanic Navigational Error Reporting (ONER) Procedures, 8–1–1
Oceanic Procedures, 8–1–1
Oceanic Separation, 8–1–1
Oceanic Transition Procedures, 8–5–1
Oceanic VFR Flight Plans, 8–1–1
Offshore Procedures, 8–1–1
Offshore Transition Procedures, 8–5–1
Pacific ICAO Region, 8–9–1
PAR Approaches – Terminal, 5–12–1
Parachute Operations, 9–7–1
Parallel Dependent ILS/MLS Approaches, 5–9–6
Passing or Diverging, 5–5–4
Personnel on Runways, 3–1–2
Pilot Acknowledgment/Read Back, 2–4–1
PIREP Information, 2–6–1
Point Out, 5–4–4
Position Determination (Airports), 3–1–2
Position Information (Radar), 5–3–2
Position Report (Oceanic), 8–1–1
Position Reporting (Radar), 5–1–4
Position Responsibilities, 2–10–1
Practice Approaches, 4–8–8
Practice Precautionary Approaches, 3–10–10
Prearranged Coordination, 5–4–5
Precision Approach Critical Area, 3–7–4

Obstruction Lights, 3–4–5
Oceanic ATC System, 13–2–1
Oceanic Coordination, 8–2–1

Precision Approach Path Indicators (PAPI), 3–4–1
Precision Obstacle Free Zone (POFZ), 3–7–5
Preventive Control (Airports), 3–1–1
Primary Radar Identification Methods, 5–3–1
Priority Interruptions, 2–4–3
Procedural Letters of Agreement, 1–1–2
Procedural Preference, 2–1–1

Questionable Identification, 5–3–2

Radar Approaches – Terminal, 5–10–1
Radar Arrivals, 5–9–1
Radar Beacon Changes for Military Aircraft, 4–7–2
Radar Beacon Code Changes, 5–2–2
Radar Departures, 5–8–1
Radar Fix Posting, 5–1–4
Radar Identification, 5–3–1
Radar Identification Status, 5–3–2
Radar Presentation and Equipment Performance, 5–1–1
Radar Separation, 5–5–1
Radar Separation Application, 5–5–1
Radar Separation Minima, 5–5–2
Radar Separation Vertical Application, 5–5–4
Radar Service Limitations, 5–1–3
Radar Service Termination, 5–1–4
Radar Use, 5–1–1
Radar–Only Mode, 3–6–2
Radio and Interphone Communications, 2–4–1
Radio Communications, 2–1–7, 2–4–1
Radio Failure (Beacon), 5–2–3
Radio Frequency Changes for Military Aircraft, 4–7–2
Radio Message Format, 2–4–3
Receiver-Only Acknowledgment (ATCT), 3–2–1
Receiving Controller Handoff, 5–4–3
Recording Information, 2–2–1

Reduced Vertical Separation Minimum (RVSM), 2–1–12
Reduction of Route Protected Airspace (Oceanic), 8–4–3

[References are to page numbers]

References, 1–2–3
REIL, 3–4–1
Relayed Approach Clearance, 4–8–7
Release Times, 4–3–6
Reporting Essential Flight Information, 2–1–5
Reporting Weather Conditions, 2–6–5
Responsibility Transfer to RCC, 10–3–2
Rotating Beacon, 3–4–5
Route Amendments, 4–2–1
Route and NA V AID Description, 2–5–1
Route Assignment, 4–4–1
Route Structure Transitions, 4–4–2
Route Use, 4–4–1
Routes in Class G Airspace, 4–4–3
Runway Centerline Lights, 3–4–4
Runway Edge Lights, 3–4–3
Runway End Identifier Lights, 3–4–1
Runway Exiting, 3–10–7
Runway Proximity, 3–7–4
Runway Selection, 3–5–1
RVR/RV, 2–8–1
RVSM, 2–1–12

S
Safety Alert, 2–1–3
Safety Management System (SMS), 1–1–2
Same Runway Separation (Arrival), 3–10–2
Same Runway Separation (Departure), 3–9–4
SAR, 10–3–1
SAR Information to be Forwarded to ARTCC, 10–3–1
SAR Information to be Forwarded to RCC, 10–3–1
Sea Lane Operations, 3–12–1
Search and Rescue, 10–3–1
Sector Eligibility, 5–14–2
Security Notice (SECNOT), 9–2–5
Selected Altitude Limits, 5–14–2
Separation from Airspace Reservations, 8–6–1
Separation from Obstructions, 5–5–6
Sequence/Spacing Application, 3–8–1
Sequenced Flashing Lights, 3–4–2
SFA, 4–7–1
Side–Step Maneuver, 4–8–8
Simulated Flameout (SFO) Approaches, 3–10–10
Simultaneous Approach and Runway Edge Light Operation, 3–4–4
Simultaneous Departures (Radar), 5–8–1
Simultaneous Independent Dual ILS/MLS Approaches – High Update Radar, 5–9–9
Simultaneous Independent ILS/MLS Approaches – Dual & Triple, 5–9–7
Simultaneous Landings or Takeoffs (Helicopter), 3–11–3
Simultaneous Offset Instrument Approaches (SOIA)–High Update Radar, 5–9–11
Simultaneous Opposite Direction Operation, 3–8–2
Simultaneous Same Direction Operation, 3–8–1
Single Frequency Approaches, 4–7–1
Spacing and Sequencing (ATCT), 3–8–1
Special Flights, 9–1–1
Special Interests Sites, 9–2–4
Special Operations, 9–2–1
Special Use Airspace, 9–3–1
Special VFR, 7–5–1
Specifying Altitude (Approaches), 4–8–7
Speed Adjustment, 5–7–1
Speed Adjustment Minima, 5–7–3
Speed Adjustment Termination, 5–7–4
Standby or Low Sensitivity Operation, 5–2–5
STOL Runways, 3–5–1
Stop–and–Go Low Approach, 3–8–1
Successive Departures (Radar), 5–8–1
Surface Area Restrictions, 3–1–5
Surface Areas, 2–1–7
Surveillance Approaches – Terminal, 5–11–1
SVFR, 7–5–1

[References are to page numbers]

Takeoff Clearance, 3–9–10
Target Markers, 5–3–3
Target Resolution, 5–5–2
Target Separation, 5–5–1
Taxi and Ground Movement Operations, 3–7–2
Taxi and Ground Movement Procedures, 3–7–1
Taxiway Lights, 3–4–5
Teletype Flight Data Format – U.S. ARTCCs – Canadian ACCs, 2–2–4
Temporary Moving Airspace Reservations, 8–6–1
Temporary Stationary Airspace Reservations, 8–6–1
Terminal Automation Systems Identification Methods, 5–3–2
Terminal Data Entries (Strips), 2–3–6
Terminal Radar Service Area, 7–7–1
Terminal Radar/Nonradar Team Position Responsibilities, 2–10–2
Terrain Awareness Warning System (TAWS) Alerts, 2–1–13
Through Clearances, 4–2–3
Timely Information (ATCT), 3–3–1
Touch–and–Go Approach, 4–8–9
Touch–and–Go Low Approach, 3–8–1
Touchdown Zone Lights, 3–4–4
Tower Team Position Responsibilities, 2–10–4
TPX–42 – Terminal, 5–16–1
Track Separation (Oceanic), 8–4–4
Track Suspend Function (ARTS), 5–15–2
Traffic Advisories, 2–1–9
Traffic Information (Airports), 3–1–2
Transfer of Jurisdiction, 4–7–4
Transfer of Position (SOP), Appendix D–1
Transfer of Radar Identification, 5–4–1
Transfer of Radar Identification – Methods, 5–4–1
Transfer of Radar Identification – Terms, 5–4–1
Switching ILS/MLS Runways, 4–7–6

T

Tailwind Components, 3–5–1
Transfer of Radar Identification – Traffic, 5–4–2
Transferring Controller Handoff, 5–4–2
Transmit Proposed Flight Plan, 2–2–3
TRSA, 7–7–1
TRSA Separation, 7–7–1

U

Unauthorized Laser Illumination of Aircraft, 2–9–2, 10–2–5
Unidentified Flying Object (UFO) Reports, 9–8–1
Unmanned Free Balloons, 9–6–1
Unmonitored NAVAIDs (Holding), 4–6–3
Unsafe Runway Information, 3–3–1
USAF/USN Undergraduate Pilots (Strips), 2–3–10
Use of Active Runways, 3–1–1
Use of MARSA, 2–1–5
Use of PAR for Approach Monitoring – Terminal, 5–13–1
Use of Tower Radar Displays, 3–1–5
User Request Evaluation Tool (URET), 13–1–1

V

Validation of Mode C Readout, 5–2–6
VASI, 3–4–1
Vectoring, 5–6–1
Vectors Across Final Approach Course, 5–9–2
Vectors Below Minimum Altitude, 5–6–2
Vectors for Visual Approach, 7–4–1
Vectors to Final Approach Course, 5–9–1
Vehicles on Runways, 3–1–2
Vertical Application Exceptions, 5–5–4
Vertical Separation (Nonradar), 6–6–1
Vertical Separation Minima, 4–5–1
VFR – IFR Flights, 4–2–3
VFR Aircraft in Weather Difficulty, 10–2–2
VFR Basic Radar Service (Terminal), 7–6–1
VFR Code Assignments, 5–2–3
VFR Conditions, 7–1–1

[References are to page numbers]

Visual Approach Slope Indicators, 3–4–1
Visual Approaches, 7–4–1
Visual Holding of VFR Aircraft, 7–1–1
Visual Signals (ATCT), 3–2–1
Visually Scanning Runways, 3–1–6
Volcanic Ash, 10–2–6

W

Wake Turbulence, 2–1–9
Wake Turbulence Cautionary Advisories, 2–1–9
Wake Turbulence Separation for Intersection Departures, 3–9–6
Warning Signal (ATCT), 3–2–1

VFR Release of IFR Departure, 4–3–8
VFR on–top, 7–3–1
VFR on–top (NAVAID Use), 4–1–2
Visual, 7–1–1

Washington, DC, Special Flight Rules Area (DC SFRA), 9–2–4
Weather and Chaff Services, 2–6–2
Weather Deviations, 8–9–4
Weather Deviations in North Atlantic (NAT) Airspace, 8–7–2
Weather Familiarization, 2–6–1
Weather Information, 2–6–1
Weather Information (Arrivals), 4–7–3
Weather Reconnaissance Flights, 9–2–9
Withholding Landing Clearance, 3–10–7
Word Meanings, 1–2–1
Words and Phrases (Communications), 2–4–5
BRIEFING GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Table of Contents

<table>
<thead>
<tr>
<th>Paragraph Number</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2−1−13</td>
<td>FORMATION FLIGHTS</td>
<td>BG-3</td>
</tr>
<tr>
<td>2−1−27</td>
<td>TCAS RESOLUTION ADVISORIES</td>
<td>BG-3</td>
</tr>
<tr>
<td>2−1−29</td>
<td>TERRAIN AWARENESS WARNING SYSTEM (TWAS) ALERTS</td>
<td>BG-3</td>
</tr>
<tr>
<td>2−4−3</td>
<td>PILOT ACKNOWLEDGMENT/READ BACK</td>
<td>BG-7</td>
</tr>
<tr>
<td>3−1−8</td>
<td>LOW LEVEL WIND SHEAR/MICROBURST ADVISORIES</td>
<td>BG-3</td>
</tr>
<tr>
<td>3−9−8</td>
<td>INTERSECTION RUNWAY SEPARATION</td>
<td>BG-9</td>
</tr>
<tr>
<td>3−10−4</td>
<td>INTERSECTING RUNWAY SEPARATION</td>
<td>BG-9</td>
</tr>
<tr>
<td>4−2−8</td>
<td>IFR−VFR AND VFR−IFR FLIGHTS</td>
<td>BG-9</td>
</tr>
<tr>
<td>4−5−7</td>
<td>ALTITUDE INFORMATION</td>
<td>BG-3</td>
</tr>
<tr>
<td>4−8−11</td>
<td>PRACTICE APPROACHES</td>
<td>BG-3</td>
</tr>
<tr>
<td>5−5−4</td>
<td>MINIMA</td>
<td>BG-10</td>
</tr>
<tr>
<td>5−5−7</td>
<td>PASSING OR DIVERGING</td>
<td>BG-10</td>
</tr>
<tr>
<td>5−8−3</td>
<td>SUCCESSIVE OR SIMULTANEOUS DEPARTURES</td>
<td>BG-12</td>
</tr>
<tr>
<td>5−9−1</td>
<td>VECTORS TO FINAL APPROACH COURSE</td>
<td>BG-15</td>
</tr>
<tr>
<td>5−15−6</td>
<td>CA/MCI</td>
<td>BG-3</td>
</tr>
<tr>
<td>7−4−4</td>
<td>APPROACHES TO MULTIPLE RUNWAYS</td>
<td>BG-3</td>
</tr>
<tr>
<td>8−9−8</td>
<td>PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES</td>
<td>BG-3</td>
</tr>
<tr>
<td></td>
<td>IN OCEANIC CONTROLLED AIRSPACE</td>
<td></td>
</tr>
<tr>
<td>9−2−21</td>
<td>NONSTANDARD FORMATION/CELL OPERATIONS</td>
<td>BG-3</td>
</tr>
<tr>
<td>9−2−22</td>
<td>OPEN SKIES TREATY AIRCRAFT</td>
<td>BG-3</td>
</tr>
</tbody>
</table>
1. PARAGRAPH NUMBER AND TITLE:
2–1–13. FORMATION FLIGHTS
2–1–27. TCAS RESOLUTION ADVISORIES
2–1–29. TERRAIN AWARENESS WARNING SYSTEM (TAWS) ALERTS
3–1–8. LOW LEVEL WIND SHEAR/MICROBURST ADVISORIES
4–5–7. ALTITUDE INFORMATION
4–8–11. PRACTICE APPROACHES
5–15–6. CA/MCI
7–4–4. APPROACHES TO MULTIPLE RUNWAYS
8–9–8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC
CONTROLLED AIRSPACE
9–2–21. NONSTANDARD FORMATION/CELL OPERATIONS
9–2–22. OPEN SKIES TREATY AIRCRAFT

2. BACKGROUND: FAA Order 7110.65 uses several terms that have the same meaning and intent when
describing aircraft separation applied by controllers. Paragraph 1–2–1, Word Meanings defines Approved
Separation as “separation in accordance with the applicable minima in this order.” There is no definition or
reference to the meaning of “standard separation,” however the intent of this term is identical to the definition of
“approved separation.”

3. CHANGE:

OLD
2–1–13. FORMATION FLIGHTS
Title through a

NOTE–
1. Separation responsibility between aircraft within the
formation during transition to individual control rests
with the pilots concerned until standard separation has
been attained.

OLD
2–1–27.TCAS RESOLUTION ADVISORIES
Title through b

c. Once the responding aircraft has begun a
maneuver in response to an RA, the controller is not
responsible for providing standard separation
between the aircraft that is responding to an RA 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 TCAS
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.

NEW
2–1–13. FORMATION FLIGHTS
No Change

NOTE–
1. Separation responsibility between aircraft within the
formation during transition to individual control rests
with the pilots concerned until approved separation has
been attained.

NEW
2–1–27. TCAS RESOLUTION ADVISORIES
No Change

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

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

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

Title through a

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:

   b1
   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.

NEW

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

No Change

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

   No Change

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

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

OLD

3–1–8. LOW LEVEL WIND SHEAR/ MICROBURST ADVISORIES

Title through c2

3. Once the responding aircraft has initiated a wind shear escape maneuver, the controller is not responsible for providing standard separation between the aircraft that is responding to an escape and any other aircraft, airspace, terrain, or obstacle. Responsibility for separation resumes when one of the following conditions are met:

   c3(a)
   (1) A crew member informs ATC that the wind shear escape maneuver is complete and ATC observes that standard separation has been re-established, or

NEW

3–1–8. LOW LEVEL WIND SHEAR/ MICROBURST ADVISORIES

No Change

3. Once the responding aircraft has initiated a wind shear escape maneuver, the controller is not responsible for providing approved separation between the aircraft that is responding to an escape and any other aircraft, airspace, terrain, or obstacle. Responsibility for approved separation resumes when one of the following conditions are met:

   No Change

   (1) A crew member informs ATC that the wind shear escape maneuver is complete and ATC observes that approved separation has been re-established, or

OLD

4–5–7. ALTITUDE INFORMATION

Title through h

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

   NOTE 1 and NOTE 2

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.

NEW

4–5–7. ALTITUDE INFORMATION

No Change

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

   No Change

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

4–8–II. PRACTICE APPROACHES

**Title** through *NOTE*

a. Separation

1. IFR aircraft practicing instrument approaches must be afforded standard separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 minima until:

**NEW**

4–8–II. PRACTICE APPROACHES

No Change

a. Separation

1. IFR aircraft practicing instrument approaches must be afforded approved separation in accordance with Chapter 3, Chapter 4, Chapter 5, Chapter 6, and Chapter 7 minima until:

**OLD**

5–15–6. CA/MCI

**Title** through c1

2. The inhibit function must only be used to inhibit the display of CA for aircraft routinely engaged in operations where standard separation criteria do not apply.

*NOTE-*
Examples of operations where standard separation criteria do not apply are ADC practice intercept operations and air shows.

**NEW**

5–15–6. CA/MCI

No Change

2. The inhibit function must only be used to inhibit the display of CA for aircraft routinely engaged in operations where approved separation criteria do not apply.

*NOTE-*
Examples of operations where approved separation criteria do not apply are ADC practice intercept operations and air shows.

**OLD**

7–4–4. APPROACHES TO MULTIPLE RUNWAYS

**Title** through b1

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

**NEW**

7–4–4. APPROACHES TO MULTIPLE RUNWAYS

No Change

2. When the aircraft flight paths intersect, ensure another form of approved separation is maintained until visual separation is provided.

**OLD**

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.

**NEW**

1. Parallel runways separated by less than 2,500 feet. Unless approved 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.
(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** through c3

(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.

**OLD**

8–9–8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC CONTROLLED AIRSPACE

Aircraft must request an ATC clearance to deviate. Since aircraft will not fly into known areas of weather, weather deviation requests should take priority over routine requests. If there is no traffic in the horizontal dimension, ATC must issue clearance to deviate from track; or if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation. If there is conflicting traffic and ATC is unable to establish standard separation, ATC must:

**NEW**

8–9–8. PROCEDURES FOR WEATHER DEVIATIONS AND OTHER CONTINGENCIES IN OCEANIC CONTROLLED AIRSPACE

Aircraft must request an ATC clearance to deviate. Since aircraft will not fly into known areas of weather, weather deviation requests should take priority over routine requests. If there is no traffic in the horizontal dimension, ATC must issue clearance to deviate from track; or if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation. If there is conflicting traffic and ATC is unable to establish approved separation, ATC must:

**OLD**

9–2–21. NONSTANDARD FORMATION/CELL OPERATIONS

Title through c

d. Apply standard separation criteria between the approved nonstandard formation/cell envelope and nonparticipating aircraft.

**NEW**

9–2–21. NONSTANDARD FORMATION/CELL OPERATIONS

No Change

d. Apply approved separation criteria between the approved nonstandard formation/cell envelope and nonparticipating aircraft.

(a) Approved 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, 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.

No Change

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

(b) When aircraft flight paths intersect, another form of approved separation must be maintained until visual separation is provided.
OLD

9–2–22. OPEN SKIES TREATY AIRCRAFT

Title through b

c. OPEN SKIES (F and D) Treaty aircraft, while maintaining compliance with ATC procedures, must have priority over activities in special use airspace (SUA) and must be allowed to transit such airspace as filed after appropriate and timely coordination has been accomplished between the using agency and controlling agency. A letter of agreement is required between the using agency and the controlling agency for Open Skies F and D aircraft to transit active SUA. When Open Skies F and D aircraft transit SUA, an ATC facility must provide standard separation services at all times.

(1) For SUA that has an ATC facility providing services to the area, provide standard separation. If the ATC facility is unable to provide standard separation from the activities in the SUA, the using agency must confirm that all operations in the SUA have ceased.

NEW

9–2–22. OPEN SKIES TREATY AIRCRAFT

No Change

c. OPEN SKIES (F and D) Treaty aircraft, while maintaining compliance with ATC procedures, must have priority over activities in special use airspace (SUA) and must be allowed to transit such airspace as filed after appropriate and timely coordination has been accomplished between the using agency and controlling agency. A letter of agreement is required between the using agency and the controlling agency for Open Skies F and D aircraft to transit active SUA. When Open Skies F and D aircraft transit SUA, an ATC facility must provide approved separation services at all times.

(1) For SUA that has an ATC facility providing services to the area, provide approved separation. If the ATC facility is unable to provide approved separation from the activities in the SUA, the using agency must confirm that all operations in the SUA have ceased.

1. PARAGRAPH NUMBER AND TITLE: 2-4-3. PILOT ACKNOWLEDGMENT/READ BACK

2. BACKGROUND: Air traffic control communications are largely comprised of human voice two-way radio transmissions. Phraseology discipline is the glue that maintains the predictability and efficiency of the world’s busiest airspace. The evolution of the 7110.65 has fallen behind on the topic of pilot acknowledgement and read back of ATC instructions and clearances. The Agency has taken definitive rulemaking positions on the respective roles and responsibilities via the Aeronautical Information Manual (AIM) and the Federal Register; however, the 7110.65 does not currently reflect this. Updating Paragraph 2-4-3 to synchronize its message with that of other operative Agency documents moves the NAS further along the safety pathway by elevating 7110.65 read back roles and expectations to the same standard.

3. CHANGE:

OLD

2-4-3. PILOT ACKNOWLEDGMENT/READ BACK

Add

a. When issuing clearances or instructions, ensure acknowledgment by the pilot. If no acknowledgment is received, attempt to re-establish contact. If attempts are unsuccessful, advise the FLM/CIC.

NEW

2-4-3. PILOT ACKNOWLEDGMENT/READ BACK

Ensure pilots acknowledge all Air Traffic Clearances and ATC Instructions. When a pilot reads back an Air Traffic Clearance or ATC Instruction:

a. Ensure that items read back are correct.
NOTE–
Pilots may acknowledge clearances, instructions, or other information by using “Wilco,” “Roger,” “Affirmative,” or other words or remarks.

REFERENCE–
AIM, Para 4-2-3, Contact Procedures.

b. If altitude, heading, or other items are read back by the pilot, ensure the read back is correct. If incorrect or incomplete, make corrections as appropriate.

Add

b. Ensure the read back of hold short instructions, whether a part of taxi instructions or a LAHSO clearance.

Add

c. Ensure pilots use call signs and/or registration numbers in any read back acknowledging an Air Traffic Clearance or ATC Instruction.

NOTE–
1. ATC Clearance/Instruction Read Back guidance for pilots in the AIM states:
   a. Although pilots should read back the “numbers,” unless otherwise required by procedure or controller request, pilots may acknowledge clearances, control instructions, or other information by using “Wilco,” “Roger,” “Affirmative,” or other words or remarks with their aircraft identification.
   b. Altitudes contained in charted procedures, such as departure procedures, instrument approaches, etc., need not be read back unless they are specifically stated by the controller.
   c. Initial read back of a taxi, departure or landing clearance should include the runway assignment, including left, right, center, etc. if applicable.

2. Until a pilot acknowledges a controller’s clearance or instruction, a controller cannot know if a pilot will comply with the clearance or remain as previously cleared.

EXAMPLE–
“Climbing to Flight Level three three zero, United Twelve” or “November Five Charlie Tango, roger, cleared to land runway four left.”

REFERENCE–
P/CG Term – Air Traffic Clearance
P/CG Term – ATC Instructions
JO 7110.65, 3-7-2, Taxi and Ground Movement Operations
JO 7110.65, 10-4-4, Communications Failure
AIM Para 4-2-3, Contact Procedures
AIM Para 4-4-7 Pilot Responsibility upon Clearance Issuance
AIM Para 6-4-1, Two-way Radio Communications Failure
Federal Register, April 1, 1999 14 CFR Part 91 Pilot Responsibility for Compliance with ATC Clearances and Instructions
1. PARAGRAPH NUMBER AND TITLE: 3–9–8. INTERSECTION RUNWAY SEPARATION

2. BACKGROUND: An issue was raised from facilities utilizing parallel runways that the separation criteria for flights whose flight paths intersect after departure could not be easily found. The paragraph that explains the procedure is titled Intersecting Runway Separation. The title does not indicate that intersecting flight paths are included.

3. CHANGE:

OLD
3–9–8. INTERSECTION RUNWAY OPERATIONS

NEW
3–9–8. INTERSECTION RUNWAY/INTERSECTING FLIGHT PATH OPERATIONS

OLD
3–10–4. INTERSECTING RUNWAY SEPARATION

NEW
3–10–4. INTERSECTING RUNWAY/INTERSECTING FLIGHT PATH SEPARATION

1. PARAGRAPH NUMBER AND TITLE: 4–2–8. IFR-VFR AND VFR-IFR FLIGHTS

2. BACKGROUND: Current guidance in FAA Order JO 7110.65, Paragraph 4-2-8 requires controllers to question pilots as to their ability to provide terrain and obstruction clearance only when controllers are aware that the pilot cannot provide such clearance. Reported weather available to the controller, pilot reports or weather forecasts may not provide the controller with enough information to make this determination.

3. CHANGE:

OLD
4–2–8. IFR-VFR AND VFR-IFR FLIGHTS
   Title through c
   d. When VFR aircraft operating below the minimum altitude for IFR operations, requests an IFR clearance and you are aware that the pilot is unable to climb in VFR conditions to the minimum IFR altitude:

   d1 Add

NEW
4–2–8. IFR-VFR AND VFR-IFR FLIGHTS
   No Change
   d. When VFR aircraft operating below the minimum altitude for IFR operations requests an IFR clearance and the pilot informs you, or you are aware, that they are unable to climb in VFR conditions to the minimum IFR altitude:

   No Change

   PHRASEOLOGY– (Aircraft call sign), ARE YOU ABLE TO MAINTAIN YOUR OWN TERRAIN AND OBSTRUCTION CLEARANCE UNTIL REACHING (appropriate MVA/MIA/MEA/OROCA)

   No Change

2. If the pilot is able to maintain their own terrain and obstruction clearance, issue the appropriate IFR clearance as prescribed in para 4–2–1, Clearance Items, and para 4–5–6, Minimum En Route Altitudes.

3. If the pilot states that they are unable to maintain terrain and obstruction clearance, instruct the pilot to maintain VFR and to state intentions.
1. PARAGRAPH NUMBER AND TITLE: 5-5-4. MINIMA

2. BACKGROUND: The application of wake turbulence separation and its minima are based on the effect of wake turbulence that occurs behind large, heavy, and super aircraft. Increased separation for trailing aircraft ensures that the likelihood of encountering wake effects are minimized. The type of ATC service or equipment is not a factor as wake turbulence is an aircraft-to-aircraft issue. Paragraph 5-5-4g, Minima, implies that only terminal facilities need apply this increased minima as enroute facilities generally do not sequence aircraft to the landing threshold. There are instances where enroute facilities provide approach services to airports not served by its own approach control facility and must provide separation to the landing threshold. As such, the increase in separation for wake turbulence is applicable.

3. CHANGE:

### OLD
5-5-4. MINIMA

#### Title through f

g. TERMINAL. In addition to subpara f, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

**NOTE** through g3

Add

### NEW
5-5-4. MINIMA

No Change

g. In addition to subpara f, separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

No Change

**If the landing threshold cannot be determined,** apply the above minima as constant or increasing at the closest point that can be determined prior to the landing threshold.

1. PARAGRAPH NUMBER AND TITLE: 5-5-7. PASSING OR DIVERGING

2. BACKGROUND: In August 2013, Terminal Procedures issued a GENOT that directed the use of En Route separation minima during the application of passing or diverging, by Terminal facilities, when using long-range radar or a combination of long range and short range radar due to the update rates of each applicable surveillance system. Over the past several months, Terminal Procedures has reviewed data identified in the following report:

DOT-FAA-AFS-440-19, Safety Study Report for Terminal Radar Separation Passing or Diverging Standards Applied to En Route Display Systems Using ASR-9 and ARSR Radars. Based on statistical data, Terminal facilities may use passing or diverging separation standards when using long range radars, provided that 45 degrees divergence is used versus the standard 15 degrees.

3. CHANGE:

### OLD

5-5-7. PASSING OR DIVERGING

a. TERMINAL. In accordance with the following criteria, all other approved separation may be discontinued and passing or diverging separation applied when:

### NEW

5-5-7. PASSING OR DIVERGING

No Change
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.

   Add

**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.

Add

Add

Add

Add

**REFERENCE**–
FAAO JO 7110.65, Para 1-2-2, Course Definitions.

2. Single Site ARSR or FUSION Mode when target refresh is only from an ARSR or when in FUSION Mode – ISR is displayed

(a) Aircraft are on opposite/reciprocal courses and you have observed that they have passed each other; or aircraft are on same or crossing courses/assigned radar vectors and one aircraft has crossed the projected course of the other, and the angular difference between their courses/assigned radar vectors is at least 45 degrees.

   No Change

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

**REFERENCE**–
FAAO JO 7110.65, Para 1-2-2, Course Definitions.

**NOTE**–
Two aircraft, both assigned radar vectors with an angular difference of at least 45 degrees, is considered a correct application of this paragraph.
Add

(b) The tracks are monitored to ensure that the primary targets, beacon control slashes, FUSION target symbols, or full digital terminal system primary and/or beacon target symbols will not touch.

Add

3. Although approved separation may be discontinued, the requirements of para 5-5-4, Minima, subparagraphs f and g apply when operating behind a heavy jet/B757.

REFERENCE—
FAAO JO 7110.65, Para 1–2–2, Course Definitions.

NOTE—
1. Apply en route separation rules when using long-range or multi-sensory radar.

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

1. PARAGRAPH NUMBER AND TITLE: 5-8-3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

2. BACKGROUND: In August 2013, the MITRE Corporation published a study (MP130441) entitled “Engineering Analysis for Reduced-Divergence Departure Operations” that examined both aircraft separation and relative heading to determine a single reduced value (from the required 15 degree divergence angle currently prescribed in Paragraph 5-8-3, Successive and Simultaneous Departures) that would be appropriate for all Area Navigation (RNAV) departure operations. Using a conservative analytical approach, the analysis determined that 10 degrees course divergence for RNAV departures from the same runway or simultaneous departures from parallel runways separated by 2500 feet or greater would achieve a level of safety equal to or better than that experienced by conventional departures using 15 degrees course divergence. The Flight Technologies and Procedures Division (AFS-400) agreed with this assessment via memorandum, dated September 17, 2013.

3. CHANGE:

OLD

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.

NEW

5-8-3. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

No Change

No Change
NOTE—
I. 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.

NOTE 2 and 3
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.)

Add

NOTE—
I. FAAO 8260.46, Departure Procedure (DP) Program, and FAAO 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), Volume 4, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet above the departure end of runway (DER) elevation before a turn is commenced. TERPS criteria ensures obstacle clearance with a climb gradient of 200 feet per nautical mile from the DER. “Immediately after departure” is considered to be any turn that provides at least 15 degrees of divergence that commences no later than 2 miles from the DER.

No Change
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 by 15 degrees or more immediately after departure or 10 degrees or more when both aircraft are departing the same runway and both are flying an RNAV SID. (See FIG 5–8–1, FIG 5–8–2, and FIG 5–8–3.)

NOTE—
RNAV SIDs specific to this paragraph are those SIDs constructed with a specific lateral path that begins at the DER.

OLD

Fig 5-8-1
Successive Departures

OLD
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.)

Add

NOTE—RNAV SIDs specific to this paragraph are those SIDs constructed with a specific lateral path that begins at the DER.
1. PARAGRAPH NUMBER AND TITLE: 5-9-1. VECTORS TO FINAL APPROACH COURSE

2. BACKGROUND: In November 2008, the Vice President of Terminal Services crafted a memorandum to the field articulating new requirements derived from the finding of a Safety Risk Management Panel (SRMP) concerning turns onto final. This SRMP was the result of audits conducted in the field on the separation methods used while vectoring aircraft to intercept the final approach course by the Air Traffic Oversight Service (AOV). One of the directives of the panel concerned the need to ensure the establishment of vertical separation during turn-on to final from opposing base legs to a single runway or parallel runways separated by less than 4,300 feet. However, this direction did not get incorporated into FAA Order 7110.65 for single runway operations or parallel runways operations separated by less than 2,500 feet.

3. CHANGE:

OLD

5-9-1. VECTORS TO FINAL APPROACH COURSE

Title through Exception
Add

b and c

NEW

5-9-1. VECTORS TO FINAL APPROACH COURSE

No Change

b. Provide a minimum of 1,000 feet vertical separation between aircraft on opposite base legs unless another form of approved separation is established during turn-on to final approach.

Re-Letter c and d
NOTE—
A pilot request for an “evaluation approach,” or a “coupled approach,” or use of a similar term, indicates the pilot desires the application of subparas a and b.

Paragraph d

NOTE—
A pilot request for an “evaluation approach,” or a “coupled approach,” or use of a similar term, indicates the pilot desires the application of subparas a and c.

Re-Letter e